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CONFORM: CONSTRAINED FORCE MODEL. VOLUME II. DETAILED MODEL DESCRIPTION, PROGRAM DOCUMENTATION, AND OPERATOR'S GUIDE

Richard H. Gramann, et al

Research Analysis Corporation

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CONFORM Constrained Force Model

Volume II—Detailed Model Description,
Program Documentation,
and Operator's Guide

by Richard H. GramannG. Robert Doenges, Jr.W. Bruce Taylor



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13- ABSTRACT

11. SUPPLEMENTARY NOTES

The Constrained Force Model, CONFORM, is designed to assist force planners in the task of adjusting proposed theater troop lists to satisfy troop ceilings, fiscal and other constraints. The model is especially suited for troop list evaluations and analyses concerned with support allocation role, constrained force design, support shortfalls and theater force costing.

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CONFORM, using an extension of linear programming called goal programming, is an optimization model that integrates mathematical programming into the support roundout process thereby enabling the planner to control the support shortfalls that occur when adjustments are made in troop lists. The model is operational at the US Army Management System Support Agency.

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DETAILED MODEL DESCRIPTION, PROGRAM DOCUMENTATION, AND OPERATOR'S GUIDE

Chapter 1

INTRODUCTION

CONFORM is an automated mathematical modeling system that aids the Army force planner in developing alternative theater forces. It is an extension of the Modular Force Planning System (Battalion Slice) which automates the theater combat force roundout process. Both the Battalion Slice and CONFORM are operational at the US Army Management Systems Support Agency (USAMSSA).

The usual Battalion Slice-CONFORM relationship involves the development of an "unconstrained base case" force by the Battalion Slice, and the modeling of that case plus the addition of specified resource and relational constraints in one or more CONFORM models to generate alternatives to the base case.

Specifically, CONFORM models are linear programming (LP) models. The reader is assumed to be familiar with LP in general and/or LP modeling techniques. CONFORM variables represent such things as the number of each type of Army unit in a force, and the amount of deviation of that number from allocation rule requirements for that unit and/or from a target value. The model equations represent such things as the setting of combat units at desired levels in the force, Battalion Slice allocation rules for support units, limits on the strength and cost of all combat units, all support units, the total force, and support units aggregated by functional area, and limits on the amount of unit deviations from allocation rule requirements and targets. Alternative objective functions include the strength and cost of all combat units, all support units, the total force, and support unit aggregates, combat unit effectiveness indices, and unit deviations.

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The solution of a CONFORM LP model is a force that satisfies all modeled conditions and constraints and which is best among all such forces with respect to a chosen objective function.

The specific LP model for each CONFORM run is automatically built by the CONFORM LP matrix generator—CONGEN. The LP model is solved by a commercially available mathematical programming system (MPS)—currently IEM's MPS/360 at USAMSSA. The model solution as reported by the commercial systems is not appropriate for force planner reports or convenient for reading by the CONFORM operator/LP analyst. Optional reports that are readable by the force planner may be automatically produced from the LP model solution by the CONFORM LP report writer—CONREP.

The Major mources of input data for CONFORM are the allocation rule coefficients of the Battalion Slice model, cost data of the Force Cost Information System (FCIS) which is also maintained at USAMSSA, and user-specified constraints and options. The CONFORM interface with both Battalion Slice and FCIS is automated. The FCIS was formerly called the Cost Analysis System (COSTALS).

Thus, CONFORM is an automated mathematical modeling system—LP matrix generator, solution system, report writer—some of whose inputs are actually other force-planning models or systems.

This volume is addressed to the CONFORM operators—those who must translate the force planner's run schedule into an appropriate set of CONFORM runs, who must prepare data and execute the runs, and who may be required to alter or further develop the model. This volume is a detailed model description, computer program documentation, and thus an operator's guide. The reader is assumed also to be familiar with the contents of Volume I of this report, which is a more general description of CONFORM, intended primarily to give the force planner a general understanding of CONFORM and its use.

Chapter 2

DETAILED MODEL DESCRIPTION

INTRODUCTION

This chapter describes in detail the logic of basic and optional CONFORM LP model structure. As an introduction the simplest model that may be automatically generated by the CONFORM LP matrix generator, CONGEN, is described.

The simplest model is one whose solution is identical to that of a Battalion Slice run in which there were no "optional," "augmentation," "deletion," or "maximum-allowable" units. This model would have one variable or column for each combat and support unit type. These variables represent the number of each unit type in the force. There would be one equation or row for each combat unit type, setting the corresponding variable to the right hand side (RHS) value. There would also be one row for each support unit type, representing the allocation rules for that unit, both allocation to combat and to support units, and equating the corresponding variable to these allocation rule requirements. In addition there would be six resource limit rows and six alternative objective functions—one of each for strength and cost of the combat force, support force, and total force. The resource limit rows should not be constraining. Since the combat force is specified by RHS values and the support force is specified by those values and the allocation rules, there is only one feasible solution to this model (and it is the optimal one). One of the six alternative objective functions still must be chosen as the one for the run, however; and its choice determines the type of marginal value information that may be obtained from the run. This point will be discussed more fully in the section on Marginal Values.

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A mathematical statement of this simplest model is:

	XS. + *** NSUPPLE NSUPPLE	Minimize) ac1XC1 + * * GROMER* * SE1XS1 + + SENSUPHER RISUPHE		CALLES CARSUPRE MSUPPE	CC1 XC1 + CC NCOMBET CONDET + CC1 XB1 + · · · · CN NSUPPRET NSUPPRET
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 $e_1, xC_1 + \cdots + e_1, ncongr^{XC}$ ncongr + $(b_1, x - 1)xS_1 + b_1, e^{XS}_2 + \cdots + b_1, nsuper^{XS}$ nsuper Ca, XC, + ... + 2, NOOMER TROOMER + ba, 1XS, + (ba, 2-1)XSa + ... + b2, NSUPRE NSUPRE "NSUPRT, 1 XC1 + · · · * NSUPRT, NCMBT * NSUPRT, 1 XS1 + (DNSUPRT, NSUPRT 1) XS NSUPRT

SS1XS1 + ... + SSNSUPRIXSNSUPRI CS1XS1 + ... + CSNSUPRIXSNSUPRI cc1XC1 + ... + ccNCOMBT XCNCOMBT + cs1XS1 + ... + csNSUPRT NSUPRT SC1XC1 + ... + SCNCOMBETXGNOBE + SS1XS1 + ... + SSNSUPPETXSNSUPPET sc1XC1 + ... + scNCOMBTXCNCOMBT cc1XC1 + · · · + ccNCOMBTXCNCOMBT

s scl

s ssl

s stl

s cel

s csl

s ctl

where

- sc, is the number of men in combat unit j
- XC_j is the number (variable) of combat units j in the force
- NCOMBT is the number of combat unit types
 - ss, is the number of men in support unit j
 - XS, is the number (variable) of support units j in the force

NSUPRT is the number of support unit types

- cc, is the cost of combat unit j
- cs; is the cost of support unit j
- c; is the number (constant) of combat units j in the force
- a; is the number of support units i required per one combat unit j
- b_{ij} is the number of support units i required per one support unit j
- scl is the upper limit on total combat strength
- ssl is the upper limit on total support strength
- stl is the upper limit on total force strength
- ccl is the upper limit on total combat cost
- csl is the upper limit on total support cost
- ctl is the upper limit on total force cost.

COMBAT UNITS

The number of combat unit types included in the Battalion Slice run on which a CONFORM run is based (or a number specified by the user if the source of basic CONFORM data is data hand-prepared by the user rather than that automatically prepared by Battalion Slice; see Chapter 3) is always modeled in CONFORM.

At least one model column and one row are always generated for each combat unit. The column represents the number of units of that type in the force. The name of the column is

["C",1,j,k],

where ijk is the DTM number of the unit. The row relates the column to the RHS value of the row. Frequently this sets the column equal to the RHS value. The type of each row is individually specified by the user. The type may be

≤ RHS value

= RHS value

≥ RHS value

unconstrained by RHS value.

The types of the rows are specified by input datum NCON. The name of the row is the same as that of the column. Figure 1 is an example of this simple structure. When the numbers of units are not fixed—the rows are not equalities—they may be constrained to some ratio or mix. This is discussed in a separate section.

Deviations

The RHS values may be interpreted as target values in certain applications. In these cases additional columns may be generated to represent deviations from the target values. The amount of deviation from the target values of individual units may be constrained, and total deviations may be minimized. One column may be generated to represent longfalls. These columns are dimensioned in numbers of units just as the basic combat unit columns. Shortfall and/or longfall columns for all combat units may be generated. The choice of these options is specified by input data CSSW, CLSW and following. These data requirements are discussed in Chapter 3. The names of the columns are

where ijk is the DTM number of the unit, and "S" and "L" are for short-fall and longfall. Each column generated intersects the basic combat unit row, and a special row that limits the amount of deviation. The shortfall and/or longfall is limited in the model with respect to the number of that unit type in the force. The deviations are usually thought of with respect to the RHS value, then the number of units of that type in the force would be at least 80 percent of the RHS value,

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Fig. 1—Example of Basic Matrix Structure for Combat Units

and thus the shortfalls would be limited to at most 25 percent $(\frac{.20}{.80})$

of the number of units in the force. If the longfalls were limited to at most 20 percent of the RHS value, then the number of units would be at most 120 percent of the RHS value, and thus the longfall would be limited to at most 16-2/3 percent $(\frac{.20}{1.20})$ of the number of units. The names of the rows that impose these constraints are

where ijk is the DTM number of the unit, and "S" and "L" are for short-fall and longfall. The types of the constraint rows, as well as the percentages are individually specified for each unit.

Figure 2 is an example of the matrix structure for one combat unit when shortfalls up to 20 percent of the RHS value are allowed.

Figure 3 is an example of the matrix structure for the same combat unit, with the addition of the allowance of longfalls up to 10 percent of the RHS value.

These deviation columns intersect the alternative objective function TDEV with all non-negative coefficients. Thus minimizing TDEV would minimize the sum of absolute deviations. Shortfalls and longfalls are individually specified to be weighted in the objective function by strength (thousands of men), cost (millions of dollars), number of units, or combat effectiveness. Combat unit effectiveness measures are discussed next.

Effectiveness Indices

Up to six indices of combat unit effectiveness may be represented in a single model. One row is generated for each index to simply calculate its total. The 6-character name and the type of each row as well as the individual coefficients of each unit for each index are user-specified. When the type of a row is "unconstraining," the row may be used as an objective function as well as to simply report the total. Otherwise these rows may be used to impose real constraints on the values of certain measures of combat units. The coefficients of these rows are always non-positive in the model. In this way the



	c 9 0 1	C 9 0 1 s	
C901	+1	+1	= 10.0
C901SP	+.25	-1	≥ 0.0

Fig. 2—Example of Matrix Structure for a Combat Unit with Shortfall Allowed up to 20 percent of the RHS Value

	c 9 0 1	c 9 0 1 s	C 9 0 1 L	
C901	+1	+1	-1	= 10.0
C901SP	+.25	-1		≥ 0.0
C901LP	+.0909		-1	≥ 0.0

Fig. 3—Example of Matrix Structure for a Combat Unit with Shortfall Allowed up to 20 percent of RHS Value and Longfall Allowed up to 10 percent of RHS Value

standard sense of optimization of most MPS—minimization—will maximize the value of the index. If the rows are used as constraints, the RHS values should be non-positive, and the row types should be reversed from the conceptual type. The combat unit effectiveness index option is selected by input data NEFF, EFFLAB and EFF.

SUPPORT UNITS

The number of support unit types mentioned in the A-matrix of the Battalion Slice run on which a CONFORM run is based (or a number specified by the user if the source of basic CONFORM data is data hand-prepared by the user rather than that automatically prepared by Battalion Slice; see Chapter 3) is always modeled in CONFORM. Even if there are no actual A-matrix coefficients for a unit, it is still modeled.

At least one model column and one row are always generated for each support unit. The column represents the number of units of that type in the force. The name of the column is

where ijk is the DTM number of the unit. The row is called the "allocation rule row" for the unit. It has a positive coefficient in the column of every combat and support unit that "requires" some of the support unit, and a "-1.0" in the column of the support unit. The row is usually equal to zero, thus setting the number of each support unit type in the force exactly equal to allocation rule requirements. The type of all allocation rule rows is user-specified. The user may thus state that all support units must be "at least" or "at most" equal to allocation rule requirements. If a support unit requires "b" of itself, then the coefficient in its column is "b-1.0" instead of "-1.0". The names of these rows are the same as the corresponding columns. Figure 4 is an example of this basic matrix structure for support units.

Note that if a negative RHS value were placed on one of these rows, then the number of support units of that type in the force would have to be equal to (or at least equal to, etc.) allocation rule requirements plus the absolute value of the RHS value. If a positive RHS value were placed on one of these rows, the number of support units of that type in the force would only have to be equal to allocation rule

Fig. 4—Example of Basic Matrix Structure for a Support Unit

requirements less the RHS value. RHS values of these rows can thus be used to represent Battalion Slice optional, augmentation, and deletion units. Optional and augmentation units would be represented by negative RHS values—units without allocation rule coefficients (optional units) still have these rows. Deletion units are represented by positive RHS values. Battalion Slice maximum-allowable units may be treated like deletion units in "base case" runs.

Requirements Deviations

Allocation rule requirements may be interpreted as only goals rather than absolute requirements in some applications. In these cases additional columns may be generated to represent deviations from the requirements. These are called "requirements deviations." The amount of shortfall and/or longfall from requirements for individual units may be constrained, and total deviations may be minimized. One column may be generated to represent requirements shortfalls, and a second may be generated to represent requirements longfalls. These columns are dimensioned in numbers of units just as the basic support unit columns. Requirements shortfall and/or longfall columns for all support units may be generated. The choice of these options is specified by input data SRSSW and SRLSW and following. These data requirements are discussed in Chapter 3. The names of these columns are

["S",i,j,k,"R", "S"],

where ijk is the DTM number of the unit, and "S" and "L" are for short-fall and longfall. Each column generated intersects the allocation rule row and a special row that limits the amount of deviation.

The shortfall and/or longfall is limited in the model with respect to the number of that unit type in the force. The deviations are usually thought of with respect to the allocation rule requirements. The conversion is straightforward. If the shortfalls of a support unit are limited to at most 20 percent of total allocation rule requirements for the unit, then that unit will be at least equal to 80 percent of requirements, and thus the shortfall would be limited to at most 25 percent $(\frac{.20}{.80})$ of the number of that type of unit in the force. If

longfalls were limited to at most 20 percent of requirements, then the unit would be at most 120 percent of requirements, and thus the longfall would be at most 16-2/3 percent $(\frac{.20}{1.20})$ of the number of that type of unit. The names of the rows that impose these constraints are

where ijk is the DTM number of the unit, and "S" and "L" are for short-fall and longfall. The type of the constraint row, as well as the percentages are individually specified for each unit.

Figure 5 is an example of the matrix structure for one support unit type, when shortfalls up to 20 percent of requirements are allowed. In the figure, " Σ " symbolizes the allocation rule requirements. Notice that a " \geq " row constrains the shortfall to be " \leq " some fraction of requirements.

Figure 6 is Fig. 5 with the addition of the allowance of long-fall up to 10 percent of requirements.

The constraining rows are always generated when the deviation columns are generated. If one wanted a deviation column to be unconstrained, the percentage should be specified as zero, and the row type as "≤". This would simply say that the column must be ≥ zero—unconstrained.

As with the combat units, these deviation columns intersect the alternative function TDEV with all non-negative coefficients and minimizing TDEV would minimize the sum of absolute deviations. Shortfalls and longfalls are individually specified to be weighted in the objective function by strength (thousands of men), cost (millions of dollars), or number of units.

Force Deviations

Fixed numbers of units may be specified as goals or target values for the actual number of support units in a force. These target values may be the numbers of the units in a "base case run." In this case an additional model row is generated for each support unit. The RHS values of these rows are the target values. Additional columns are generated to represent shortfalls and/or longfalls from the target values. The

		S 1 9 4	S 1 9 4 R S	
S194	Σ	-1	-1	= 0
S194RSP		+ •25	-1	≥ 0

Fig. 5—Example of Matrix Structure for a Support Unit with Requirements Shortfall Allowed up to 20 percent of Requirements

		5 9 4	S 1 9 4 R S	S 1 9 4 R L	
8194	Σ	-1	-1	+1	- 0
S194RSP		+.25	-1		≥ 0
8194RLP		+.0909		-1	≥ 0

Fig. 6—Example of Matrix Structure for a Support Unit with Requirements Shortfells Allowed up to 20 percent of Requirements and Requirements Langfall Allowed up to 10 percent of Requirements

planner may desire the number of units of each type in an alternative force to be as close as possible to those in the base case. These target values frequently define that base case or previous force. This type of deviation is therefore called "force deviation." The amount of force shortfall and/or longfall for individual units may be constrained, and total deviations may be minimized.

One column may be generated to represent force shortfall, and a second to represent force longfall for each unit. These columns are dimensioned in numbers of units, just as the basic support unit column and the RMS target value. Force shortfall and/or longfall columns may be generated for all units. The choice of these options is specified by input data SFSSW, SFLSW and following. The names of these columns are

where ijk is the DIM number of the unit, and "S" and "L" are for short-fall and longfall. The name of the row whose RHE value is the target value is

where ijk is the DTM number of the unit. Each column intersects the target value row and an additional row that limits the amount of deviation.

The shortfall and/or longfall is limited in the model with respect to the number of that unit type in the force. The deviations are usually thought of with respect to the target value. The conversion is straightforward; it is the same as for "requirements deviations" and "combat unit deviations." The names of these constraining rows are

where ijk is the DTM number of the unit, and "S" and "L" are for shortfall and longfall. The type of the constraint row, as well as the percentages are individually specified for each unit.

Figure 7 is an example of matrix structure for one support unit type, when shortfalls up to 20 percent of the target value (10.0) are allowed. In the figure " Σ " symbolizes the allocation rule requirements for the unit.

		5 1 9	5 1 9 4 F 5	
8194	Σ	-1	3	- 0
8194F		+1	+1	= 10.0
8194 FSP		+.25	-1	≥ 0

Fig. 7—Example of Matrix Structure for a Support Unit with Force Shortfall Allowed up to 20 percent of RHS Value

Figure 8 is Fig. 7 with the addition of the allowance of longfall up to 10 percent of the target value.

As before, these deviation columns intersect the alternative objective function TDEV with all non-negative coefficients and minimizing TDEV again minimizes the sum of absolute deviations. Shortfalls and longfalls are individually specified to be weighted in the objective function by strength, cost or number of units.

Support Unit Aggregates

Up to 25 aggregates of support units may be represented in one model. These aggregates may correspond to functional areas of support, such as "medical," "engineer," "signal," etc. One unit may be included in more than one area if it is meaningful to do so. The user defines each aggregate by specifying the unit types to be included in each. At least two model rows are generated for each aggregate. The rows total the strength and the cost of the aggregate. The name and the type of each row is user specified. The names of the strength rows are

and the names of the cost rows are

where ab is a two-character identifier supplied by the user for each aggregate. The row types are individually specified. If the type of a row is "unconstraining," it may be used as an objective function. Otherwise, the RHS value of the row represents a constraint on the strength or cost of the aggregate. All coefficients in these rows are non-negative.

If support unit requirements shortfalls and/or longfalls are represented in a model, two additional rows are generated for each aggregate. These rows total the strength and cost requirements deviations of the units. Shortfall columns intersect these rows with non-positive coefficients, and longfall columns intersect them with non-negative coefficients. Since these rows are designed for reporting purposes, they are always generated as "unconstraining" rows. The names of these rows are

		S 1 9 4	S 1 9 4 F S	S 1 9 4 F L	
S19 ⁴	Σ	-1			= 0
S194F		+1	+1	-1	= 10.0
S194FSP		+.25	-1		≥ 0
S194FLP		+.0909		-1	≥ 0

Fig. 8—Example of Matrix Structure for a Support Unit with Force Shortfall Allowed up to 20 percent of RHS Value and Force Longfall Allowed up to 10 percent of RHS Value.

and [a,b,"C","S","T","R","D"],

where ab is as for the basic support unit aggregate row names.

Likewise, if support unit force shortfalls and/or longfalls are represented two additional rows are generated for each aggregate. They report the total strength and cost force deviation of the aggregate. The names of these rows are

[a,b,"S","T","R","F","D"]

and [a,b,"C","S","T","R","D"]

where ab is as above.

COSTING

CONFORM represents one type of cost in a single model. That type may be for example "total initial cost," "total annual operating cost," "initial plus ten years operating cost," or "initial plus ten years operating cost discounted at ten percent," with an assumed distribution of units at peacetime stations such as "5/6 in CONUS and 1/6 in Europe." One cost factor or unit cost is used in a strictly linear fashion for each combat and support unit type in model objective functions and constraints.

Basic CONFORM data, including cost factors, may be input automatically from the Battalion Slice model or from data hand-prepared by the user. If the user hand-prepares the data, he inputs the one cost factor for each unit. If the data source is the Battalion Slice model, its special extraction from the FCIS is the source of cost data. This source contains cost factors for most units for 14 initial investment and 18 annual operating budget categories. These are peacetime costs. In addition the cost factors for some of these categories may vary by peacetime stations. FCIS currently represents six peacetime stations. Actually 132 cost factors are available for each unit. Table 1 shows the budget categories and peacetime stations currently used. To condense this data into the one cost type for each CONFORM model, the user specifies a linear combination of the 32 budget categories and of the six peacetime stations. Costs are dimensioned in dollars in the data file, but are scaled in millions of dollars for use in CONFORM.

Table 1

CURRENT BUDGET CATEGORIES AND PEACETIME STATIONS OF FCIS

Budget Categories

Initial Investment

- 1. PEMA Major Equipment
- 2. PEMA Operational Readiness Float
- 3. PEMA Repair Cycle Float
- 4. PEMA Repair Parts
- 5. OMA Repair Parts
- 6. OMA Minor Equipment
- 7. OMA Station Equipment
- 8. OMA Original Clothing
- 9. OMA Program 4
- 10. OMA Program 7S
- 11. OMA Accession and Training
- 12. MPA Accession and Training
- 13. PEMA Accession and Training
- 14. MPA Initial PCS

Annual Operating

- 1. PEMA Major Equipment
- 2. PEMA Repair Parts
- 3. PEMA Ammo
- 4. PEMA Missiles
- 5. OMA Programs 1 and 2
- 6. OMA Base Operations
- 7. OMA Aircraft Operations
- 8. OMA Program 4
- 9. OMA Program 7M
- 10. OMA Program 7S
- 11. OMA Program 8M
- 12. OMA Program 80
- 13. OMA Program 9
- 14. OMA Accession and Training
- 15. MPA Accession and Training
- 16. PEMA Accession and Training
- 17. MPA (Annual Excluding PCS)
- 18. MPA (Annual PCS)

Budget Categories

Peacetime Stations

- 1. CONUS
- 2. Europe 3. Korea
- 4. Alaska
- Southern
- Vietnam

The actual uses of cost factors in the model are discussed throughout this chapter.

STRENGTH AND COST LIMITS

Six resource limit rows are always generated. They are:

- (a) TFSTRL. Total force strength, scaled in thousands of men.
- (b) TCSTRL. Total combat strength, scaled in thousands of men.
- (c) TSSTRL. Total support strength, scaled in thousands of men.
- (d) TFCSTL. Total force cost, normally scaled in millions of dollars.
- (e) TCCSTL. Total combat cost, normally scaled in millions of dollars.
- (f) TSCSTL. Total support cost, normally scaled in millions of dollars.

The coefficients of all of these rows are non-negative. The type of each row is individually specified by the user. They are usually < or = their positive RHS values. The types are specified by input data set RESCON.

UNIT MIX CONSTRAINTS

Several constraints on the ratios of the number of selected individual units in a force may be specified. Each mix constraint may be on combat and/or support units. A single unit type may appear in more than one mix constraint. The most likely use of this option is to constrain combat units to a specified mix in CONFORM runs in which combat units, men or dollars are to be traded for support units, men or dollars (or vice versa), and in which the resulting combat force is not known in advance. Such a run would likely have one mix constraint on all combat units.

The specification of each mix constraint involves the input to CONGEN of the "mix or ratio entry" for each unit in the mix and possible lower and upper deviations from that number. For example, two units may be constrained to be in the ratio 3:2, or $(3 \pm .3):(2 \pm .2)$. The first ratio constrains the two units to values along a straight line. The ratio with 10 percent tolerances only constrains the two units to

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values in the sector defined by the straight lines corresponding to the possible extreme ratios—2.7:2.2 and 3.3:1.8. Figure 9 illustrates this example. Tolerances are actually specified in terms of fractions of the mix entry, e.g., the specification "2 + 0.1" defines the range "1.8 - 2.2." The lower and upper tolerances are individually specified.

The number of unit mix constraints plus the total number of mix entries can be no greater than 100.

One model column containing the mix specification is generated for each mix constraint. One row is generated for each unit in the mix to couple the variable representing the number of units of that type in the force to its entry in the mix. In addition, one row and one or two columns are generated for each mix entry that has a tolerance. One column is generated to represent the amount of lower deviation from the mix entry actually taken, and one column for upper deviation. One row ties together the mix column and the one or two tolerance columns.

The name of the mix column is

where ijk is the sequence number of the mix, from one to the number of mixes, in the order input by the user. This sequence number is right-justified with zero fill. Thus the name of the column generated for the first unit mix constraint specified by the user is "MIXOOL".

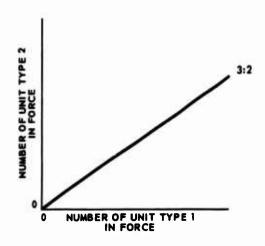
The name of the row coupling the variable for each unit to its entry in the mix is

where ijk is the mix sequence number and lmn is the unit's DTM number. These rows are equalities, and their RHS values should normally be zero.

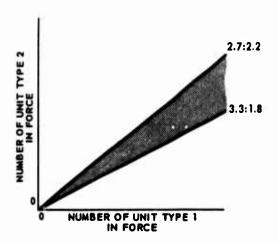
The name of the row tying together the mix column and tolerance columns is

where ijk is the mix sequence number and lmn is the DTM of the unit on whose mix entry tolerance is allowed. These rows are "less than or equal to," and their RHS values should normally be zero.

The names of the lower and upper deviation columns are



a. Two-Unit Example of CONFORM Unit Mix Constraint without Tolerance



b. Two-Unit Example of CONFORM Unit Mix Constraint with 10 percent Lower and Upper Tolerance for Both Units

Fig. 9—Two-Unit Example of CONFORM Unit Mix Constraint without and with Tolerance

and and with the same

where ijk is the mix sequence number, "U" and "L" are for upper and lower deviation, and lmn is the unit's DTM number.

Figure 10 is an example of the matrix structure for an unit mix constraint without any tolerance. In this example, combat units 901, 902 and 903 are constrained to be exactly in the ratio 10:3:5. Figure 11 is an example of matrix structure for the same mix constraint but with the addition of tolerance on the mix entries. Here unit 901 is allowed up to 10 percent lower and upper deviation, unit 902 is allowed up to 5 percent lower and 20 percent upper deviation, and unit 903 is allowed 50 percent lower and no upper deviation. In this case, therefore, the units are only constrained to be in the ratio 9-11:2.85-3.6: 2.5-5.

This logic is easily understood by looking for example at rows "MOOlT901" and "MOOlX901". The solution value of "MOOlL901" for example can be no greater than .10 of the solution value of the mix column. "The number" to which the solution value of "C901" must be equal can therefore be anything from 10.0 times the solution value of "MIX001" to (10.0 * MIX001 - 10.0 * MOOlL901) = (10.0 * MIX001 - 10.0 * .10 * MIX001) = (9.0 * MIX001). The same logic holds for upper deviations. In general, only the lower deviation or the upper deviation columns will have non-zero solution values.

Unit mix constraints are specified by input datum UMIXSW and following. These data requirements are discussed in detail in Chapter 3.

ALLOCATION RULE COEFFICIENT TOLERANCE

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Model structure may be generated to represent maximum permissible lower and/or upper deviations from the values of individual allocation rule coefficients. These tolerances are expressed as fractions of the coefficients. Thus if "a" is a coefficient and " d_1 " and " d_u " the maximum lower and upper deviations, the effective coefficient in a solution, $\stackrel{\wedge}{a}$, may be between a - d_1 a and a + d_u a; $\stackrel{\wedge}{a}$ may equal a. This generalization from a specific matrix coefficient is straightforward; it is, however, a large generalization.

	C 9 0 1	0 9 0 2	c 9 0 3	M I X O O	
M001X901	-1.0			16.0	= 0
M001X902		-1.0		3.0	= 0
M001X903			-1.0	5.0	= 0

Fig. 10—Example of Matrix Structure for Three Combat Units Constrained to the Retio 10:3:5

	0 0 1	C 9 0 2	9 0 3	M M I O K O O D I D O D D D D D D D D D D D D D D	M 0 0 1 U 9 0 1	M 0 0 1 L 9 0 2	M 0 0 1 U 9 0 2	M 0 0 1 L 9 0 3	
M001X901	-1		10.	0 -10.0	10.0				= 0
M001T901			-1	1/.10	1/.10				≤ 0
M001X902		-1	3.	0 3.0		-3.0	3.0		= 0
M001T902			-1.			1/.05	1/.20		≤ 0
M001X903			-1 5.	0				-5.0	= 0
M001T903			-1					1/.50	≤ 0

Fig. 11—Example of Matrix Structure for Three Combat Units Constrained to the Ratio 10:3:5 but with Tolerance s

A single specified value of an allocation rule coefficient is very restrictive. Figure 12 portrays a two-unit force. Unit "u" is the independent variable, perhaps a combat unit. Support unit "s" is related to unit "u" by an allocation rule coefficient—the slope of the line. The number of support units "s" in a force must be on the line through the origin. When the number of type "u" units in a force is given, the number of type "s" units is specified—is a single point on the line. This is restrictive and in some cases may be unrealistically so.

Figure 13 shows that when lower and/or upper tolerance is allowed on a coefficient, when the number of type "u" units is given, the number of type "s" units is no longer a single point, but may be anywhere on the vertical line (without considering any other constraints). No longer a single line relates the number of units of types "u" and "s". but a sector of a two-dimensional quarter-space. If two different units "u1" and "u2" require unit "s", then the line of Fig. 12 has become a two-dimensional quarter space inclined to the "u," axis as its coefficient and to the "u2" axis as its coefficient. Given values of "u1" and "ug", however, "s" is still a single point. If tolerance is allowed on both allocation coefficients, the sector of the two-dimensional quarter-space in Fig. 13 has become a sector of a three-dimensional quarter-space. No attempt is made to picture this or relations of higher dimensionality. Also the case when unit "s" may require some unit "s" (some of itself) is not shown. This corresponds to a constant increase of the slope of the line of Fig. 12.

One model row and one or two model columns are generated for each coefficient on which tolerance is allowed. One column represents the amount of lower deviation taken in a solution, and one column is for upper deviation. Only one row is needed to tie these columns to the coefficient.

Figure 14 shows the logic of coefficient lower tolerance. Note that $B_{ijl} \leq t_{ijl} * B_j$, i.e., the tolerance used, or actual deviation in a model solution must be \leq the maximum specified— t_{ijl} .

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Fig. 12—Force Model Allocation of Support Units "s" per Unit "u" without Telerance

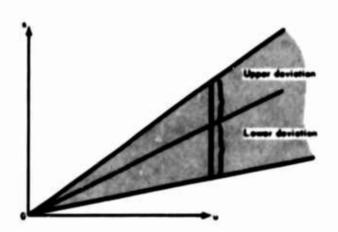


Fig. 13-Force Model Allocation of Support Units "s" per Unit "u" with Lower and Upper Telerance

BijL & tijL * Bj Bj Column Vector Column Vector Representing Unit j Representing Lower on Which Support Tolerance on Require-Unit i Allocation ment for Support Unit 1 Due to Unit j is Based Intersection with Objective Functions. Limits, and Allocation Rules for Other Support Units Allocation Rule + r_{ij} - ruj **S** 0 Equation for Support Unit i Based on Unit j Special Row Coupling ' + 1/t_{ijL} "Requirements" and - 1 € 0 Tolerance Column Vectors

where

- r_{ij} = number of support units of type i required per 1 unit of type j
- tijL = decimal fraction of rij allowed as a maximum deviation below rij
 - β_j = solution value of that column vector, i.e., the number of units of type j in a force
- β_{ijL} = solution value of the lower tolerance column vector—actually the deviation below β_i

Fig. 14—CONFORM Representation of a Support Unit Allocation Coefficient Lower Tolerance (in Detected Matrix Coefficient Form)

Before giving actual examples of this model option, the row and column names will be defined. The names of the tolerance columns are [i,j,k,"T",l,m,n,"],

where ijk is the DTM number of the supported unit (the column of the coefficient), lmn is the DTM number of the supporting unit (the row of the coefficient), and "U" and "L" are for upper and lower deviation.

The name of the row is

where ijk and lmn are as for the column names.

As an example, consider the coefficient of allocation of support unit 24 to combat unit 902. Assume that 0.1419 units 24 are required per one unit 902. Also assume that 10 percent lower deviation is allowed, and that there is one combat unit 902 in the force. Figure 15 shows the matrix structure of interest for this example.

In any solution of this model, the effective value of this allocation coefficient may be between 0.1419 and 0.1277 (0.1419 - 0.01419). If the overall model structure and choice of objective function made it attractive for this coefficient to be as small as possible, then the solution value of column "902T024L" would be 0.10 and the effective coefficient would be 0.1277. Note that the tolerance column does not intersect any other rows, and is thus not influenced directly by any of the normal CONFORM objective functions. The representation of permissible maximum deviation above an allocation rule coefficient is analogous to that for lower tolerance. In Fig. 14 " t_{ijl} " would be " t_{ij0} ", " β_{ijl} " would be " β_{ij0} ", and " $-r_{ij}$ " in the tolerance column vector would be " $+r_{ij}$ ".

Figure 16 is Fig. 15 with the addition of a column vector representing maximum deviation of 10 percent above the coefficient.

Practically, only lower or upper tolerance on a single coefficient will be used in a solution. Therefore it is correct to use only one equation to couple both tolerance column vectors to the combat module column. Here model row "902T024X" specifies that the solution value of column "902T024L" plus the solution value of column "902T024U" may be



Fig. 15—Example of Allocation Coefficient Lower Tolerance

Fig. 16—Example of Allocation Coefficient Lower and Upper Telerances

no greater than 0.1 of the solution value of column "C902". This does allow lower tolerance or upper tolerance assumed in a solution to be the maximum allowed (here 10 percent).

Input datum TOLRSW and following choose this option. These data requirements are discussed in Chapter 3.

UNIT GROUP CONSTRAINT

One model row may be generated that constrains the ratio of some attribute (strength, cost, etc.) of two groups of units. The two groups of units may be all combat and all support, or the user may define them by specifying the DTM numbers of the units to be included in each group. The structure of the row when the ratio of all combat units to all support units is constrained is

$$w_1$$
 Σ $a_jX_j + w_2$ Σ $b_jY_j \ge 0$,
all all combat support units units

where w₁ is a weighting factor (positive or negative) for all combat units

a, is the attribute of combat unit j

X, is the number of combat units of type j in the force

w₂ is a weighting factor (positive or negative) for all support units

b, is the attribute of support unit j

Y, is the number of support units of type j in the force. Each weighting factor applies to the whole group, and a different attribute may be used for each group, although only one attribute may be used per group. Thus if it is meaningful to do so for example, total combat strength may be compared to total support cost.

The structure of the row when the user defines each group is

$$\begin{array}{cccc} \Sigma & w_j a_j X_j + & \Sigma & v_j b_j Y_j \ge 0, \\ & & & \text{all} & \\ & & & \text{units in} & \\ & & & & \text{group 1} & & \\ \end{array}$$

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where w_j is the weighting factor (positive or negative) for unit j in group 1

- a, is the attribute of unit j in group 1
- X₁ is the number of units of type j in group 1
- v; is the weighting factor (positive or negative) for unit j in group 2
- b, is the attribute of unit j in group 2
- Y, is the number of units of type j in group 2.

Here the weighting factors and attribute selection are individually specified for each unit in each group. One unit may only be included in one group.

To clarify, an example of the use of this option is to constrain total combat strength to be greater than or equal to some fraction of total support strength.

The name of the row is

["G","R","O","U","P"],

and it is always a "greater than or equal to row". Its RHS value should normally be zero.

This option is selected by input datum GRPSW and following, discussed in detail in Chapter 3.

SUPPORT UNIT SUBSTITUTIONS

Model columns may be generated to represent the possible substitution of one support unit type for another in satisfaction of allocation rule and other requirements for it. Other requirements include the "optional unit" and "augmentation unit" concepts of the Battalion Slice model. Up to 100 such substitutions may be generated; one column is generated for each one. For each one the user must specify the DTM number of the unit that may be diverted from satisfaction of requirements for it, the DTM number of the unit to satisfaction of whose requirements the first unit may be diverted, and the rate of substitution. The rate is expressed as the equivalent number of the new unit type for one (1.0) of the diverted unit type.

The name of these columns is

[i,j,k,"S","B",l,m,n],

where ijk is the DTM number of the diverted unit, and lmn is the DTM number of the unit to whose requirements it is diverted.

The matrix structure for one sample substitution is shown in Fig. 17. In the figure, " Σ_{212} " represents allocation rule requirements for unit 212, and " Σ_{478} " represents allocation rule requirements for unit 478. The number of units of type 212 in the force must be equal to allocation rule requirements for unit 212 plus the number of units 212 that are diverted. The rate of substitution is .35. The number of units of type 478 in the force plus .35 times the number of units 212 that are diverted must be equal to allocation rule requirements for unit 478.

Substitution columns do not intersect any rows other than the allocation rule rows. Thus their solution values are not influenced directly by any objective function, but only indirectly.

This option is chosen by input datum SUBSW and following, discussed in detail in Chapter 3.

OBJECTIVE FUNCTIONS

There are several standard alternative objective functions in CONFORM models. In addition some model rows not usually thought of as objective functions may be so used in certain applications.

TFSTRN

TFSTRN is an objective function that is the total force strength, scaled in thousands of men. The coefficients of TFSTRN are all non-negative. TFSTRN is always generated.

TCSTRN

TCSTRN is a function that is the total combat strength, scaled in thousands of men. The coefficients of TCSTRN are all non-negative. TCSTRN is always generated.

TSSTRN

TSSTRN is a function that is the total support strength, scaled in thousands of men. The coefficients of TSSTRN are all non-negative.
TSSTRN is always generated.

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Fig. 17- Matrix Structure for Sample Support Unit Substitution

TFCOST

TFCOST is an objective function that is the total force cost. Currently costs are in millions of dollars when obtained from the FCIS, but the user-specified combining of budget categories into one cost type may also scale the costs into something other than millions of dollars. The coefficients of TFCOST are all non-negative. TFCOST is always generated.

TCCOST

TCCOST is a function that is the total combat cost. It is scaled exactly as TFCOST above. The coefficients to TCCOST are all non-negative. TCCOST is always generated.

TSCOST

TSCOST is a function that is the total support cost, scaled exactly as for TFCOST above. The coefficients of TSCOST are all non-negative. TSCOST is always generated.

TDEV

TDEV is an objective function that is the weighted sum of all combat and/or support unit deviations modeled. TDEV is only generated when combat unit shortfalls and/or combat unit longfalls and/or support unit requirements shortfalls and/or support unit requirements longfalls and/or support unit force shortfalls and/or support unit force longfalls are modeled. The weighting factor types are individually specified for each type of deviation. The weighting types may be strength (thousands of men), cost (millions of dollars), number of units, and for combat unit deviations only, each of the six possible combat effectiveness indices. The coefficients of TDEV are all non-negative. Minimizing TDEV is equivalent to minimizing the absolute value of unit deviations from requirements and/or target values.

Combat Unit Effectiveness Indices

Up to six combat unit effectiveness indices may be represented in a single model. One model row is generated for each. Both the name and type of each row is user-specified. When one of these rows is unconstraining (neither \leq , =, nor \geq RHS value), it may be used as an



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objective function. The coefficients of all such rows are all non-positive. Thus minimizing (the standard sense of optimization in most MPSs) one of these functions actually maximizes the corresponding index.

Combat Units

One basic row is generated for each combat unit in the model. These rows frequently set the number of each combat unit in the force to their RHS value. However, the type of each row is individually specifiable by the user. When one of these rows is unconstraining (neither \leq , =, or \geq RHS value), it may be used as an objective function. The names of these rows are

where ijk is the DTM number of the unit.

Support Unit Aggregates

Up to 25 aggregates of support units may be represented in a model. These may correspond to function areas. For each one, two model rows are generated. One is the total strength (thousands of men) of the aggregate, and the other is the total cost (millions of dollars) of the aggregate. The names of these rows are user specified as

and [a,b,"C","S","T"],

where ab is two characters input by the user. The type of each of the two rows for each aggregate is user specified. When one of these rows is unconstraining (neither \leq , =, nor \geq RHS value), it may be used as an objective function. The coefficients of these rows are all nonnegative.

Support Unit Aggregate Deviations

The purpose of this section is to caution the user against the selection as objective functions of some unconstrained model rows. The rows described here are designed primarily for reporting purposes. If support unit aggregates are represented and support unit requirements shortfalls and/or longfalls are represented, two model rows are generated for each aggregate. One is the strength-weighted sum of shortfalls (negative coefficients) and longfalls (positive coefficients). The

other is the cost-weighted sum. These rows are always unconstraining and thus could be used as objective functions. Note however that they do not have all non-negative or all non-positive coefficients. Thus if one were to minimize one of these rows, he would not be minimizing the sum of the absolute deviations but would be minimizing the total longfall and maximizing the total shortfall of that aggregate. Likewise, maximizing one of these rows would be minimizing the total shortfall and maximizing the total longfall of that aggregate. The names of these rows are

and

where ab are the same two characters input by the user for the basic aggregate row names mentioned above.

Likewise, if support unit aggregates are represented and support unit force shortfalls and/or longfalls are represented, two model rows are generated for each aggregate to represent the strength and cost force deviation of that aggregate. The names of these rows are

To actually minimize the sum of the absolute deviations of one or a few aggregates, the user would have to structure a special objective function which is a subset of function TDEV. He may do this through a revised procedure of an MPS.

LP MARGINAL VALUES

The marginal values, pi-values, or dual activities of LP model rows reported as part of the solution of a CONFORM model express the rate of change of the objective function used in the solution, relative to changes in the RHS value of the row. In general, a RHS value cannot be changed arbitrarily without violating a condition of the LP problem. The marginal values are generally only valid when interpreted one at a time and over a certain range. The range of validity is frequently small. It can be determined by use of procedures included in most MPSs.

Some special properties of the marginal values have been verified for CONFORM "base case runs." In a base case run, changing the RHS

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value of a combat or support unit changes the number of that unit and possibly many other units in the force. If the objective function is total force strength, the marginal values express the rate of change of the total force strength relative to a change in the number of one unit type (as the lst-order effect). It is thus the marginal unit slice strength—the marginal strength of the unit plus its support tail. It has been verified that the range of validity of the marginal values of combat unit rows is essentially infinite. Also, the marginal values of combat units are mutually exclusive. Thus if the marginal value of every combat unit type were multiplied by the number of that unit in the force, and totaled, that total would be the total force strength due to allocation rules. Any "optional," "augmentation," or "deletion" support units, that is any RHS values of support unit allocation rule rows, are not accounted for, however.

If the objective function were total force cost, then the marginal values of the combat units would be the slice costs of units.

For support units, the marginal values still represent the unit's slice strength or cost, and have a wide range of validity, but they are not mutually exclusive. The marginal values of support units should only be interpreted as valid one at a time.

For all CONFORM models, marginal values present useful information about infeasible, feasible and optimal solutions. If a solution is optimal, the marginal values indicate the sensitivity of the objective function to changes in RHS values—changes in allocation rules, resource limits, target values, deviation limits, etc. If a solution is not feasible, the marginal values (relative to a special objective function) express the sensitivity of the infeasibility to changes in RHS values. Because the non-zero marginal values identify the rows in which changes directly influence infeasibility, the analyst is often able to localize model troubles quickly. He may find that one or more RHS values were not input or were input with the wrong sign(s).

In some CONFORM applications, the question may be whether or not a certain set of force-planning constraints and policies is feasible. In these cases, an infeasible solution may be an acceptable solution,

and not indicative of improper model formulation/generation. Also in these cases, the marginal values would be an indication of why the answer is "not feasible."

In general, marginal values are only compared to one another to see their relative values, rather than interpreting their absolute values.

Chapter 3

MODEL GENERATION

INTRODUCTION

Chapter 2 showed that the CONFORM modeling logic implies a large number of actual CONFORM LP models. The appropriate LP model for each CONFORM run is generated automatically by a computer program—CONGEN. CONGEN accepts input that defines a CONFORM LP problem and produces a complete LP problem file in a form acceptable by one of several commercially available computer programs for the solution of LP problems. CONGEN belongs to the class of computer programs usually called "LP Matrix Generators." CONGEN translates the defining input to a complete problem file much more quickly and accurately than is possible by any manual process. Of course, the development of CONGEN consumed more effort than would have been required to manually produce a single CONFORM model. However, the finished CONGEN permits rapid, accurate generation of different CONFORM LP models as needed; a single manually-produced model would have been obsolete before it was completed.

The principal data sources for CONGEN are the allocation rule coefficient data files, the troop list, and the cost data file of a Battalion Slice run to specify basic CONFORM model structure, and the selection of modeling options by the CONFORM user. The principal output of CONGEN is the thousands of card-images that define the LP model. Typical CONFORM problem files have comprised 12,000 to 16,000 card-images, 6000 of which are directly related to the Battalion Slice allocation rule coefficients.

This chapter in general treats CONCEN as a "black box," while discussing its inputs and outputs in detail. Detailed discussion of CONCEN itself is deferred to its program documentation in Appendixes B and C.

CONGEN EXECUTION

An LP model consists of many variables (columns), and equations or constraints (rows). Each must be identified uniquely. The exact position of any problem coefficient (matrix element) may be specified by the identifiers of the corresponding equation and variable. ConGEN generates only the equations and variables desired and supplies unique identifiers for all equations and variables generated. An equally important, but in many respects easier CONGEN role is the generation of appropriate numerical values of matrix elements. The currently available LP solution systems do not require zero-valued elements to be included within a problem file; accordingly, CONGEN, with a few exceptions, is limited to the non-null information defining a CONFORM LP model.

Frequently, not only one but several different CONFORM LP models may be generated to address a force planning problem. Only one model is generated at a time, and the one produced is as chosen by the user/analyst. The many modeling options place a greater burden on the user. The use of CONGEN requires the selection of one model from among several reasonable and permitted designs. However, the options provide the opportunity to address a wide variety of force planning problems with corresponding LP models.

The output of CONGEN is readable by an analyst and by commercial LP solution systems. An LP solution system for third generation computers is commonly identified as a Mathematical Programming System, or simply as MPS. CONGEN is operational at USANSSA on its IBM 360/65 computer system and at RAC on its CDC 6400 computer system. At either installation CONGEN may generate matrices in a format of IBM's MPS/360 or CDC's OPTIMA solution system.

Although some MPSs accept rendomly order matrix input files, most analysts prefer to read and check well-ordered files. Matrix generators that produce problem files by expansion or repetition of data through successive similar model submatrices or similar vectors (columns or rows) may provide appropriate column or row order vithout sorting.

CONCEN generates matrices column-by-column; the output file is well

ordered exactly as produced. The column order (with all options exercised) is:

- (a) For each combat unit type.
 - (1) The unit variable.
 - (2) The unit shortfall variable.
 - (3) The unit longfall variable.
- (b) For each support unit type.
 - (1) The unit variable.
 - (2) The unit requirements shortfall variable.
 - (3) The unit requirements longfall variable.
 - (4) The unit force shortfall variable.
 - (5) The unit force longfall variable.
- (c) For A-matrix (by combat unit type) and B-matrix (by supported support unit type) coefficients.
 - (1) Allocation rule coefficient lower deviation variable.
 - (2) Allocation rule coefficient upper deviation variable.
 - (d) For each unit mix.
 - (1) The mix variable.
 - (2) For mix entries.
 - (i) Upper tolerence variable.
 - (ii) Lover tolerance variable.
 - (e) Support unit substitution variables.

There are three somes of input to CONCENT. First, the basic structural data defining allocation rules and unit identification numbers, titles, strengths and costs may be automatically read from the outputs (and inputs) of a Battalion Slice run, with the CONFORM user/analyst choosing other model options.

Second, the basic structural data used in a previous CONGEN run may be restored for the current run by reading a data file produced in that previous run, with the user/analyst choosing other options.

Third, all data may be hand-prepared by the user. This mode may be useful for addressing some problems by generating and solving small models—ones with only a few unit types. These unit types may be notional units representing aggregates of actual unit types.

The output of CONGAN is input to a MPS for solution; this solution step is the subject of Chapter 4. Optional reports may be automatically prepared from the LP solution by the CONFORM LP reporter, CONREP; this step is discussed in Chapter 5.

DATA REQUIREMENTS

For each LP model to be generated, CONGEN requires data to define in terms of combat force and support unit allocation rules the theater to be modeled, characteristics of units, upper and lower limits on various strength and cost subtotals, values of any tolerances to be employed, and the selection of other optional features. This data is read by CONGEN from magnetic tapes and/or disk files and cards produced by Battalion Slice, and cards punched by the CONGEN user and/or produced by a previous CONGEN run.

As previously stated, there are three input data modes: (1) basic structure specified by the output tapes of a Battalion Slice run, with CONGEN-user-specified tolerances and options; (2) basic structure specified by a binary data file produced on a previous CONGEN run, with user-specified tolerances and options; and (3) all user-prepared data.

Each of these input modes is separately discussed. They are compared in Fig. 18, a schematic diagram of the CONGEN input data process. All data is normally read from system input/card reader unless otherwise noted.

Input from Battalion Slice Model

In this section each input data item for CONGEN matrix generation based on Battalion Slice output is discussed in the order in which it is input to CONGEN. Where appropriate, data items are referred to by the names of the corresponding CONGEN variables and arrays. Where space permits, these names are repeated as card titles on the right hand side of actual data cards. Card titles are not read by CONGEN; they are only included to help document the data. Some sample data values are given, and a complete sample data set is listed in Appendix A.

PRENAM. This datum is the name of the LP model to be generated. It may be from one to six characters, abiding by any specific naming



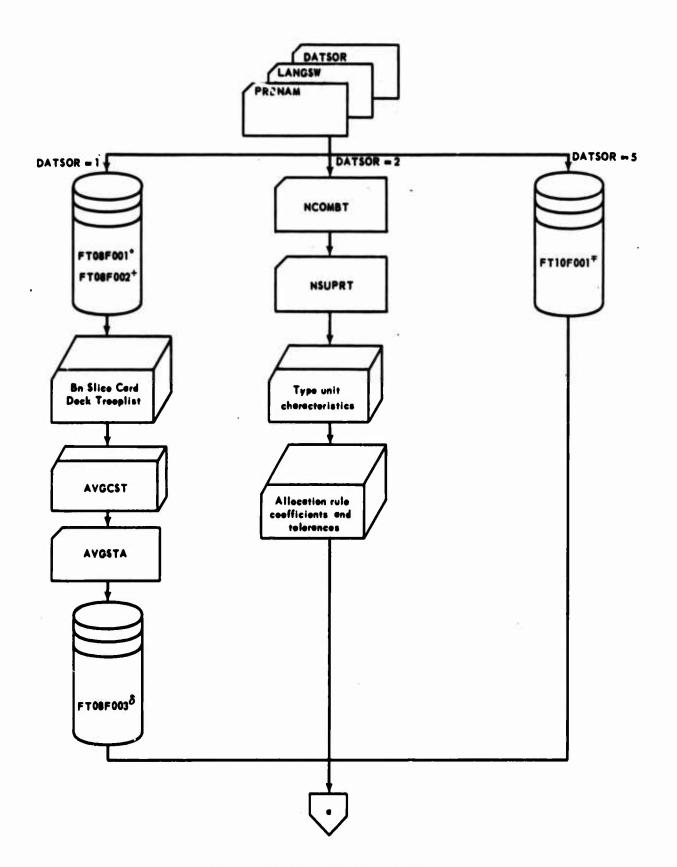


Fig. 18-CONGEN Input Data Structure

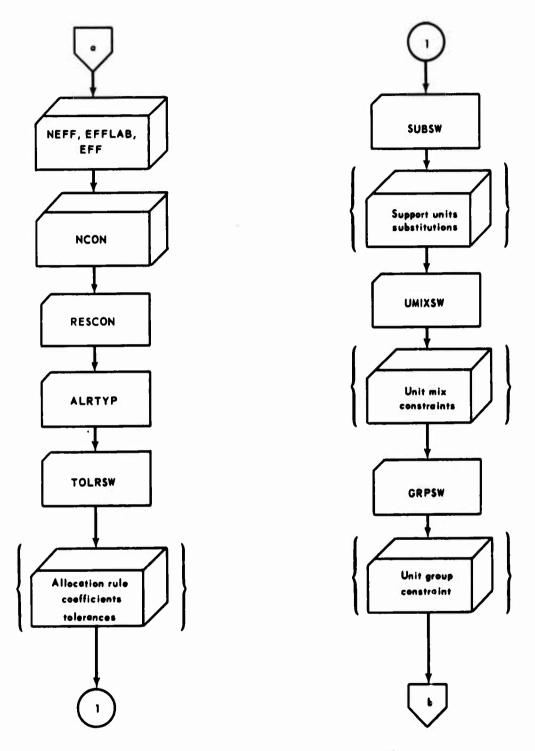
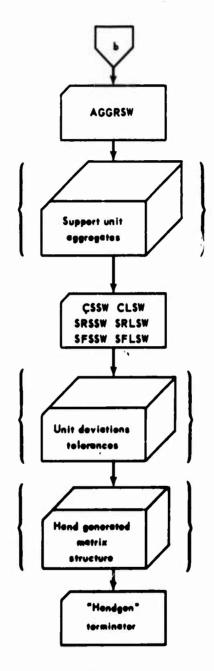


Fig. 18—CONGEN Input Data Structure (cont'd)

verteballenderberer



*FT08R001 is Bn Slice FT40F001.

*FT08F002 is Bn Slice FT75F001.

*FT10F001 is from a previous CONGEN run.

SFT08F003 is Bn Slice FT85001.

Fig. 18-CONGEN Input Data Structure (cont'd)

conventions of the MPS in whose format the model is to be generated (see data item LANGSW). It is written on the "NAME" card (for MPS/360) or "FILE" card (for OPTIMA) at the beginning of the matrix row identification file (unit 7).

Input format:

A4,A2

one value, on one card, left-justified in columns 1-6, always input.

A sample PRBNAM card is shown in Fig. 19.

LANGSW. The value of LANGSW specifies the MPS in whose format the matrix is to be generated.

LANGSW = 1 ... IHM's MPS/360

2 ... CDC's OPTIMA.

Input format:

12

one value, on one card, in column 2, always input.

A sample LANGSW data card is shown in Fig. 19.

<u>DATSOR</u>. The value of DATSOR specifies the source of the basic structural data, and thus which of the three input data modes is being used.

DATSOR = 1 ... basic structural data is read from Battalion Slice model output tapes and card deck

2 ... basic structural data is hand-prepared

5 ... basic structural data as specified for a previous CONFORM run is restored by reading a binary file, unit 10, of data produced by that run.

Of course, for this mode of input, DATSOR always = 1. Input formst:

12

one value, on one card, in column 2, always input.

A sample DATSOR card is shown in Fig. 19.

Bettalion Slice Model Outputs. Basic structural data is read from Battalion Slice model output (and input) tapes and solution card deck. CONGEN reads the A-matrix (and other data) tape (Battalion Slice unit

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Fig. 19—Sample PRBNAM, LANGSW and DATSOR Date Cards

40 produced by APROG), a B-matrix tape produced specially for CONGEN (unit 75 produced by BPROG), the Battalion Slice extraction from the FCIS tape (unit 85), and the troop list card deck which is produced by DPROG. The three tape files are assumed by CONGEN to follow one another in that order on CONGEN unit 8. The troop list card deck immediately follows the DATSOR card. CONGEN ignores some blocks of data on the A-matrix tape and cost tape; and CONGEN execution is not impaired if there is no cost data for some units. The following data is obtained from the A-matrix tape:

- (a) NCOMBT. The number of combat unit types. NCOMBT must be ≤ 60.
- (b) DTM(i), for i = 1 to NCOMBT. The Battalion Slice DTM identification numbers (less 900) of each of the NCOMBT combat unit types. CONGEN increments them by 900 before using them. Also the unit title is read and passed to CONREP.
- (c) Number of "parameterized" unit types and their DTM numbers. CONFORM model logic treats the Battalion Slice parameterized units as any other support unit.
- (d) NSUPRT. The number of support unit types. This number includes the number of unique parameterized units. NSUPRT must be ≤ 700.
- (e) Requirements for support units by combat units. For each of the NSUPRT support unit types, its DTM number and the number of units of that type required by the number of each combat unit in the force is read. Also the unit title, and SRC and TPSN numbers are read and passed to CONREP. The order of appearance of these NSUPRT support unit types is the order in which they are modeled. Only requirements greater than zero are stored. They are stored in CONGEN array COEF(8000), starting in word one. CONGEN variable NANZ is a count of these positive coefficients and those read below for the "parameterized" units. It is the number of CONFORM A-matrix coefficients. These coefficients are later divided by the number of the appropriate combat unit type in the force for use in the CONFORM model on a per unit basis. "Parameterized" units are included here, but without specification of any coefficients.
- (f) Requirements for parameterized units by combat units. For each parameterized unit, the number of units of that type required by

the number of each combat unit type in the force is read. Only coefficients greater than zero are stored. The coefficients are counted as part of the NANZ CONFORM A-matrix coefficients and are also stored in CONGEN array COEF(8000). These coefficients are also later divided by the number of the appropriate combat unit type in the force.

From the B-matrix tape is read the requirements for support units by support units. Only coefficients greater than zero are stored, and they are already on a per-unit-basis. They are also stored in CONGEN array COEF(6500), starting in word NANZ + 1. NENZ is a count of the number of these B-matrix coefficients.

The next data to be read from system input is the card deck troop list from the Battalion Slice run. The entire deck as produced by the Battalion Slice DPROG procedure, including the header card and "999" terminator card is included. From this data is read the strength of each unit and the number of each combat unit type in the run. These latter values are used to convert the A-matrix coefficients into a perunit form. Sample troop list cards are listed in Fig. 20.

Next the Battalion Slice extraction from the FCIS is read. This tape contains one record per unit in the data bank. Each record contains the DTM number of the unit and 132 unit costs corresponding to 32 budget categories, the cost of some of which may vary by six peacetime stations. Table 1 shows the budget categories and peacetime stations currently used. Each CONFORM model has one cost function. It is a linear combination of the 32 budget categories and 6 peacetime stations. Thus such cost functions as "total initial," "total annual operating cost," "initial plus ten years operating cost," and "initial plus ten years operating cost," and "initial plus ten years operating cost discounted at 10 percent" may be represented, each with a particular assumed distribution of units at peacetime stations, such as "5/6 in CONUS and 1/6 in Europe." To specify the cost function, two data items which are prepared by the CONFORM user are read from system input before the cost data tape is read. They are:

(a) AVGCST. A multiplier for each of the 32 budget categories. Input format:

10E8.6

10 values per card (up to ten on the last card).

TESTING USAMSSA 8 DIVISION PRAM INPUT DECK			
902 0 BN MECH IN DIV/SEP BCE 07945H02000	22231	689 22.000	22
905 0 BN TANK 17035H02J00	20725	573 56.600	56
906 8 - SQDN CAV HECH/AR DIV 17185H00800	0400007	855 4.000	4
907 J SQON CAV AM/ABN/INF DIV 17095H11000	0536008	937 4.600	4
	1300007	161 -4.600	
919 0 BN 155 SP HECH/ARHD DIV V 66365HJ0006	0406014	584 21.000	21
-920 8 BN 155 SP SEP HAR BDE 06375HU0000	1400014	614 6.000	6
924 0 BN CHAPARRAL-VULCAN 44325H0000C	2014000	559 7.000	7
928 8 8N 155 SP (NON-DIV) 86455G70000	2186000	567 0.600	- 8
929 0 BN B INCH SP (NON-DIV) 06445G70000	21843	564 12.000	12
932-0- BN-LANCE (NON-DIV) 06595760006	21869	463 37 00 0	3
938 0 BN 8-IN (DIV) £6395H0000C	0206618	529 10.000	13
-943 0 ARMD CAV SQDN TRICAP V 17135T1000G	-0000607	694 7.090	7
949 J SOON ATK HEL TRICAP 17285T20000	00000	820 2.606	2
951 9 CO ATK HEL 17111H028U0	2079400	210 17.000	17
2 9 HQ 11 HHC THEATER ARHY TDAP1 WOARAA	36301	884 1.00 ú	1
3 9 AR 11 HHT ARHO CAV REGT 170 52H00 000	26710	2.000	- 2
5 9 IN 11 HHC SEP LT INF BDE 771u2H00000	1500000	256 1.000	1
6 9 HQ 11 HHC CORPS 52001G91000	3003506	256 1.000	• 1
8 9 AR 11 HHC ARMORED DIVISION 17004HJ0000	0260001	192 7.000	7
10 9 AR 11 HHC EDE ARMO DIV - 17042H00000	020006	116 21.000	21
. 16 9 IN 11 CO LONG RANGE PATROL U7157G80000	2226500	216 1.000	1
•			
•			
968 9 DUMMY UNIT 21/21,600 DS AGFT		u 16.578	17
969 9 DUMPY UNIT 21/29,800 GS ACFT		u 9.601	10
978 9 DUMMY UNIT 21/29,849 GS ACFT		9 1.250	1
971 9 DUNNY UNIT FOR COMPZ FOL 210		0 .938	1
972 9 DUNNY UNIT NO. OF AIRGRAFT	• 400	0 -25.968	56
973 9 DMMY UNIT EQUIVALENT COR		6 1.630	1
975 9 DUM M UNIT INTER SIZE THEAT	•	6 1.600	1
990 9 DUNNY UNIT ZBASE UNIT-TERMIN		0 9.112	9
982 9 DUNNY UNIT 21/21,6000 DS ACF		0 .776	1
984 9 KEY UNIT FOR CGO HOVEHENT -		J 2.946	3
965 9-KEY UNIT FOR GGO HOVEHENT -		0 14,586	15
986 9 DUMMY UNIT 21600 BEDS+		0 22.289	55
987 9 DUPHY UNIT CORPS POL		0 5.345	5
AAA A BULLAN INICO ABMY BOL		6 14.28L	4.4

Fig. 20—Sample Bettalian Slice Card-Dock Troop List Date

(b) AVGSTA. A multiplier for each of the six peacetime stations. These fractions should usually sum to 1 (1.0).

Input format:

6E8.6

six values on one card.

Sample AVGCST and AVGSTA data cards are shown in Fig. 21.

The cost tape is then read, and a single unit cost factor as specified by AVGCST and AVGSTA is stored for use by CONGEN. It is permissible for the cost tape not to have data for some units modeled or to have data for units not modeled in a CONFORM run. Costs are dimensioned in dollars in the data file, but are scaled in millions of dollars by CONGEN.

NEFF, EFFLAB, EFF. Up to six indices of combat unit effectiveness may be represented in a CONFORM model. NEFF is the number to be represented. One row in the model is generated for each index represented. EFFLAB is a six-character name and the type of each row. EFF is the index value for each index modeled for each combat unit type modeled.

Input format:

NEFF and EFFLAB are input on one card under format (13.7X,6(A4,A2,2X,A1,1X)).

The first field is the value of NEFF. The next six fields are the name (A4,A2) and type (A1) of the model row for each index. The name can be any six characters consistent with the naming conventions of the MPS in whose language the model is to be generated (see input datum LANGSW). The value of the row type indicator may be:

"+" ... total value of that combat index < RHS value.

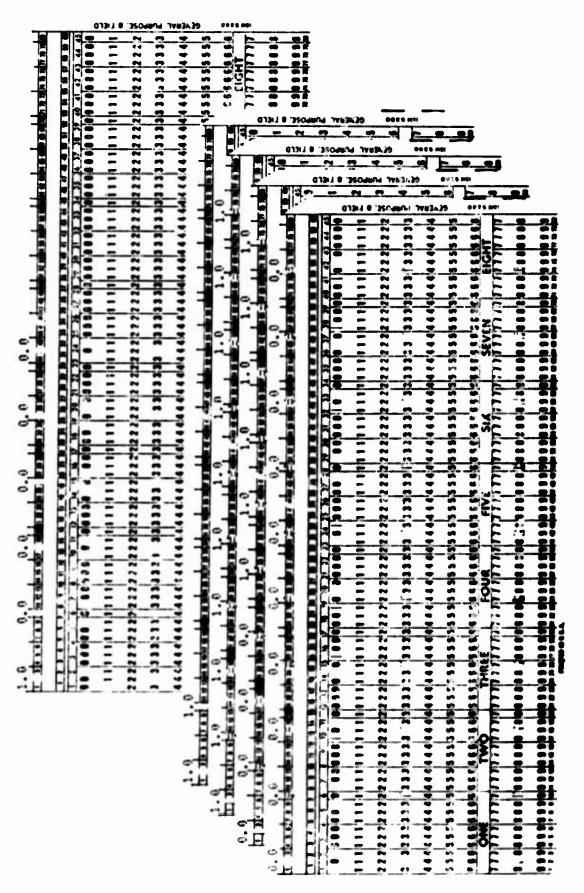
blank ... total of index = RHS value.

"-" ... total of index ≥ RHS value.

"F" ... total of index unconstrained by RHS value.

One additional card for each combat unit type modeled specified the actual index values on a per-unit-basis. .If NEFF is zero, no additional cards should be input. The format of these cards is

(10x,6210.6).



57

Sample NEFF, EFFIAB and EFF data cards are shown in Fig. 22. In the example, the DIM number of the unit has been included in the first three columns of each of the EFF data cards.

NCON. The values of NCON specify the type of the row for each combat unit type.

NCON(i) = "+" ... the number of units of combat unit type i ≤ the RHS value of its row.

blank ... the number of units of combat unit type i = the RHS value of its row.

"-" ... the number of units of combat unit type i ≥ the RHS value of its row.

"F" ... the number of units of combat unit type i unconstrained by the RMS value of its row.

Input format:

d(A1,9X)

COMBT values on NCOMBT/8 cards, always input.

Sample NCON data is shown in Fig. 23.

RESCON. The values of RESCON specify the types of the six resource constraints.

RESCON(1) = type of constraint on total force strength, row "TFSTRL".

RESCON(2) = type of constraint on total combat strength, row "TCSTRL".

RESCON(3) = type of constraint on total support strength, row "TSSTRL".

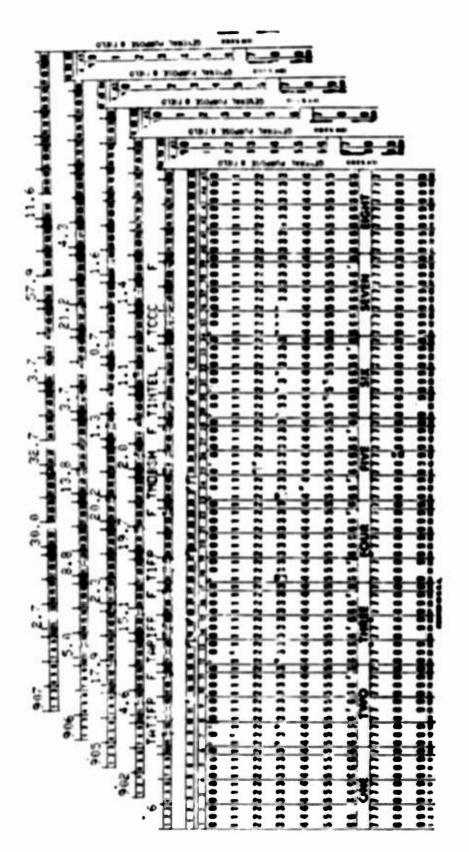
RESCON(4) = type of constraint on total force cost, row "TFCSTL".

RESCON(5) = type of constraint on total combat cost, row "TCCSTL".

RESCON(6) = type of constraint on total support cost, row "TSCSTL".

RESCON(i) = "+" ... resource i ≤ RMS value
blank ... resource i = RMS value
"-" ... resource i ≥ RMS value

"F" ... resource i unconstrained by RMS value.



22-Sample HEFF, EFFLAS and EFF Date Cards

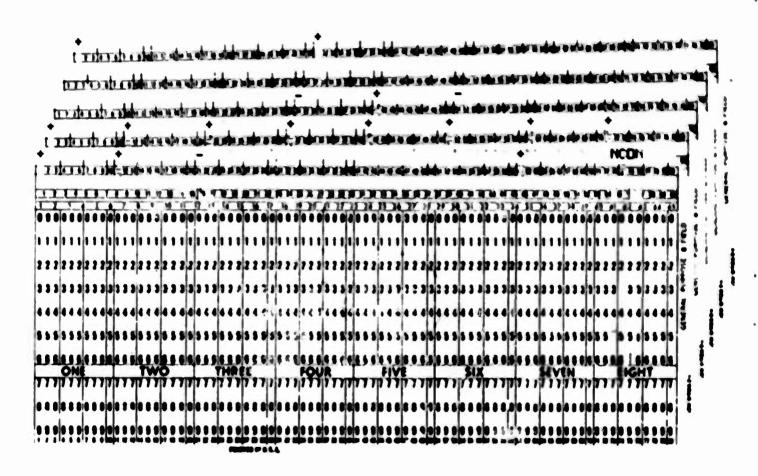


Fig. 23—Sample MCON Date

Input format:

6(A1,9X)

six values on one card, always input.

Sample RESCON data is shown in Fig. 24.

ALRTYP. The value of ALRTYP specifies the type of all allocation rule rows.

ALRTYP = "+" ... all allocation rule rows ≤ RHS value
blank ... all allocation rule rows = RHS value
"-" ... all allocation rule rows ≥ RHS value
"F" ... all allocation rule rows unconstrained by
RHS value.

Input format:

Al

one value, on one card, always input.

A sample ALRTYP data card is shown in Fig. 24.

TOLRSW. TOLRSW is an integer variable used as a logical switch to specify whether or not tolerance on individual allocation rule coefficients may be allowed at all in a particular model.

TOLRSW = 1 ... lower and/or upper deviations from coefficients allowed; tolerances are specified below.

otherwise ... no coefficient tolerance is allowed; no attempt is made by CONGEN to read any tolerance specifications below.

Input format:

12

one value, on one card, in column 2, always input.

Allocation Rule Coefficient Tolerance Specification. If allocation rule coefficient tolerance may be allowed at all (TOLRSW, above, = 1) this data segment specified any allowable deviations from the coefficient. This data segment must have a header card

card columns

1 - 7

COEFTOL

and a trailer card

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Fig. 24—Sample RESCON and ALRTYP Data

card columns

1 - 8

ENDCFTOL.

Between these, one card is input for each coefficient for which tolerance is to be allowed. Each card identifies the coefficient on which tolerance is allowed by the DTM number of the supported and supporting unit types, and the maximum allowable upper and lower deviation from the coefficient in terms of decimal fractions. If tolerance is specified for a nonexistent coefficient, the tolerance is ignored, a diagnostic message is written and CONGEN execution (data input) continues. Sample coefficient tolerance data cards are shown in Fig. 25.

Input format:

(9x,13,2x,13,4x,5x,E12.6,E12.6)

four values (supported unit DTM number, supporting unit DTM number, maximum upper deviation, and maximum lower deviation) per card, not input if TOLRSW $\neq 1$.

SUBSW. SUBSW is an integer variable used as a logical switch to indicate to CONGEN whether or not substitutions of support unit types in satisfaction of allocation rules may be represented at all.

SUBSW = 1 ... support unit substitutions may be represented in the model; those allowed are specified below

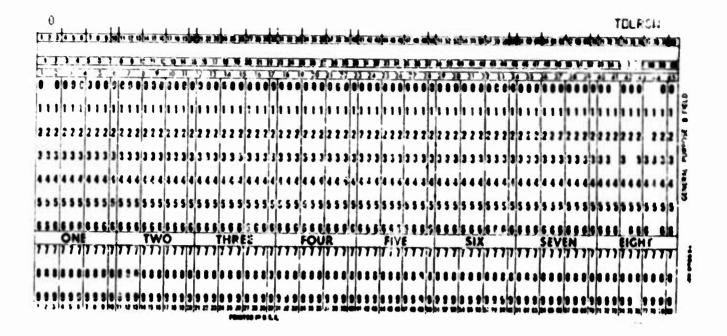
otherwise ... no support unit substitutions may be represented; no attempt is made by CONGEN to read any substitution header, data or trailer cards below.

Input format:

12

one value, on one card, in column 2, always input.

Allowable Support Unit Substitutions Specifications. If substitution of support unit type in satisfaction of allocation rules may be allowed at all (SUBSW, above, = 1), this data segment specifies any allowable substitutions in this model. This data segment must have a header card



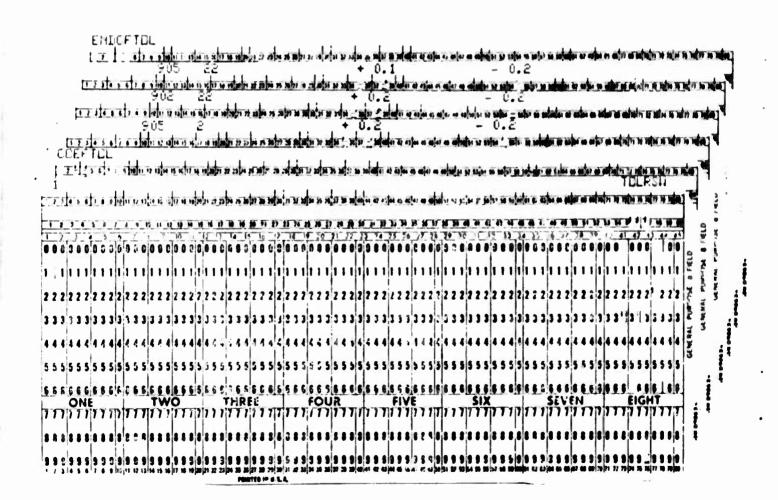


Fig. 25-Sample Allocation Rule Coefficient Tolerance Data



card columns

1 - 8

UNITSUBS

and a trailer card

card columns

1 - 7

ENDSUBS.

Between these, one card is input for each allowable substitution. Each of these cards specifies the DTM number of the unit type which may be substituted, the DTM number of the unit type for which it may be substituted, and the rate at which it may be substituted. For example, DTM i may be substituted for DTM j at the rate of x DTM j equivalents for each DTM i substituted. Figure 26 shows sample support unit substitution input data cards.

Input format:

(9x,13,2x,13,14x,5x,E12.6)

three values (substituted unit DTM number, replaced unit DTM number, and rate of substitution) per card not input if SUBSW $\neq 1$.

UMIXSW. UMIXSW is an integer variable used as a logical switch to indicate to CONGEN whether or not constraints on the mix of units may be represented at all in a model.

UMIXSW = 1 ... unit mix constraints may be represented;
those mixes desired are specified below
otherwise ... no unit mix constraints are to be represented; no attempt is made to read header,
data or trailer cards below.

Input format:

12

one value, on one card, in column 2, always input.

Unit Mix Constraints Specifications. If any unit mix constraints may be represented at all (UMIXSW, above, = 1), this data segment specifies any desired in this model. This entire data segment must have a trailer card

CONT. TWO THERE SOLVE STATES S

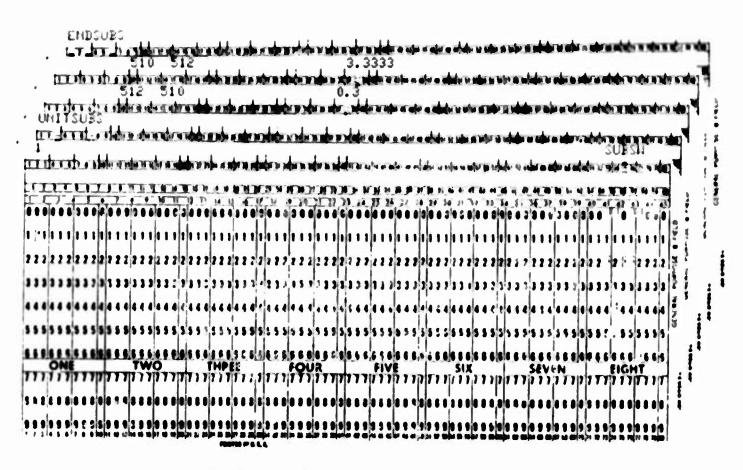


Fig. 26—Sample Support Unit Substitutions Date

card columns

1 . 8

ENDNITTES.

A header card

card columns

4-6

MIX

and a trailer card

card columns

1 - 6

ENDNIX

must be included for each unit mix constraint specified. One data card is input for each entry in each mix constraint. Each of these eards inputs the DTM number of the unit in the mix, its entry in the mix (such as "x" in "unit i is to unit j as x is to y"), and the maximum allowable upper and lower deviation from this entry in terms of decimal fractions of the entry. The ratio of more than two unit types may be controlled in any one constraint, and one unit type may appear in more than one constraint. Figure 27 shows some examples of unit mix constraint input data. The number of mix constraints plus the total number of mix entries must be \leq 100.

Input format:

(10x,13,5x,E12.6,5x,E12.6,5x,E12.6)

four values (unit DTM number, mix entry, allowable upper deviation from entry, and allowable lower deviation from entry) per card, not input if UMIXEW $\neq 1$.

GRPSW. GRPSW is an integer variable used as a logical switch to indicate to CONGEN whether or not a constraint on the ratio of some measure(s) of two groups of units is to be included in a model.

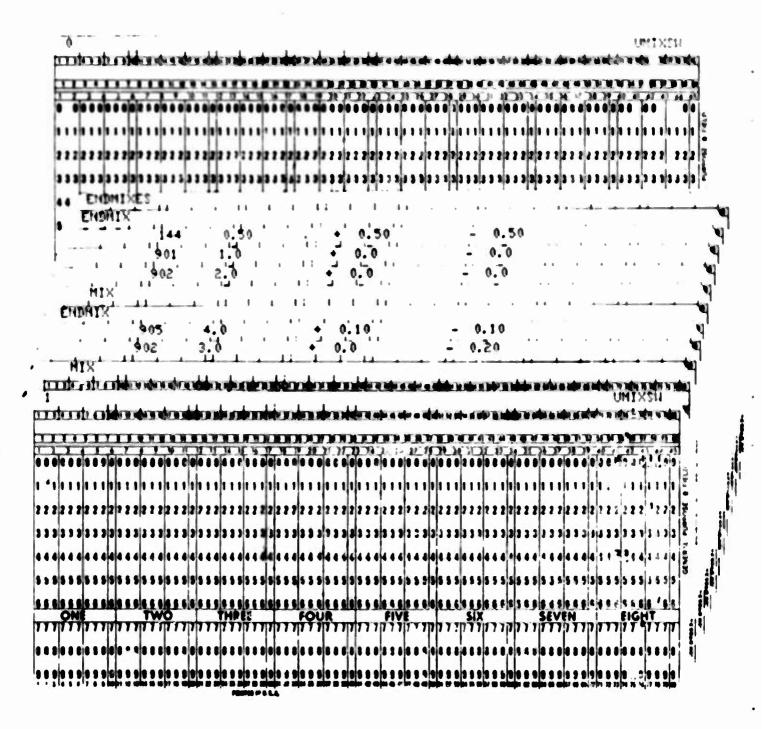


Fig. 27-Sample Unit Mix Constraint Date

(RAC)

2 ... a constraint, specified in detail below, vill be generated relating the sum of some measure of one group of units and of another group of units.

otherwise ... no unit grouping constraint will be generated; no attempt will be made to read header, data or trailer cards below.

Input formet:

15

one value, on one card, in column 2, always input.

Unit Grouping Constraint Specification. If a unit grouping constraint is to be included in a model (GRPSW, above, = 1 or 2), this data segment specifies the constraint. In either of the two constraint modes, a header card

card columns

4 - 8

GROUP

and a trailer card

card columns

1 - 8

ENDGROUP

must be input.

For a Mode 1 unit grouping constraint, only two data cards need be input—one for all combat units and one for all support units. Each card inputs a positive or negative weighting factor and the code number of the attribute of the group of units (all combat or all support) that is to be constrained. The attribute may be selected by

code number	attribute		
1	strength		
2	cost		
3	number of units		

3 + i, for i = 1 to 6 combat unit effectiveness index i. The weighting factor is applied to the specified attribute of all combat or support units. The constraint in this mode is structured as

69

RAC

 $v_1 \Sigma a_{1j}X_j + v_2 \Sigma a_{2j}X_j \ge 0$, all all combat support units units

where the \mathbf{v}_i are the weighting factors and the \mathbf{a}_{ij} are the attributes (such as strength) of the units. Figure 28 shows an example of input data specifying a Mode l unit grouping constraint. That data specifies that total combat force strength is constrained to be ≥ 0.449 total support force strength.

For a Mode 2 constraint, the user defines the two groups of units, for which the ratio of the sum of the attributes is constrained. One data card must be input for each member of each group; no unit may be a member of both groups. The weighting factors and attribute selection are individually specified for each member of each group. Figure 29 is an example of input data defining a Mode 2 unit grouping constraint. This data specifies that the strength of all units 446,448 and 450 in the force is constrained to be \geq 0.50 the strength of all units 274,275 and 276 in the force.

Input format:

RAE

(20X, 15, 10X, E12.6, 10X, 13)

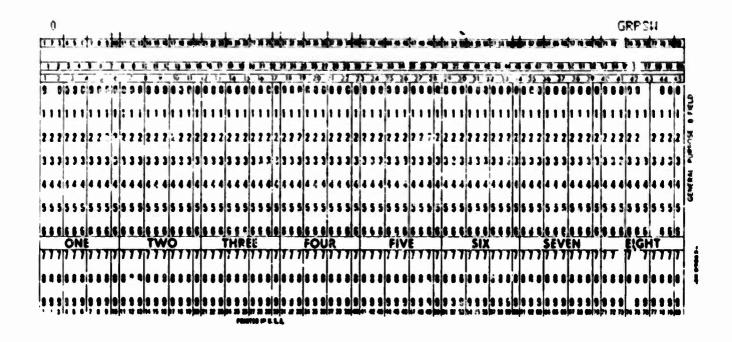
the three fields are the unit DTM number (only required for Mode 2), the weighting factor, and the attribute selection number. Not input if GRPSW $\neq 1$ or 2.

AGGRSW. The value of AGGRSW indicates whether or not support unit aggregation rows may be represented in the model. These aggregates may correspond to functional areas. A strength and a cost row is generated for each aggregate; the row names and types are user-specified.

AGGRSW = 1 ... support unit aggregates, specified in detail below, may be generated.

otherwise ... no support unit aggregates will be generated.

Support Unit Aggregate Specifications. If support unit aggregates may be represented in the model (AGGRSW, above, = 1), this data defines the number and type of aggregates. Up to 25 aggregates may be represented. A single support unit type may appear in more than one



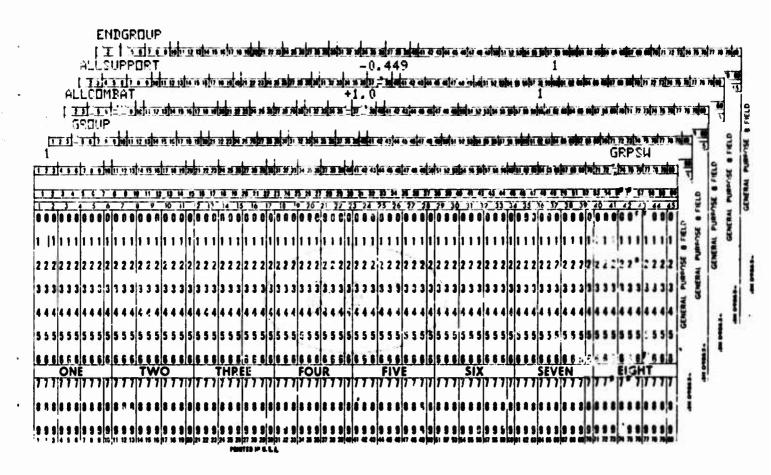


Fig. 28—Sample Mode 1 Unit Group Constraint Data

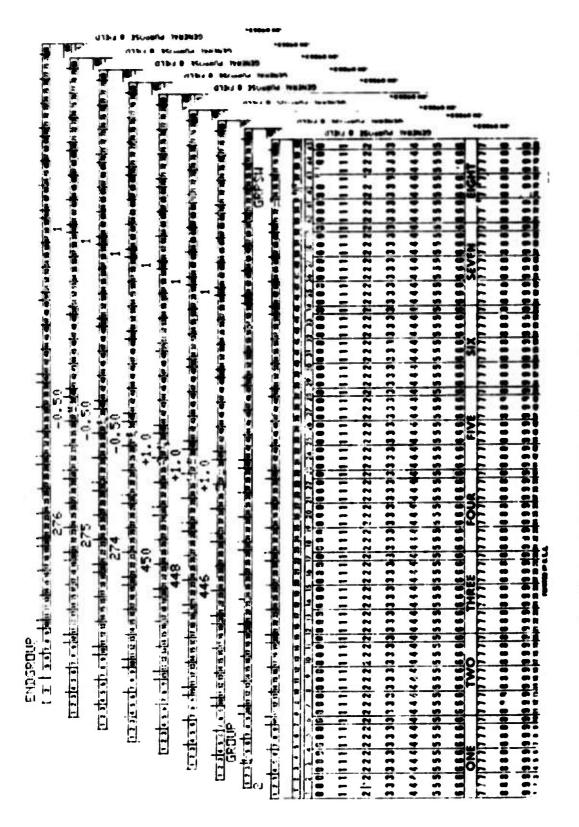


Fig. 29 - Sample Made 2 Unit Group Constraint Date

aggregate. A header card for each aggregate and a trailer card for the entire segment of data is required. The format of each header card is card columns

1 - 9 21-22 36 38

AGGREGATE label strength row type cost row type where "label" is two (2) alphanumeric characters to be used in the strength and cost row names of the aggregate, and the row types may be

"+" ... total aggregate strength or cost & RHS values.

blank ... total aggregate strength or cost = RHS values.

"-" ... total aggregate strength or cost ≥ RHS values.

"F" ... total aggregate strength or cost unconstrained by RHS values.

The aggregate is further defined by one data card for each support unit type to be included in the total. These cards immediately follow the corresponding header card. The format of each card is

card columns

31 - 33

DTM number (right justified).

Figure 30 shows sample support unit aggregate data cards.

CSSW, CLSW, SRSSW, SRLSW, SFSSW, SFLSW. The values of these variables indicate whether or not various types of unit deviations are to be allowed in the model

CSSW is the switch for combat unit shortfalls from RHS values.

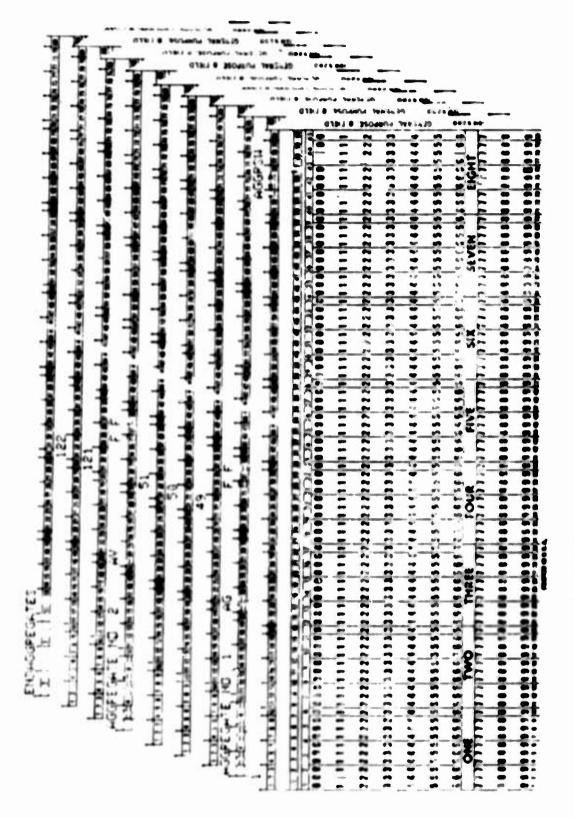
CLSW is the switch for combat unit longfulls from RHS values.

SRSSW is the switch for support unit shortfalls from allocation rule requirements.

SRLSW is the switch for support unit longfalls from allocation rule requirements.

SFSSW is the switch for support unit shortfalls from RHS target values.

SFLSW is the switch for support unit longfalls from RHS target values.



. 38-Semple Support Unit Aggregate Date

2 ... model deviation variables will be generated, weighted by unit cost.

3 ... model deviation variables will be generated, weighted by 1.0 (number of units).

(CSSW,CLSW, SRSSW,SRLSW, > otherwise ... no unit deviation variables will be generated.

Input format:

612

six values on one card, elways input.

Limits on the amount of deviation are defined below.

Unit Deviation Tolerances. If any of the unit deviation switches above were turned on, data must be included here to define on a unit-by-unit basis, limits on each type of deviation. First data is input for CSSW if turned on, then CLSW, then SRSSW, etc. A row type indicator and a real number must be input for each unit applicable to each switch. Thus, for CSSW and CLSW, a pair of values must be input for each combat unit type. For the other switches, values must be input for each support unit type. The model logic for representing unit deviations is discussed in detail in Chapter 2, but a few notes here may be useful.

Unit deviation variables are limited with respect to the corresponding unit solution variable. Thus, if one were representing support unit shortfalls from allocation rule requirements and wanted this deviation to be exactly 20 percent of requirements, then the solution

variable would be exactly 80 percent of requirements, and the deviation variable would be 25 percent $(\frac{.20}{.80})$ of the solution variable. In this case, the limiting row type would be specified as "=" (blank input value) and the value as 25 percent (input value of .25). If longfalls were being represented, and were wanted to be 10 percent of allocation rule requirements (or a RHS target value), then the solution variable would be 110 percent of requirements and the longfall variable would be 9.09 percent $(\frac{.10}{1.10})$ of the solution variable. Except for this difference between shortfalls and longfalls, the calculation of the value to be input is the same no matter the type of deviation of the type of the row. Table 2 lists values to be input for various deviation limits.

Table 2

INPUT VALUES FOR VARIOUS UNIT DEVIATION LIMITS
WHEN LIMIT IS EXPRESSED AS FRACTION OF
ALLOCATION RULE REQUIREMENTS OR RHS
TARGET VALUE

	Input ve	Input value				
Limit	Shortfall (Limit/(1-Limit))	Longfall (Limit/(1+Limit))				
.01	.0101	.0099				
.05	.0526	.0476				
.10	.1111	.0909				
.15	.1765	.1304				
.20	.2500	.1667				
.25	•3333	.2000				
.50	1.0000	•3333				

For this model logic, "deviations & some \$ of requirements or target values" are represented by ">" rows. Data must be input for the units in the order in which they are modeled.

DAG

As for other data items, the row type indicator may be:

"+" ... ≤ row

blank ... = row

"-" ... ≥ row

"F" ... unconstrained row.

Input format:

10(A1,E7.5), data for one switch at a time, only input if corresponding switch is turned on.

Sample unit deviations data is shown in Fig. 31.

Hand-Prepared Matrix Structure. During CONGEN execution, any matrix structure that is hand-prepared by the user may be read from system input and included in the matrix at the end of the automatically generated matrix structure.

No matter what the level of generality of a specialized LP matrix generator, the need is foreseen for the inclusion from time to time of very special structures. The hand-generated matrix structure of "handgen" concept provides this additional model generality. The user may hand-generate some structure that is additional to that generable by CONGEN, or he may suppress the CONGEN generation of some structure and hand-generate his own version of it. During any future model logic development, this concept may provide the most efficient means to test new logic prior to inclusion in the matrix generator itself.

Matrix structure is read until a terminator card is encountered. The terminator card must always be present. Handgen may be input in the form of new row or column vectors. Rendom handgen input of the coefficients of new columns is not allowed. Additional coefficients for "old" rows and columns may be input here, but the column name will be duplicated in the list of column names output by CONGEN (unit 1). Handgen must be prepared in a format of the MPS in which the matrix is being generated as specified by input data variable LANGSW above. These formats are

MPS/360 (LANGEW = 1)

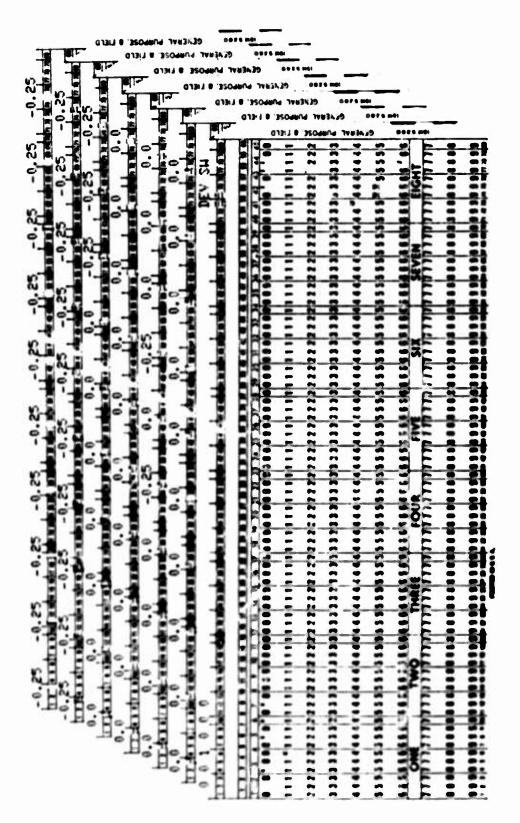


Fig. 31-Sample CSSV, CLSV, SRSSV, SRLSV, SFSSW,

card column

OPTIMA (LANGSW = 2)

card column

The row type indicators are

blank ... = row

"+" ... ≤ row

"-" ... ≥ rov

"F" ... type free, unconstrained row

The terminator card is simply a card blank in the row name field. Fig. 32 is an example of a handgen input data set.

RHS, Bound, Range Data. RHS values of CONFORM model rows, upper and lower bounds on model columns, and upper and lower ranges on model row linear forms (MPS/360) or logical variables (OPTIMA) represent the values of many of the constraints of CONFORM LP models. Several alternative sets of these values may be included in a single model. The CONGEN operator must prepare any such data in the format of the MPS in which the matrix is being generated (see input datum LANGSW). These cards are input as a separate data set after CONGEN execution, and are concatenated with the row identification and matrix element files output by CONGEN to form the complete LP problem file for input to the MPS. This whole data set must have at least a terminator card:

"ENDATA" in columns 1-6 for MPS/360

or "ENDFILE" in columns 2-8 for OPTIMA.

RHS values. For MPS/360 any RHS values should be preceded by a card with "RHS in columns 1-3. The RHS values of CONFORM model rows represent:

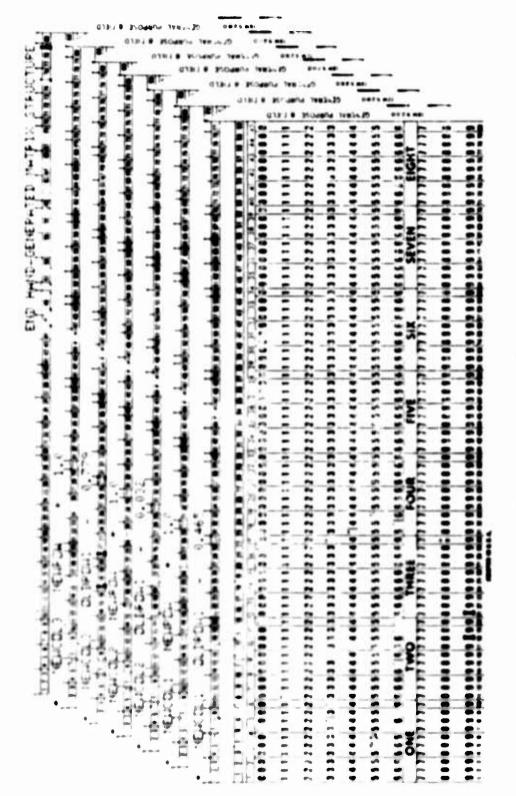


Fig. 32—Sample Head-Propered Metric Dete in MPS-360 Former

(a) The number of each combat unit type in the force. One basic model row is generated for each combat unit type. The type of each row is user-specified (see input datum NCON). Frequently these rows are equalities, and one RHS value is input for each row to specify the number of that type of unit to be in the force. The four character names of these model rows are

where ijk is the DTM number of the combat unit. These RHS values should be non-negative.

(b) The number of "optional" support units and/or the amount of "augmentation" or "deletion" of support units. One basic model row is generated for each support unit type, including dummy units, whether or not there actually are any allocation rule requirements for it. The type of these rows is user specified (see input datum ALRTYP), but is usually "=" meaning exactly or "≤" meaning at least as many units as specified by allocation rules. Negative RHS values of these rows introduce into the force that number of units in addition to any allocation rule requirements for it. The units support tail is automatically introduced also. Negative RHS values of these rows may thus be used to represent Battalion Slice "optional" or "augmentation" units. Positive RHS values of these rows delete that number of units from whatever was specified by allocation rules. Support tails are also deleted. The four-character names of these model rows are

where ijk is the unit's DTM number.

- (c) Upper or lower limits or fixed values of total combat, support and force strength and cost. Six resource constraint rows are generated in each model on:
 - (1) Total combat strength, row "TRSTRL".
 - (2) Total support strength, row "TSSTRL".
 - (3) Total force strength, row "TFSTRL".
 - (4) Total combat cost, row "TCCSTL".
 - (5) Total support cost, row "TSCSTL".
 - (6) Total force cost, row "TFCSTL".

The type of each of these rows is user-specified (see input RESCON). Thus, RHS values of these rows may represent floors, ceilings or fixed values on the corresponding resource, or may be unconstraining. Since all coefficients in the rows are non-negative, these RHS values should be non-negative.

- (d) Upper or lower limits or fixed values of any combat unit effectiveness indices. Up to six combat unit indices may be generated in a model. The number and name and type of each is user-specified (see input data NEFF, EFFLAB, EFF). Frequently these rows are only generated as unconstraining for use as alternative objective functions and/or to simply report their values. Since the standard sense of optimization in most MPSs is minimization, and one would most often want to maximize these functions, these functions are generated with all non-positive coefficients. Thus if any RHS values are used, they should be non-positive, and the actual row type should be the opposite of the conceptual one.
- (e) Upper or lower limits or fixed values of the strength and cost of any support unit aggregates. Up to 25 aggregates of support units may be generated in a model. Two rows totaling the strength and cost are generated for each aggregate. The names and types are user-input (see input datum AGGRSW and following). All coefficients in these rows are non-negative, and thus any RHS values should be non-negative. The rows may be unconstraining, to be used as alternative objective functions or simply to report the totals. The row names are

[a,b,"S","T","R"] for strength
[a,b,"C","S","T"] for cost,

where ab is a two-character identifier input for each aggregate.

and

RAC

(f) Target values for support units. If support unit force short-falls and/or longfalls are represented (see input data SFSSW and SFLSW), a special row is generated for each support unit type, including dummy units. A non-negative RHS value of each of these rows represents a target or goal for the number of each support unit in the force. Frequently total deviations (short- and longfalls) from all such targets are to be minimized. The five-character names of these rows are

["S",i,j,k,"F"],

where ijk is the DTM number of the unit.

(g) Change RHSs. Frequently in advance of model generation and solution, the CONFORM analyst will know the type or types of post-optimal analyses he may wish to perform. If these include parameterization of one or several RHS values, he may specify in advance the change RHSs needed and include them in this data set instead of waiting until after model solution and using a MPS REVISE to set them up. Parameterization of RHS values may be described by

effective RHS = RHS + ϕ * (change RHS), where the value of ϕ is changed while maintaining primal and dual feasibility. Thus as an example, the change RHS specified in MPS/360 format as

CRHS C905 = 3.0

would allow the increasing of the number of combat unit 905 above that specified in an original model RHS in increments of 3.0 units for each increment of 1.0 in .

Bounds. Eounds data specify upper and lower bounds on the solution values of model columns. For MPS/360 this data must be preceded by a card with "BOUNDS" in columns 1-6. There is no standard requirement for bounds on CONFORM model variables. One way in which it might be used, however, is to specify that certain units (for example combat units) be held in a fixed ratio. In this case a single additional model column is generated to represent the mix or ratio of units. Bounds may then be placed on the level of this mix column. Another use of bounds is to limit the number of individual unit types in a force. This would be done by bounding columns "Ci,k" or "Ci,k". The use of bounds in this way should be in conjunction with the use of support unit requirements deviations, to insure feasibility.

Ranges. For MPS/360 range data specify upper and lower limits on row linear forms (Σa_i , x_j). For OPTIMA this data defines limits on the row logical variable (lgl_i in Σa_i , x_j + lgl_i = RHS_i). For MPS/360, this data must be preceded by a card with "RANGES" in columns 1-6. There is no standard requirement for ranges in CONFORM models, but it is conceivable that they may be useful in some application.



Matrix Coefficients. User-prepared matrix structure may be input in this data file instead of or in addition to the "handgen" data set of actual CONGEN execution. If it is, it should precede any RHS, bounds or ranges data. See Fig. 33 for sample data set inputs.

Input from Hand-Prepared Data

In this section, each input data item peculiar to CONGEN matrix generation based on hand-prepared basic structural data is discussed. As in the previous section, each input data item is presented in its order of input, but only those differing from the above description are discussed. Some sample data values are given.

PRBNAM. Same as discussed above.

LANGSW. Same as above.

<u>DATSOR</u>. Same as above, except that DATSOR always = 2 for this mode of input.

Hand-Prepared Basic Structural Data. In this mode, all basic model structural data is hand-prepared (is not the automated output of any known theater force model) and read by CONGEN from system input. There are three logical sections of data:

- (a) the number of combat and support unit types
- (b) unit characteristics
- (c) unit allocation rule coefficients and possible tolerances.
 Data items of these three sections are discussed in their order of input.

NCOMET. NCOMET is an integer variable that is the number of combat unit types to be represented in a model. Figure 34 shows an example of a NCOMET data card.

Input format:

15

DAG

one value, on one cerd, right justified in columns 1-5, always input.

NSUPRI. MSUPRI is an integer variable that is the number of support unit types to be represented in a model. Figure 34 shows an example of an NSUPRI data card.

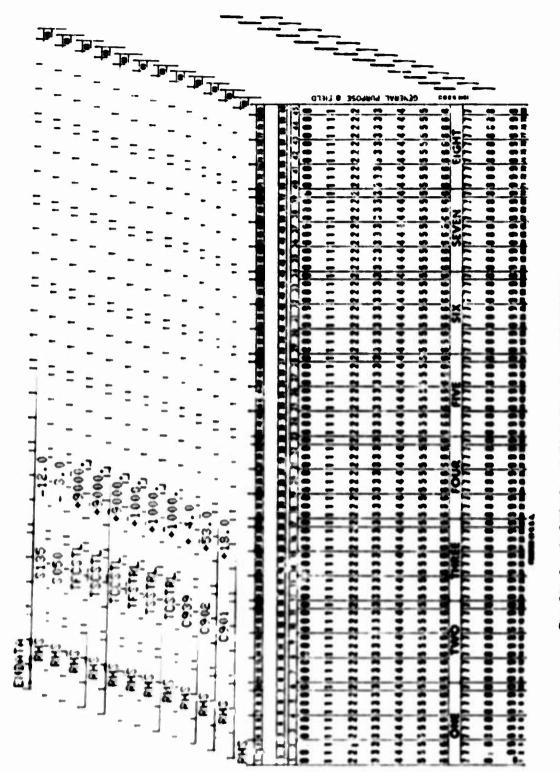


Fig. 33—Sample BMS, Board, Roage Date Set in 16PS/360 Former

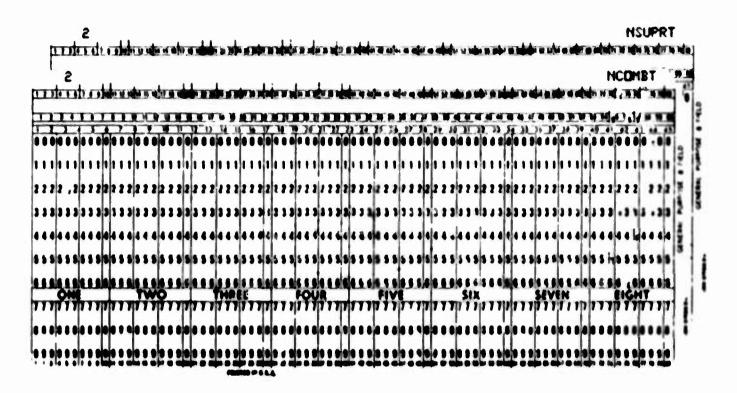


Fig. 34—Sample HCOMBT, NSUPRT Date Cords

Input format:

15

one value, on one card, right justified in columns 1-5, always input.

Unit characteristics. One data card must be input for each of the NCOMBT + NSUPRT unit types modeled, specifying the unit's DTM (or other 3-digit identification) number, title, SRC number, strength, and cost. The order of appearance of these data cards is the order of the unit types in the model generated. The data for the NCOMBT combat unit types must appear first in this section of data. The structure of each data card is:

card column

Figure 35 is an example of unit characteristics data cards.

laput format:

(14,2x,7A4,2x,2A4,A3,2x,15,2x,E11.6)

five values per card, NCOMBT + NSUPRT cards, always input.

Unit allocation rule coefficients and tolerances. This data segment specifies the allocation rule coefficients and any permissible deviations from them. This segment must have a header card

card columns

1 - 7

REGCOEF

and a trailer card

card columns

1 - 7

ENDCORY.

One data eard is input for each positive allocation rule coefficient. The structure of each of these eards is:

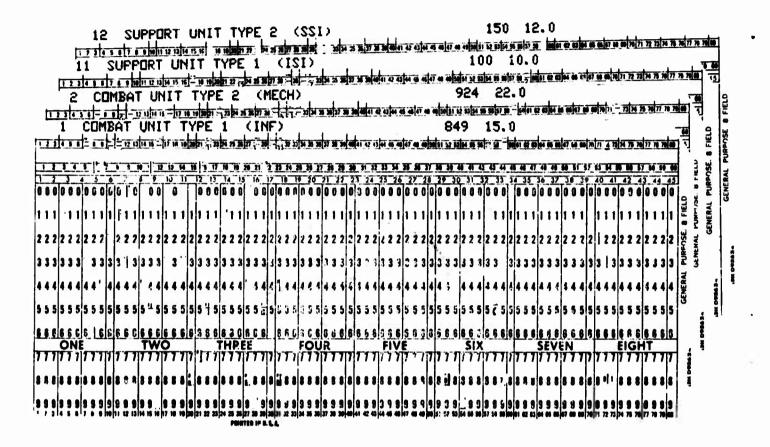


Fig. 35—Sample Unit Characteristics Data

card column

12 17 20-31 37 - 48 56 - 65 10 15 supported unit supporting unit coefabsolute absolute identification identification ficient value value number number of maximum of maximum (right justified) (right justified) allowable allowable upper lower deviation deviation (decimal fractions of coefficient)

Figure 36 is an example of allocation rule specification data cards.

Input format:

(9X,13,2X,13,2X,E12.6,5X,E12.6,5X,E12.6) five values per card, always input.

NEFF, EFFLAB, EFF. Same as above.

NCON. Same as above.

RESCON. Same as above.

ALRTYP. Same as above.

TOLRSW. Same as above.

Allocation Rule Coefficient Tolerance Specification. No header, data, or trailer cards are read here since any tolerances were specified along with the coefficients on the allocation rule data cards above.

SUBSW. Same as above.

Allowable Support Unit Substitutions Specifications. Same as above.

UMIXSW. Same as above.

Unit Mix Constraints Specifications. Same as above.

GRPSW. Same as above.

Unit Grouping Constraint Specification. Same as above.

AGGRSW. Same as above.

Support Unit Aggregation Specification. Same as above.

CSSW, CLSW, SRSSW, SRLSW, SFSSW, SFLSW. Same as above.

Unit Deviations Tolerances. Same as above.

Hand-Generated Matrix Structure. Same as above.

RHS, BND, RNG Data. Same as above.

the military william to market in a corp. o

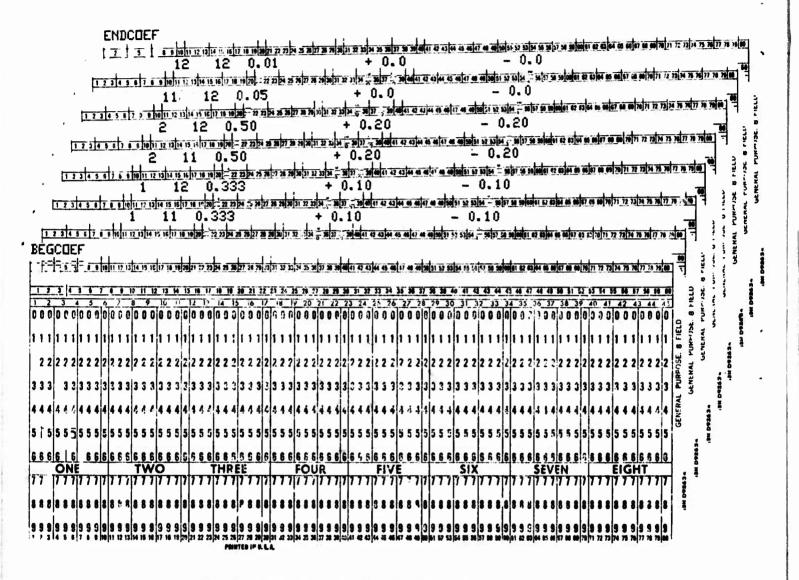


Fig. 36—Sample Allocation Rule Coefficient Data

Restoration of Basic Structural Data Arrays

This section presents each input data item for CONGEN matrix generation based on restoration of basic structural data arrays from binary dumps of those arrays produced on a previous CONGEN run. On every CONGEN run, a binary file (unit 10) is written. This file consists of six logical records which are dumps of the values of certain CONGEN basic structural data variables and arrays. The records are:

- (a) NCOMBT, NSUPRT, NANZ, NBNZ
- (b) COEF(8000)
- (c) KJCOEF(8000)
- (d) DIM(760)
- (e) STRNTH(760)
- (f) COST(760)

This data file may be saved. When a subsequent model will have the same basic structural data this data may be quickly read, bypassing the Battalion Slice output tapes and card deck, or some of the hand-prepared input data.

PRBNAM. Same as above.

LANGSW. Same as above.

 $\underline{\text{DATSOR}}$. Same as above, except that must always = 5 for this mode of input.

Basic Structural Data. A binary file of six logical records (unit 10) defined above in terms of variable and array names, is read in its entirety.

NEFF, EFFLAB, EFF. Same as above.

NCON. Same as above.

RESCON. Same as above.

ALRTYP. Same as above.

TOLRSW. Same as above.

Allocation Rule Coefficient Tolerance Specification. Same as for input in Bn Slice mode (DATSOR = 1).

SUBSW. Same as above.

Allowable Support Unit Substitutions Specifications. Same as above.

UMIXSW. Same as above.

Unit Mix Constraints Specifications. Same as above.

GRPSW. Same as above.

Unit Grouping Constraint Specification. Same as sove.

AGGRSV. Same as above.

Support Unit Aggregation Specifications. Same as above.

CSSW, CLSW, SRSSW, SRLSW, SFSSW, SFLSW. Same as above.

Unit Deviation Tolerance. Same as above.

Hard-Generated Matrix Structure. Same as above.

RHS, BND, FNG Jeta. Same as above.

CONGEN OUTPUT

The output of CONGEN consists of a one-page generation summary and data files defining the LP model, a possible solution, and information about it that is passed to the LP reporter, CONREP. The specific output is:

- (a) One page of generation summary statistics, printed directly on system output. Figure 37 is an example of this page.
- (b) A card-image file of model row names. The first card is the "NAME" (MPS/360) or "FILE" (OPTIMA) card. This is output on FORTRAN unit 7. Figures 38 and 39 are examples of this output.
- (c) A card-image file of model coefficients. For MPS/360 the first card is the "COLUMNS" card. This is output on FORTRAN unit 4. Figures 40 and 41 are examples of this output.
- (d) A card-image file of candidate LP basis vectors, both row and column, that may be used for advanced starts to model solution. This is output on FORTRAN unit 3. Figure 42 is an example of this output.
- (e) A card-image file of unit DTM numbers, titles, SRC numbers, and TPSNs which is passed to CONREP for use in the reports. This is output on FORTRAN unit 2.
- (f) A binary file of data to be passed to CONREP. This is output on FORTRAN unit 11.
- (g) A binary file of data that may be used on a subsequent CONGEN run to bypass the processing of Battalion Slice data. This is output on FORTRAN unit 10.

		I D MAT	COMFORM PIX GENEPATION SUMMARY
			2 10
		34	COMBAT UNIT TYPES
		554	SUPPORT UNIT TYPES
TATAL	POWS SENEPAYED	645	PONTO IS FORTRAN LOGICAL UNIT 7
TOTAL	STPUCTUPAL COLUMNS GENERATED	588	COLID IS UNIT 1
TOTAL	NON-NULL MATPLY COEFFICIENTS	12803	MATRIX ELEMENT FILE IS UNIT 4
TOTAL	CANDIDATE PASIS VECTORS	645	ADVANCED START BASIS IS UNIT 3
	MUTEEXCENT FOR NUMBER OF	COMPAT	AND SUPPORT UNIT TYPES MODELED.
	AULEEXCLUT EUD MANAED UE	COMBAT	AND SUPPORT UNIT TYPES MODELED, BY HAMD-PREPARED MODEL (MATRIX)

Fig. 37—Sample Generation Summary Statistics Page of CONGEN Output

NAME ROHS		BASE		<u> </u>		-		
- N	TFSTRN							
N	TCSTRN							
N	TSSTRN							
N	TFCOST						•	
N	TCCOST		-					
N	TSCOST							
N	TOEV							-
N	TATIFP							
N	TAPIFP					•		
N	TIFP							
	THOBSH					5.5		
	TINTEL							
	†0 00 · · □							-
	C902							
	5032		٠	~				
	2106			•				
	S008					the state of the s		
	S01C							
	3025		- •					
	S032							
	5051						-	
	S106							
	S112			• • •				
	S113							
	S130		•			•		- ·
	S145							
_	S165 - S167							
	S168					_		
	S175							
_	\$ 102		·	··· /				
	S186							
	S190		-		ya			miner bil
	S190							
	5194				- · · · · · · · · · · · · · · · · · · ·			
	S270							
_	J							

Fig. 38—Example of Row Identification Section—Unit 7—of CONGEN Output in MPS/360 Format

FILE	BASE		
ԼGL	TESTRN.	(F)	
LGE	TOSTRN.	(=)	•
LGL	TSSTPN.	(F)	
LGL	TECOST.	(=)	
LGL	TCCOST.	(F)	
LGL	TSCOST.	(=)	
LGL	TATIFP.	(F)	
_ rer .	TAPTEP.	(下)	
LGL	TIFP .	(F)	
LGL	TMORSH.	(F)	
LGL	TINTEL.	(F)	
LGL	TCCC .	(=)	
LGL	C931 •	(7)	
- LGL	S002 • " -	(a)	
LGL	5394 .	(P)	
LGL	5036 .	(P)	
「じ」	S012 ·	(2)	
LGL	SU14 .	(P)	
LGL	5015 .	(0)	
LGL	S032 .	707	
LGL	5051 .	(0)	
LGL	S197 .	(0)	
LGL	S110 .	(7)	
LGL	S113 •	(2)	
LGL	S128 .	(0)	
ี เดเ	S137 .	(5)	****
LGL	S145 .	(0)	
LGL	S165 .	(2)	
LGL	S168 .	(5)	
LGL	S176 ·	(2)	
LGL	S178 .	(P)	
EGF	\$195	(5)	
LGL	S190 ·	(P)	
LGL	\$192 •	(0)	
LGL	S194 ·	(5)	
LGL	S270 ·	(0)	
LGL	S271 •	(0)	
- ·			-

Fig. 39—Example of Row Identification Section—Unit 7-of CONGEN Output in OPTIMA Format

COLUMNS			• •		
C902	TFSTRN	•	.889030		
C99 2	TCSTRN	•			
C90 2	TFCOST	•	8.730004		
C902	TCCOST	•	6.730004		
C90 2	TATIFP	-	4.600000		
C902	TAPIFP	•	15.100000 -		
C90 2	TIFP	-	19.703000		
C99 2	· THOBSH =		2.000000	· W Fi •	1 -
C90 2	TINTEL	-	1.100606		
C90 S	TCCC	-	1.400000		
6905	C902	•	1.600000		
C90 2	5002	•	005464		
C902	S006	•	.008317		
C98 2	- Suda	+	056543		
C902	S010		.202479		
C98 2	S0 25	_ -	103/14		
C90 2	S032	. •	.605464		
C90 2	30 5 1	• • • • • • • • • • • • • • • • • • • •	056543		
C902	S1 u 6	+	.072727		
090 2			.050612		
C90 2	S113	•	.005464		
C90 2	S130	•	.058612		-
C90 2	S145	•	.103414		
C90 S	S165	+	.856543	•••	
C96 2	S167	•	.056543		
	9166		103414		
C98 2	S175	+	.091809		
C902-	5182		.034499		
C902	S186	•	.042445		
C 98 2	- S19t -	•	.056543		
C9 u 2	\$192	•	.042832		
	3194		.056543		
C90 2	S270	•	.329126		
C90 2	· 9 276 ··	+ =:	062663		- # 10.
C90 2	S276	•	.703578		
C90 2	S29 0	• •	-65122 0		
C90 2	S293	•	.080808		
· C98-2	5296		···· 051486		
C90 2	S3 ú 0	+	.003019		
C90 2	5420		. 9 56543		
C902	S432	•	.056543		

Fig. 40—Example of Matrix Coefficients Section—Unit 4— of CONGEN Output in MPS/360 Format

	5733 .	,0919 .		=+	.331964
AIJ	5755 • 5936 •	,0019		=+	.007183
ATJ	5594	,0210		=+	. 647899
ATJ		,0019		=+	.331597
AIJ		,7019		=+	.024472
ATJ		,0010		=+	.001431
ATJ		0910		±+	.04965a
ATJ		5919		=+	. 94 865 Q
AIJ		raja		=+	.01:426
ATJ	5997 •	,^919		=+	.051150
ATJ	519?	·		=+	.61736E
AIJ	5988 .	,0919		=+	.583000
ATJ	TFSTRL.	,		=+	5930)
AIJ	TOSTPL.	,		=+	5.44(55.8
LTA	TECSTL.	,7719	•	=+	5.341568
AT.J	TOOSTL.	,	•	=+	613000
ATJ	TESTEN.	•	•		.613000
AIJ	TOSTON.	,	•	=+	5.117561
ATJ	TECOST.	,	•	=+ ===	5.117651
AIJ	TOURST.	•	•		.203000
ATJ	TATIFD.		•	=-	15.773600
ATJ	TAOIFD.	•	•	=-	15.900000
AIJ	TIFO .	,3920	•	= -	-
ATJ	TMORSH.	*3050	•	==	1.305000
AIJ	TINTEL.	,6926	•	=-	.453633
ATJ	TCCC .	,002C	•	=-	.55.000
ATJ	0320	,caso	•	=+	1.000000
ATJ	5294 .	"Case	•	=+	.005452
AIJ	5339 .	,0926	•	=+	.626093
ATJ	5145	,coso	•	=+	.117772
ATJ	5630 .	1056	•	=+	.11777?
ATJ	5175 .	,0020	•	=+	2009002
AIJ	5572	,0920	•	=+	.03AC30
ATJ	5113 •	.0920	•	=+	.038639
ATJ	S125 •	.0920	•	=+	.091583
۸IJ	5290	,5026	•	=+	.021850
	0456	,0920	•	=+	.128342
ATJ	0.70	Casū		=+	.003033
ATJ	0450	, , , , ,	•	=+	.117772
ATJ	0.37	35.00	•	=+	.095755
ATJ		, ,0056	•	=+	.03R149
ATJ	5963	6729		=+	.055490
ATJ	9962 • 9964 •	,7020		=+	.04C867
ATJ) m n + •	,	5		

Fig. 41—Example of Matrix Coefficients Section-Unit 4-of CONGEN Output in OPTIMA Format

NAME	TAPES -	
XF C305	C902	
- XL C905	3305	
XL C986	Su 0 6	
XL C907	5008	
XL C939	SU 10	
XL C919	3025	ender of the control of the date of the control of
XL C920	S0 32	
XL C924	- 5051	* 1 ***** **** **** *** ****
XL C928	S106	
XL C929	5112	
XL C932	S113	•
XL C938	5130	es la
XL C943	S145	
XL C949	-3165 ·	
XL C951	S167	
XL S002	- S168	Many or year and a second or
XL SDD 2RS	S175	•
XL 5003	5182	A 4 1 1 10 10 10 10 10 10 10 10 10 10 10 10
XL SDO3RS	S186	
XL -3004 -	- 5190	
XL SJ04RS	S192	
XL 5365	S194	· •(•)- ·
XL SUD5RS	S270	
XL 5086	5276	
XL SOUGRS	S278	
XL SUO 7	3290 -	
XL SOO7RS	S293	
XL 3006	5296	17 P. 0 1 100 100 100 100 100 100 100 100 10
XL SOJERS	530 C	
XL - SU 0 9	5420	
XL SOO 9RS	5432	
XL - 5016	- 55 18	
XL SULURS	5520	
XL 5011	5532	es de destablisher de 1 mars up
XL SOLIRS	5534	
~ JJ-6	·· \$548	
XL SO12RS	S630	
XL -5013	- 367 2-	

Fig. 42—Example of Advanced Start Basis-Unit 3-of CONGEN Output in MPS/360 Formet

(h) A card-image file of model column names. This has proved useful in some solution strategies using OPTIMA, but most likely is useless when using MPS/360. This is output on FORTRAN unit 1.

Normally after CONGEN execution, to produce a complete LP model for input to the PPS for solution, the row identification file (unit 7) the matrix element file (unit 4), and the user prepared RHS, bounds and ranges data are concatenated to form a single data file.

Chapter 4

MODEL SOLUTION

The output of the CONFORM automated LP matrix generator, CONGEN, is essentially a complete statement of the model in card-image format. The model is input to a commercially available mathematical programming system (MPS) for solution, and that solution is input to the COMFORM IP reporter to produce English-language reports for use by the force planner. The MPS, available at USAMSSA, is IBM's MPS/360. The MPS at RAC is CDC's OPTIMA. CONGEN can generate a model in the format of either MPS/360 or OPTIMA.

Through the use of the control statements of the MPS, the CONFORM analyst converts the card-image model to an internal form (more efficient for computation), selects an objective function and a RMS vector from alternative ones in the model, may input a starting point for solution, applies a solution algorithm, and produces reports in the format of the MPS. Figure 43 is a listing of a sample sequence of MPS/360 control statements used to solve a CONFORM model.

ADVANCED STARTS TO MODEL SOLUTION

Insight to the logical and mathematical formulation of an LP model may be exploited to achieve improved solution efficiency. The analyst would like to reduce the time and number of iterations leading to a solution. Whatever the starting procedure, it too must consume time and effort; the practical criterion of course is the total expended in preliminary and solution procedures. Strategies for advanced starts to LP problems center on the selection of a subset of a problem's vectors. A set of linearly-independent vectors that span the space of a problem is called a basis. The conventional process of LP solution

CONTROL PROGRAM COMPILER - MPS/360 V2-M10

0001		PROGRAM('ND')
0.12		INITIALZ
0065		MVADR(XDOFREQ1.SAV)
3066		XFREQ1-50
9567		XFREE=49152
3069		HVADR (XDONFS, OUT)
0069		MOVE (XDATA, "USERT3")
9079		MOVE(XPBNAME, 'TESTFOUR')
0.71		MOVE(XOLDNAME. TESTFOURT)
0072		MOVE(XOBJ. TDEV')
0073		MOVE (XRHS, "RHS")
OC 74		MVADR (XMAJERR . CON)
0075		CONVERT(SUMMARY)
0076	CON	SETUP
0077		MYADR (XMAJERR, CON2)
3078		MOVE(XDATA, 'TAPE3')
0079		INSERT('FILF', 'TAPE3')
2080		PRIMAL
0081	TUO	SAVE('NAME' , 'TSTFUR')
0:62		SOLUTION
0383		ASSIGNI'CODE', 'FTC7FCC1', 'COMM')
0084		PREPOUT('CODE')
UC 65		SOLUTION('FILE', 'CODE')
J:86		FREECORE
0987		CONFIL(8)
INVALID FUNCTION NAME.		
98 70		EXIT
6089	SAV	SAVF('NAHE', 'TSTFUR')
0090		CONTINUE
00.91	CONZ	STATUS
OC 92		FXIT
0093		PEND

Fig. 43—Sample MPS/360 Control Sequence

proceeds from an initial basis through as many bases as necessary to discover first a feasible and then an optimal one. The challenge to the analyst is to pick either an initial basis that is "better" than the MPS's own choice or to limit (at least temporarily) the MPS's choice of bases so that the likelihood of early discovery of a "good" basis is increased.

Experimentation was conducted on CONFORM models to determine general rules for selection of a superior starting basis. The rules were kept uncomplicated and fairly general for easy incorporation into CONGEN. Rules were discovered, and CONGEN outputs a candidate LP bases vector list (CONGEN unit 3).

The experiments resulted in a generalized definition of a vector class which cut total solution time—number of iterations of a primal algorithm—to zero for a CONFORM "base case" or "calibration" run, and by about 2/3 relative to starting points automatically chosen by the MPS for more complex models. However, for a complex model similar to one already solved, it is likely better to use the optimal basis to the former problem as the initial bases of the new one than to start from the CONGEN vector list. Unfortunately, the break even point at which sufficient problem similarity ends and too much newness begins is not predictable.

The general rules for selection of vectors (if generated) for inclusion in the starting list is:

- (a) For rows (logical vectors) add:
- (1) All alternative objective functions and unconstrained rows not usually thought of as objective functions.
 - (2) All strength, cost and effectiveness limits rows.
 - (3) The "unit group constraint row."
 - (b) For columns (structural vectors) add:

MAE

- (1) The basic column for each combat and support unit type.
- (2) The combat unit shortfall and longfall columns.
- (3) The support unit requirements shortfall and longfalls columns.

- (4) The support unit force shortfall and longfall column vector.
 - (5) The allocation rule coefficient lower deviation columns.
 - (6) The unit mix columns.

These rules define a vector class that is generally equal in size to the number of model rows—"m". When CONGEN is outputting the matrix in MPS/360 format, it never produces a list greater than "m", and it associates a row name not in the list with every column name in the list for use by MPS/360's INSERT. For use with OPTIMA, the list is input to the MAPIN procedure.

OUTPUT FOR CONREP

Figures 44 and 45 are examples from MPS/360's "SOLUTION" report procedure. Figures 46 and 47 are examples from OPTIMA's "RECORD" procedure. The output produced by OPTIMA's "RECORD" is readable directly by the analyst or CONREP. However, CONREP cannot read directly the output of MPS/360's "SOLUTION". To produce output from MPS/360 that is readable by CONREP, a small CONFORM program, CONFIL, has been written that is called into execution from within MPS/360, reading the output of "SOLUTION" and writing a file of row and column solution values that can be read by CONREP. The CONFIL program is documented in Appendix D.

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Fig. 44—Sample Page from the Rows Section of MPS/360's SOLUTION

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799	C903	88	9.00000	.78700	•	MONE	
663	C904	88	00000*6	. 76800	•	NONE	
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999	6063	98	00000-9	.16100	•	MONE	
699	C912	BS	15-00000	.95100	•	NONE	
670	C913	Se	5.00000	-18200	•	MONE	
671	C914	88	9.00000	.51200	•	MONE	
672	C915	88	3.00000	• +0000		NONE	•
673	C917	98	3.00000	.45700	•	MONE	
419	6163	88	27.00000	-58400	•	NONE	
675	C920	88	00000-9	.61400	•	MONE	
676	1263	92	3.00000	• 64000		MONE	
677	C922	88	12-00000	.26400		MONE	
678	6263	2	000001	0000	•	MONE	
619	C924	88	12.00000	.55900	•	NONE	
9	C927	93	7.00000	. 56300	•	MONE	
189	6263	92	20.00000	. 50700	•	. NONE	
682	6263	S	27.00000	. 56400	•	MONE	
683	C930	92	00000	. 55100		NONE	
100	C932	9	9 00000	.46300	•	WONE .	
082	2,30		• 00000	0064/	•	MONE	
999	C938	9	9.00000	. 52900	•	NONE	
199	C939	82	00000	00449		MONE	
9	0460	80	4-00000	00996	•	MONE	,
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Fig. 45—Sample Page from the Columns Section of MPS/360's SOLUTION

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	LOGICAL INDIC.	L-VALUE	Id	COMPOSITE RMS	
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		-12986. 67680913		2	
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	BASIC	-8775, 6213 6413	.	.	
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Fig. 46—Sample Page from the Rows Section of OPTIMA's RECORD

Fig. 47—Sample Page from the Columns Section of OPTIMA's RECORD

Chapter 5

SOLUTION REPORTING

INTRODUCTION

The model solution report produced by the commercial solution system is unacceptable to a force planner and is even inconvenient for an LP analyst to read. Figures 44 to 47 in Chapter 4 show this. The CONFORM LP reporter—CONREP—is a computer program that produces any of several optional English-language reports of one or two LP solutions from the coded reports produced by the MPS. This chapter provides instructions for their production. The data and parameters required for CONREP before and during execution are discussed and illustrated by examples.

CONREP is written in the FORTRAN language and is designed to permit the CONFORM user to extract a wide variety of information from CONFORM LP solutions obtained under IBM's MPS/360 and CDC's OPTIMA and from the model itself. The production of a CONREP report is subject to program logic, to the values obtained in one or two LP solutions, to data passed from the CONFORM LP matrix generator—CONGEN—and to a user-prepared control deck.

The original force planning problem was translated by CONGEN into a coded form suitable for input to the MPS; the MPS solution is coded identically. A retranslation is required if a solution is to be expressed in the terms of the original problem. CONREP is an efficient solution decoder.

There are seven optional reports or subreports. These are listed in Table 3.

Table 3

SUBREPORTS PRODUCIBLE BY THE CONFORM LP REPORTER (CONREP)

Force Summary

Peacetime Cost Summary

Troop Deck

Troop List

Unit Allocations

Unit Deviations

Unit Support

EXAMPLES OF CONREP SUBREPORTS

This section contains examples of the optional CONREP subreports with explanatory text. The discussion of each subreport includes a section, "Request". Request keys the corresponding argument of the CONREP control verb REPORT for reference to the discussion of that particular argument in the next section on control verbs and data requirements.

Force Summary Report

Request:

REPORT SUMMARY

Purpose:

To summarize on one page force strengths and costs, combat unit effectiveness indices, and strength and cost values of the alternative and force deviations and requirements deviations for support unit aggregate.

Example:

Figures 48 and 49.

Comment:

In Fig. 48, the top line on the page is information relating the report to the specific LP solution. For reporting of LP solutions produced by OPTIMA, this information is automatically extracted from the solution. For reporting MPS/360 solutions, 132

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Fig. 48—Sample 1-Case Force Summary Report

Fig. 49—Sample 2-Case Force Summary Report

characters are input by the user for each LP solution input to CONREP. The next line is a constant CONREP heading, plus the report page number. The five lines of comments below the subreport title are input by the user for this subreport on five cards. The number of division force equivalents (DFE) is input by the user for this subreport, and is used to calculate the strength and cost per DFE. In the support functional areas, force short- and longfalls are the result of comparing this alternative to target values actually in the model or to another LP solution. This example is for a CONFORM "base case" or "calibration run." and thus there are no force short- or longfalls. Requirements short- and longfalls are the differences between actual allocation rule requirements for support units and the number of those units actually in the force. Figure 49 is a Force Summary Report for an alternative to the base case reported in Fig. 48. First note that there are two lines of information at the top of the page. "Case 1" is the alternative, and "Case 2" is the base case to which it is compared. Notice that force and requirements deviations are reported for the support aggregates of this alternative. Negative numbers are shortfalls and positive numbers are longfalls.

Limitations:

Although the LP matrix generator CONGEN allows 0-6 combat effectiveness indicators of any type, CONREP always looks for six and labels them as shown in the figure. CONREP does however use the names that the user input to CONGEN to retrieve the values. A simple CONREP program change is required to change the labels.

Peacetime Cost Summary

Request:

REPORT COSTSUM

Purpose:

To report the cost of the combat, support and total force by each of the budget categories of the FCIS, and by certain subtotals and totals.

Example:

Figure 50 (two pages).

Comment:

This is a two-page report. The first page reports the total of each of the 14 initial investment and 18 annual operating budget categories currently represented in the COSTAL model for the combat force, the support force and the total force. Some subtotals and totals are also reported. The second page reports initial investment plus 10 years operating cost for some representative discounting rates. Total strength is also summarized on this page. The numbers shown in this report are calculated based on the fractional troop list and the cost factors in the special Battalion Slice extraction from FCIS. Some of these cost factors may vary by peacetime station; six peacetime stations are represented. The CONREP user specifies an assumed across-the-board distribution of units at peacetime stations as imput data to this report. This distribution is noted at the bottom of the second page of the report. In this example, all units are assumed to be in CONUS. The report may be executed several times with different distributions.

Troop Deck Report

Request:

REPORT TROOPDCK

Purposus

To report the troop list in a card-image format identiual to that produced by Battalion Slice (DPROG).

Example:

Figure 51.

Comment:

Prom left to right, the information reported here is the DTM number, title, SRC number, TPSN, unit strength, and fractional and integer number of each combat and then each support (including dummy) unit in the force. The format is the same as that of Battalion Slice, except for the omission of the header and trailer card. Also

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ig. 30—Sample Cost Summery Report

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Fig. 38-Sample Cost Summery Report (Cost'd)

Fig. 51-Excerpt from Sample Treep Deck Report

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PAG

CONREP includes all units that are in the model, even if they have a solution value of zero. The output of this report may be punched or simply printed. The report is several pages long; this example is extracted from the middle of it.

Troop List Report

Request:

REPORT TROOPLST

Purpose:

To report the troop list in a full-page format, showing total and per-unit strengths, support and total slice strengths; cost, number of units, or some other measure be substituted for strengths.

Example:

Figure 52 (three pages).

Comment:

This subreport is most useful in conjunction with a "base case" or "calibration run." The example is taken from a "strength base case", i.e., a run that reproduced a Battalion Slice force and in which the objective function was total force strength. The first page of the figure is the first page of the subreport. It reports the combat units. Subtotals are taken.

The subtotal "total fractional slice strength" is equal to the total force strength due to the combat force and the allocation rules only. If there are any optional, augmentation, deletion, or maximum allowable units in Battalion Slice terminology, or any support units with nonzero right hand side (RHS) values in CONFORM terminology, this total will differ from the true total force strength. The second page of the figure shows that the report continues, reporting the same type of information for the support units. The third page of the figure is the last page of the report. It shows that the report continues through the dummy units, reporting support unit subtotals and grand totals. In the grand totals, fractional and integer total units strength is equal to frectional and integer total force strength. In the

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Fig. 52—Excerpts from Sample Troop List Report

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Fig. 52—Excerpts from Sample Troop List Report (Cont'd)

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Fig. 52—Excerpts from Sample Troop List Report (Con'd)

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support subtotals and the grand totals, "Total Support Strength" and "Total Slice Strength" are not meaningful.

Per-unit slice strengths are actually obtained from the LP marginal values or Pi-values. Thus, if the CONFORM run had been a "cost base case", the slice values would have been measured in cost, and unit cost would have been used instead of unit strength to fill-out the rest of the report. The CONREP user specifies whether to use strength, cost, number of units, combat unit effectiveness, or "other" as the unit of measure. The report headings as well as the calculation of values varies according to this specification. The section on LP Marginal Values in Chapter 2 discusses these values in more detail.

Unit Allocations Report

Request:

REPORT ALLOCATN

Purpose:

To report the units that require each support unit, based on allocation rules, and the amount and sensitivity of each requirement.

Example:

Figure 53.

Comment:

This report will probably be most useful when produced once for the "base case" of a CONFORM exercise or run series, and not for any alternative forces. The proport is produced by "supporting unit", including dummy units. The DTM number, title and number of each unit in the force is shown. For each of these units, every unit that requires it is listed—its DTM number, title, and solution value—along with the coefficient of allocation, e.g., "x supporting unit per supported unit". The number of units and men of the supporting unit actually required for the number of each of the supported units in the force are reported in the "SUPTING UNIT SUB TOTAL" and "SUB TOTAL STRNTH" columns. These columns are

	CHATTER PERSON OF S	Solution	4 VALUES (COMPER	RED VERSION	9.6	(2//9)	PAGE 219			
			UNIT ALLOCATIONS REPORT	1					SUBPACE	
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		106			2.000	.001598		200	N	005
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		989	CAN TOP SED L'AVE		16.000	1001597		920-	23	052
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		913	ATP CAVALRY TOP 24CP+		050.4	.661598		900.	•	013
		916	FA 8W, 135WH TOWED 24W+		2.000	.001596		.003	E C	900-
		410	FA SH, 105MM TOWED SEST		0.000	-601597 -031598		216	21	032
		919	1554" SP WECH/ARVD DIV		30.00	.031597		.061	54	123
		426	8.		9.009	.001594		.010		819
		226	FA 94, HONEST JOHN 2DI V		16.000	.001597		920.	23	052
		22	SH. VULCAN AN OTV	1	100-1	. 601597		- 602		003
		926			2.000	-00159			P. F	628
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								4.11	3	

Fig. 53—Excerpt from Sample Unit Allocations Report

totaled to show the total number of units and men of the supporting unit required in the force, based on allocation rules. This example is a base case. The number of supporting units in the force does equal the total of supporting unit subtotal column. If this were an alternative force run, one might expect the number of supporting units in the force to be less than (shortfall) or greater than (longfall) the allocation rule requirements. The LP marginal value of the supporting unit is reported. In this example the objective function used in obtaining the LP solution was total force strength. The marginal value for unit 2 is 20.319, indicating that deleting one unit 2 from the force would remove 20,319 men from the force—unit 2 plus its support tail. This marginal value checks with the per-unit slice strength of unit 2 shown on the second page of Fig. 52. The positive marginal value here is interpreted in the deletion sense, because positive LP model RHS values for support units represent deletions, while negative RHS values represent augmentations. More precisely, the LP marginal value is the rate of change of the objective function per a change of one (1.0) in the corresponding RHS value. For CONFORM base cases, the rate of change of the objective function with respect to a change in the RHS is the same as with respect to a change in the number of units in the force. The final column of values reported are derived from the supported unit marginal value and the solution values of the supported units. These values show the sensitivity of the solution—the force—to changes in the individual allocation rule coefficients. For example, the first value, -.338, indicates that if the coefficient allocating unit 2 to unit 901 were to be increased by 10

committee county

percent, 338 men would be added to the force. These coefficient marginal values are calculated based on

$$\frac{\Delta J}{\Delta a_{ij}} = - \pi_i X_j$$

where

J is the objective function

a;; is the matrix coefficient in the ith row
and jth column

 $\boldsymbol{\pi}_i$ is the LP marginal value of the RHS value of row i

X, is the solution value of column j.

In this example, these values show that this solution is about twice as sensitive to changes in three coefficients that allocate unit 2 (to units 901,902 and 905) than it is to any of the others. As an option the CONREP user may speed up this report by suppressing the (search for and) printing of the unit titles.

Unit Deviations Report

Request:

REPORT TRPLSTX

Purpose:

To report unit-by-unit deviations from target values (force deviations) and from allocation rule requirements (requirements deviations).

Example:

Figure 54 (two pages).

Comment:

(BAC)

This report is most useful for reporting on other than "base case" or "calibration" runs. For each combat and support unit, including any dummy units, is reported its DTM number, title, SRC number, unit strength, unit cost, LP marginal value, and in terms of both number of units and strength the fractional and integer number of the unit in the force, its force deviation and requirements deviation. As for the Force Summary Report, force deviations may be computed from structure within this alternative, or by comparison with another LP solution. In this example this alternative (case 1) is compared to a base case (case 2), as indicated by the top two lines of

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Ng. 54-Excepts from Sample Unit Devictions Report

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in. 54. Escents from Samelo Unit Deviations Report (Cart'd)

the page, to compute force deviations. Only one type of deviation may be modeled for combat units. This is like the force deviation of support units—thus the "N/A" under requirements devictions for combet units, as shown on the first page of the figure. As for the Force Summary Report, negative deviations are shortfalls and positive deviations are longfalls. In this report zero values are blanked-out. Notice that in this example all combat units have force longfalls—the combat force was augmented above the base case. The first page also starts the support units. The second page of the example continues into the support units. No totals are taken in this report. Also as for the Force Summary Report, the five lines of comments under the subreport title are input to this subreport on five cards. The unit strength, unit cost, and unit LP marginal value are reported as indicators of the sensitivity of the solution to changes in numbers of individual units. For example, if a force planner were looking for "most significant" force or requirements deviations, he might scan one of these three

Unit Support Report

Request: REPORT SUPPORT

Purpose: To report the units that are required based on alloca-

deviation he was interested in.

tion rules by each combat and support unit, any deviations of these supporting units from total requirements for these, and the allocation of the deviations to the

columns for the largest values that also had the type of

individual supported units.

Example: Figure 55 (two pages).

Comment: This report is useful for reporting a wide variety of

both "base case" and "alternative force" runs. First, note that we for the Unit Allocations Report, the

printing of the unit titles may be suppressed by the

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. 55-Excorpts from Sample Unit Support Report (Cont'd

user to speed up the report. The first unit in each group is the supported unit, and the ones immediately following it are the ones that support it. Thus on the first page of the example, unit 418 is a supported unit, and on the second page units 419,420 and 421 are supported units. For all supported and supporting units, their solution value, any requirements deviation, and their unit strength, unit cost, and LP marginal value are reported. As for the Unit Deviations Report, these last three values are reported to key the "most important" units. Next the coefficient that allocates each supporting unit to the supported unit is listed. Any requirements deviation already reported to the left is with respect to total requirements for the unit-not necessarily only due to the supported unit of the group. Whether or not each supporting unit has any requirements deviation, its allocation to the supported unit is first calculated assuming no deviation with respect to this supported unit, and then assuming uniform or across-theboard distribution of any deviation to all units that require it (including this supported one). This is done both in terms of number of units and number of men. For example, look at supporting unit 312, under supported unit 418. There are .650 unit 312 in the force, which is .163 fewer than total requirements for it, based on allocation rules. This shortfall is 20 percent of those requirements. If none of this shortfall was allocated to unit 418, there would be .813 (63 men) of unit 312, just due to the presence of .813 unit 418. Thus, in this example, unit 312 is only required by unit 418; and it is therefore quite correct to allocate the same percentage deviation (20 percent) to this requirement as to total requirements for unit 312. When this is done, only .650 (51 men) of unit 312 are in the force due to unit 418. The allocation of men to unit 418 is totaled at the top

of page two of the figure. The 10 percent allocation rule coefficient marginal values are reported to indicate the sensitivity of the solution to changes in them. These values are calculated and interpreted just as for those reported in the Unit Allocation Report.

CONTROL VERBS AND DATA REQUIREMENTS

The user chooses from the optional CONREP reports and specifies parameters for those reports with three CONREP control verbs and associated data. The verbs are:

- (a) LP.READ
- (b) REPORT
- (c) ENDREP.

Each of these is discussed in turn, and then other data requirements are discussed. These other data requirements are satisfied directly by the output of CONGEN—the user need not prepare other data. The control verbs and their parameters are the user-prepared data for CONREP. It is read from FORTRAN logical unit one.

LP.READ

An LP solution or two LP solutions must be read by CONREP, as the source of model column solution values, and row slack, RHS and marginal values. For reporting on solutions produced by CDC's OPTIMA MPS, CONREP reads the output of OPTIMA's "RECORD" directly. For reporting on solutions produced by IBM's MPS/360, CONREP reads the output of the post-processor CONFIL, whose input was the output of MPS/360's "SOLUTION".

All CONREP subreports report on a "case 1". Two of the subreports have the option of computing some information based on comparison with some values in a "case 2". LP.READ may be executed twice in one CONREP run to read two LP solutions as two "case 1s" or a "case 1" and a "case 2".

The format of the LP.READ control card is:

Col 2	Col 10	Col 21	Col 24
LP.READ	 MPS/360 OPTIMA	$\begin{Bmatrix} \frac{1}{2} \\ 12 \end{Bmatrix}$	$\begin{Bmatrix} 1 \\ 2 \end{Bmatrix}$

RAC

A LAND - 9

There are three parameters, each of which may assume one of two values. The first parameter specifies the MPE that produced the solution. The second parameter specifies the FORTRAN logical unit from which the solution is to be read. The third parameter specifies whether the solution is to be stored as case 1 or case 2.

If more than one case is to be stored, each case must be stored in natural order. An attempt to store case 2 first produces unpredictable results. The storage of case 1 destroys any previously stored cases.

Run title information for printing at the top of each page of the reports is obtained automatically from a solution produced by OPTIMA. At present the MPS/360 LP solution files do not contain run title information. Therefore, when a MPS/360 solution is to be read, the user must input this information. He does so on two cards following the "LP.READ MPS/360" card. Any legitimate symbols may be used and are read under (1X,17A4/1X,16A4) format.

All cases read are used with the one set of other data which is described at the end of this chapter.

Report

There are seven optional CONREP subreports. REPORT is a request to produce a subreport. The verb requires a non-blank argument to designate the specific subreport to be produced. The production of some subreports requires no parameters, but from one to several parameters are required for others. Parameters may be carried in the REPORT card or in following data cards.

The report argument may be any one of seven values; it must be punched starting in column 10 exactly as listed:

- (a) SUMMARY
- (b) COSTSUM
- (c) TROOPDCK
- (d) TROOPLST
- (e) ALLOCATN
- (f) TRPLSTX
- (g) SUPPORT.

Each of these arguments is discussed in turn in the following sections.

REPORT SUMMARY. This is a request to produce the one-page Force Summary Report. Two parameters input on a following card, and five following cards of comments to be printed in the report are required. The format of the parameter card is

Col 1-10

Col 20

NDFE

T

"NDFE" is the number of division force equivalents (DFE) assumed for the force to be reported. "NDFE" must include a decimal point. "I" is an indicator as to how to calculate support unit force deviations. A value of "l" means to calculate them based on comparison of unit solution values in case 1 and case 2. Any other value is an indication to determine force deviations from structure within the model—case 1. The next five cards may have any legitimate characters, and are printed as five lines of comment near the top of the report.

REPORT COSTSUM. This is a request to produce the two-page peacetime cost summary report. Six parameters are required; they are input on a single following card. The six numbers are fractions (from 0.0 to 1.0) usually summing to 1.0, which specify an assumed distribution of all units at the six peacetime stations of the FCIS model. These stations currently are:

- (a) CONUS
- (b) Europe
- (c) Korea
- (d) Alaska
- (e) Southern
- (f) Vietnam.

The six numbers should be punched in card columns 1-10, 11-20, ..., 51-60. In addition, this report requires the special Battalion Slice extraction of cost factors from FCIS.

REPORT TROOPDCK. This is a request to produce the card-image, Battalion Slice-format troop list report. No parameters or arguments are required.

REPORT TROOPLST. This is a request to produce the full-page troop list report. One parameter is required; it is input in column 21 of

the REPORT care. The value of this parameter indicates how to interpret the LP marginal values for use in this report. Different parameter values imply different modes of calculation and the printing of different report headings.

- Parameter = 1 ... marginal values are to be interpreted as unit slice strengths, as in a "strength base case" run; report headings say "STRNTH".
 - 2 ... marginal values are to be interpreted as unit slice costs, as in a "cost base case"; report headings say "COST".
 - 3 ... marginal values are to be interpreted as number of units; report headings say "UNITS".
 - 4 ... marginal values are to be interpreted as combat effectiveness index number 1; report headings say "IFP".
 - 5 ... other marginal values are not really interpreted in the report; report headings say "OBJCON" for "objective function contribution".

REPORT ALLOCATM. This is a request to produce the Unit Allocations Report. One parameter is required; it is input in column 21 of the REPORT card. If a "1" is input, the search for and printing of unit titles is suppressed. This suppression significantly speeds up the report.

REPORT TRPISTX. This is a request to produce the Unit Deviations Report. One parameter input in column 21 of the REPORT card, and five cards of comments following the REPORT card are required. If the parameter is "1", combat and support unit force deviations are computed by comparing this force—case 1—to a case 2 LP solution. Otherwise, force deviations are computed based on information in case 1 alone. The five comment cards may contain any legitimate characters, and are printed as five lines near the top of each page of the report.

REPORT SUPPORT. This is a request to produce the Unit Support Report. One parameter is required; it is input in column 21 of the REPORT card. If a "1" is input, the search for and printing of unit titles is suppressed. This suppression significantly speeds up the report.

ENDREP

The verb ENDREP is a request to terminate the CONREP run. No arguments or parameters are required. The format of the ENDREP card is Col 2

ENDREP

Other Data

Three files of other data are input to CONREP. One of these is optional. All three are automatically prepared by other computer programs.

CONGEN prepares two of these files. The first is a formatted file of unit DTM numbers, titles, SRC numbers and TPSNs. This is produced on CONGEN FORTRAN logical unit two (2), but is read by CONREP on unit ten (10).

The second file is a binary file of model data—DTM numbers, unit costs, unit strengths, allocation rule coefficients, etc.—prepared by CONGEN on unit ten (10). This file is read by CONREP on unit four (4).

The third file is only required if the Cost Summary Report is requested—REPORT COSTSUM. This file is the Battalion Slice extraction of cost factors from the FCIS. This is the Battalion Slice unit 85 and the third file on CONGEN unit eight (8). It is input to CONREP as unit 11.

Whatever LP solution cases are read in a single CONREP run, they are all interpreted using this set of "other data".

For sample listing of control cards see Fig. 56.

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Fig. 56—Listing of Sample CONREP Control Cards—Unit 1

Appendix A

COMPLETE LISTING OF CARD-IMAGE INPUT DATA FOR A SAMPLE CONGEN RUN

Direct CONGEN Input 138-153
RHS Values 154

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21-	TESTING USAMSSA & CIVISION PRAP				10.00
315		C7:454.20JC			.91 55
915		17:35H:2Juc	2.725	573 56.	.00 56
906	3 SOON CAV MECHIAP DIV	171J5HJ20J0 17395H11J06	3436307	855 4.1	.00
917	O SOON CAY AMPARMED CIV	17395H11J00	0500009		116 4
939	3 309 PAN-VAI 922 VAS 951 IN V VID CHEANHOR 92 921 IN CHEANHOR 92 10 IN V	17167H30J66	13:.337		110
919	V VID CHEALHOUSE 42 151 HB C	C6365H_CJ.C	0466314	584 21.1	316 21
92:		C6375HJ27JC	1406 014	614 6.1	
924	9 94 CHAPARRAL-VULCAN	44325HJCCCL	2-14-36	559 7.5	ist 7
92 8	J EN 155 SP (HON-DIV)	645567LLUC	2186636	547 0.1	10
929	a AN & INCH SP (NON-CIV)	C 6445 G7C :: :	21843	564 12.0	12
932	4 BY LANCE (MON-DIV)	66595T.22230	21969	463-3.6	20
474					
94.3	A ARMO CAY SOON TRICAP V	17135712:40	Sudu Cu7	4 94 7 . (30
-	A SOCH ATE HEL TRICAR	17245728390	22264	A24 2.1	10 2
951	1 CO ATK MEI	17111M 240	· 20794 L	214 -17.	
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	A AB 44 MMT. ADMO CAN DECT.	4206241644	- 90714	224 2.	
	3 ARMC CAV SODH TRICAP - V 8 SOCH ATK HEL TRICAP 3 CO ATK MEL 9 HO 11 HHC THEATER ARMY 9 AR 11 HHT ARMO CAV REGT 9 IN 11 HHC CORP.	774. 9416:30	1631606	266	11
?	9 HO 11 HHC CORPS	# 76 24 CO1 144	1 30 0 0 70	230 1.0	34
	3 NO 11 NNC CORPS	ALCATANTAN	3673700	5 20 3 0	
	9 AR 11 HHC ARMORED DIVISION	17104M:0036	05-(0)1	192 7.	7
13	9 AR 11 HHC BOE ARMD DIV			110-5146	0 9 21
16		67157G86JG6		216 1.	90 1
	9 IN 11 HHC SEP MECH RCE				
26	9 FA 11 HHB DIVAFTY IN/AR/PECH	0 63 CSHP0 733	03-6015	220 7.0	106 7
26	9 FA 11 HHS ARTY GROUP	664u1G66LJ6	5186675	134 - 3.0	
33	9 FA 11 HHS ARTY GROUP 9 FA 11 HHS COPPS ARTY	66531661166	2186300	515 1.0	JC 1
32	9 FA 11 STRY SEARCHLIGHT	06559660-10	2189699	154 1.5	30
34	9 FA 11 9TRY SEARCHLIGHT	26575G92636	2187330	769 1.0	06 1
51	9 AG 11 CO AG AR/IN/MECH DIV	12.07Mide10-	- J200u61-	- 2657.0	10
57	9 AG 11 CO PERS SVC TY A 9 AG 11 CO PERS SVC TY P 9 AG 11 CO PERS SVC TY C	12067671:00	30413	71 1.0	00 1
5.6	9 AG 11 CO PERS SVC TY P	120676723LC	3041400	122 7.6	95
60	9 AG 11 CO PERS SVC TY C	12067673:04	3441500	152 7.6	95 8
62	9 AG 11 CO PERS SYC TY D	12067674006	- 33416CG	140 - 7.6	95
64	9 AG 11 CO PERS SVC TY D 9 AG 11 CO PERS SVC TY E	12067675201	3261740	220 7.6	95
66	9 AG 11 BAND ARMY 42-PIECE	1 21 u 7 G 81 G is 0 -	- 3241900	43	3u
70	9 AG 11 HHD PERSTARMIN PRASCOM	12166692066	3064700		00 1
72	A AC BE DET ADMIN SUC DEASCONA	12570691541	30500		10 1
76	9 AG 55 DET ADMIN SVC PASCOM+ 9 AG 55 DET SPECIAL SVC	1 20 1 8 60 4 8 6 6	3.6031.	26 4	43
7.0	O AC 14 DET BEDI DEC	4 2542 604.66	7450544	-20-44-6	44
	9 AG 11 DET REPL REG	1256 (05566	7077700	34 6 7	04
0.0	A AC 44 DET ARMY BOET OFFICE	12776477766	3192600	30 7.7	44
. 91	9 AG 11 OET ARMY POST-OFFICE	1 2226 634	. 30350:0.		
8.3	9 AG 11 CU POSTAL GS	1255669AGGC	3047233		00 1
54	9 AG 11 CO POSTAL GS	12556646466	- 3047200	454, 9	9
5.5	9 AG 11 MHO PEPL PEG CO 9 AG 11 MHO SPECIAL SVC CO 9 AG 11 AGCV PEPS AND ACMIN	1 6560 694 771	3659505	7 1.0	1
89	4 AG 11 HHD SPECIAL SVC CO	126 1569AA41	5758501	5 - 1.0	ru
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	9 AG 11 HHD PERSYADMIN EN TA				
	9 AG 55 CO ADMIN SVC ZASCCH+				30 1
172	9 AG 55 HHC PERSONNEL COMMAND	29111H20JE3	3111000	1321.0	16 1-
106	9 MI 11 CO SUPPORT (SEP BDE)	32064H11CJu	3384460		.00
135	9 HI 11 HHC ASA BY 2CCRPS+	32356661436	3.514	161 1.0	00 1
112	9 MI 11 MMC ASA BN 2CCRPS+ 3 MI 11 CO ASA DIV SPT ARM	32357G82GJJ	35822	213 7.0	JO 7
113	9 HI 11 CO ASA AVIATION ARDF	32259G53330			
116	9 HI 11 CO ASA OP A	32067G97136	3 4 8 3 1	347 1.0	
- 114	9 HI 11 CO ASA PROCESSING	3237767us66 -	3963794		ju1
12	O AT 11 CO ASA STOURTY	32178666.000	3082636		
122	9 HI 11 CO ASA SECURITY 9 AV 11 CO ASLT HEL	1, 2367H. 2n .	- 21616	2 3 1 7 6	u 67
47.1	O AU 44 CO / PAGE STATETON	17.474 6"50	1214667	101 7.4	
470	9 AV 11 CO AFRICE STVISICH	4457:14	7017777	101	

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142		AW	11	HHC BN (SEPARATE)	61256663656	3061336	86	1.000	1
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143	9	IN	- 11	TH FA PATHFOR ARM	C 756869F A11	555 0606		1.600	
444				CO ASLT SPT HELICOPTER			190	3.500	•
_			-				7 7 9		
-145	. 9	CH	- 11	TH JE COR EL MENT	-6 3566 687638	31071			-7-
144	•	A 14		CO HEAVY HELICOPTER	55259MJ3346	3065936	164	2.204	2
	-	_		CO MESSI MEETICELES	226 22492001		7.2		-
167	9	CH	-11	CO MECH FLAME	L 7357423464	21465	165	1.000	-
484		-		TH LA COR RECON	1 350 CALA .	31393.0			_
474	•	CH		IN EN COM MECOM	C 33.903C 467	2 70 4220	5	2.000	5
156	•	CA	11	HHO CA GP (ASCOP)	41502681066	3.916	- 227	. 676	9-
447				MMO CA BN /15CCM)	4 46 ACAD *44	2201633	494		
121	7	-	* 1	HHO CA BN (ASCOM)	47346035466	3:41239	154	. 474	1
158	9	CA	11	CO (ASCOM)	4150,683666	· 3593u8a	116	- 2.051	
480		-		MMS CB	A 7: 306401 10	21146	4.4		
477		- Un		and Ge	A 44 35 344 F 40	2 70 6 0	-		1
166	•	CM	- 55	CO POCESTING	£ 3577672.00	7105530	29	6.072	
				A CANADA TO THE PROPERTY OF THE PARTY OF THE					
701		C	11	MUN CA EU (LESCCA)	41500694066	3691563	116	1.638	1
162	9	CH	11	HHO SHOKE GENR ON	C 326666CtLL	31625-6	31	- 5.333	2
					41516665066	3642436	119	8.250	•
164	•	CH	11	CO SHOKE SEAR	C #267664_C6	3106234-	-166-		-
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102	•	GH	11	TH KA COR AGENT S AND A	: 35£366K#61	3157800	5	7.608	7
146		CH	11	DET JA CBR ELEMENT	C 3512601441	3107136		eet	
44.	-	-		DET JA CBR FLEMENT DET DECONTAMINATION FR DET DECONTAMINATION FA	. 35	244 2444			
101	7	CH	11	DEL DECONTAGINATION PA	f 3276 PBL 677	3167600	•1	12.704	13
168	9	CH	11	DET DECONTAMINATION FA	& 35 Ca Gof Atl	3107506-	- 22	7.001	- 7
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104	7	Ch	11	DET LAB THEATER	C 30 976506	31096	64	1.630	1
174	•	-CS	44	HHC ARHD SPT COMMAND	299 12Mas 806	- 6 2ut 9 30-	-424-		
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175	7	C2	11	ON SPT SEP H/A BOE	5.47.12H1CC06	1483835	735	4.000	
142		CS	11	BN HAINT ARMORED DIV -	200 36H . J . JA	0 2L C u 37	1000	7. 000	- 7
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100	•	C2	11	BN SUPPLY TRANS ARPO D	541124102CE	45-6-36	.443	7.038	7
444	•	23		HIC GEN SPT GP-CORPS	20162641446	1114444 -	-443	2 6 6 9	9
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370	7	C2	11	CO FIELD SERVICE FWO	5 47 7 4645 666	3112136	559	7.000	7
-192		CS	4.4	CO GENERAL SUPPLY ARMY	20110604:06	1112400	- 263-	7.000	-
					29118696386	3112400	129	10.506	11
104		23		CO REP PART SUP CORPS	29119591 144	11127 -	. 374	3.50t	- 4
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170	T	C2	11	CO REP PART SUP COPHE	29119692276	31134-8	540	1.750	
246		23		CO DEP PART SUE COPHE	20110602466	3113476	-244	6-136	-4-
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Z) 8	7	C 2	11	CO HYY HAT SUP CORPS/AR	24157648195	3115696	267	1.836	1
214			46	CO HYY HAT SUPPLY COME	261276666.44 .	11196AL .	-1.30-		-
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214	9	CS	55	CO ACFT MSL REP PTS COME	:29129696:00	3113601	193	2.669	
214				CO IT COD MATHT	201 146646	3115090	262	40 444	
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217	9:								12 -
220		63	77	CO LT EOP HAINT	29134663636	3112000	151	3.066	3
		63	14	CO LT EOP MAINT	20134667636	3112003	151	3.066	3
				CO LT EOP HAINT	24134643636	3115000	151	3.066	3
26.3				CO LT EOP MAINT HHO MAINT BN ARPY CO HYT EQUIP MNT GS ARMY	24134643636	3115000	151	3.066	3
	•	CS	11	CO HYT EQUIP HAT GS ARMY	291346671560 29134671560 29137678 ₁ 88	3115000 3115000 3115000	151 · 64 296	3.066 26.937 30.167	3 27 39
554.	•	CS	55	CO HYY EQUIP MMT GS ARMY	29134667616 29134678960 2913767898 2913767895	3112460 3112460 3112546 3112564	151 64 296 134-	3.666 26.937 34.167 -6.136	3 27 30
554.	•	CS	55	CO HYY EQUIP MMT GS ARMY	29134667616 29134678960 2913767898 2913767895	3112460 3112460 3112546 3112564	151 64 296 134-	3.666 26.937 34.167 -6.136	3 27 30
554	•	CS CS	11 55 11	CO HYY EQUIP HNT GS ARMS CO COLL CLASS	2913667136 29136673960 /2913767838 /2913767836 29139686384	3112900 3112900 3112500 3112500 3113200	151 - 64 296 - 134- 216	3.666 26.937 30.167 -6.136	30
55.0 55.0	• • • •	CS CS CS	11 55 11 55	CO HYY EQUIP HHT GS ARMS CO HYY EQUIP HHT-GS COME CO COLL CLASS CO COLL CLASS	29134667136 29136673660 29137678388 2913767036 29139686384 2913968634	3112003 3112960 3112940 3112960 3113240 31132-0	151 64 290 134- 216	3.666 26.937 34.167 - 6.136 1.690	33
55.0 55.0	• • • •	CS CS CS	11 55 11 55	CO HYY EQUIP HNT GS ARMS CO COLL CLASS	29134667136 29136673660 29137678388 2913767036 29139686384 2913968634	3112003 3112960 3112940 3112960 3113240 31132-0	151 - 64 296 - 134- 216	3.666 26.937 30.167 -6.136	33
224 226 230	• • • • •	CS CS CS CS	11 55 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS COM CO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY	29134663636 29134673660 29137670308 2913767036 29139686386 2913968634 2914469434	3112000 3112960 3112950 3112960 3113250 3113655	151 - 64 - 296 - 134- - 216 - 84 - 101	3.066 26.937 34.167 -6.176 1.690 8.066	27
224 226 230 231	•••••	CS CS CS CS	11 55 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS COM S CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BN ECOMPS —	291346636168 29134673960 29137678.98 29137678.36 2913968638 2913968638 2914669436 2914669436	3112000 3112960 3112960 3112960 3113960 3119600	151 - 64 296 - 134 216 - 84 - 101	3.066 26.937 36.167 -6.176 1.690 3.066 -6.717	327
224 226 230 231	•••••	CS CS CS CS	11 55 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS COM S CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BN ECOMPS —	291346636168 29134673960 29137678.98 29137678.36 2913968638 2913968638 2914669436 2914669436	3112000 3112960 3112960 3112960 3113960 3119600	151 - 64 296 - 134 216 - 84 - 101	3.066 26.937 36.167 -6.176 1.690 3.066 -6.717	327
224 226 230 231	•••••	CS CS CS CS	11 55 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS COM S CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BN ECOMPS —	291346636168 29134673960 29137678.98 29137678.36 2913968638 2913968638 2914669436 2914669436	3112000 3112960 3112960 3112960 3113960 3119600	151 - 64 296 - 134 216 - 84 - 101	3.066 26.937 36.167 -6.176 1.690 3.066 -6.717	327
224 226 230 231 232 232 233	••••••	CS CS CS CS CS CS	11 55 11 55 11 11 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM GO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BNECOHPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+	29134667136 29134673960 (29137678.98 (29137678.96 (29137678.96 29139686.94 29146699.96 29146699.96 29147694884 29147694884	3112003 3112960 3112960 	151 64 296 134- 216 06 1C1 1C1- 3C3 191-	3.066 26.937 36.167 -6.136 1.690 3.066 -6.717 -9.436 -19.975	3 27 39 1 1 3 7 7 7 9 20 9
224 226 230 231 232 232 233	••••••	CS CS CS CS CS CS	11 55 11 55 11 11 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM GO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BNECOHPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+	291346671080 291346773980 29137678198 29137678136 2913968(284 2913968(184 2914669114	3112003 3112960 3112960 	151 - 64 296 - 134 216 - 84 - 101	3.066 26.937 36.167 -6.176 1.690 3.066 -6.717	3 27 33
224 226 228 238 231 232 233 234		CS CS CS CS CS CS CS	11 55 11 55 11 11 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM CO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BN BCOMPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+ CO LT MAINT DS	29134667136 29134673960 (29137678198 (29137678136 29139686314 29146691136 29147691136 29147691136 29147691133	3112003 3112960 3112940 	151 64 296 134- 216 04 101- 101- 101- 203 191- 214	3.066 26.937 30.167 -6.136 1.690 3.066 -717 -9.430 19.975 -5.676	3 27 33 4 1 1 -3 -7 7
224 226 228 231 232 233 234 236	•••••••	CS CS CS CS CS CS CS CS	11 55 11 55 11 11 11 55 11	CO MYY EQUIP MMT GS ARMS CO MYY EQUIP MMT-GS-COM2 CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BNECOMPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+ CO LT MAINT DS CO MAIN SPT DS	29134667136 29134673960 (2913767848 (29137678436 2913968634 2914669444 2914669443 2914769444 2914769444 2924688648	3112003 3112960 3112960 	151 - 64 298 - 134- 216 - 86 - 101 - 101 - 303 - 191 - 214 305	3.066 26.537 30.167 -6.136 1.600 -8.666 -6.717 -9.430 -19.975 -6.357	3 27 33 4 1 -3 -7 7 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9
224 226 228 231 232 233 234 236	•••••••	CS CS CS CS CS CS CS CS	11 55 11 55 11 11 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM CO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BN BCOMPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+ CO LT MAINT DS	29134667136 29134673960 (2913767848 (29137678436 2913968634 2914669444 2914669443 2914769444 2914769444 2924688648	3112003 3112960 3112940 	151 64 296 134- 216 04 101- 101- 101- 203 191- 214	3.066 26.937 30.167 -6.136 1.690 3.066 -717 -9.430 19.975 -5.676	3 27 33 4 1 1 -3 -7 7
224 226 220 230 231 232 233 234 236 239	••••••••	CS CS CS CS CS CS CS CS CS	11 55 11 55 11 11 11 55 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-CON CO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BNECOMPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC >COMPZ+ CO LT MAINT DS CO HO/SVC (CAL) (TASCOM)	29134667136 29134673960 (2913767848 (29137678436 2913968634 2914669444 2914769444 2914769446 2914769446 2914769446 2924686648 2924686648	3112003 3112960 3112500	151 - 64 290 - 134 216 - 04 - 101 - 101 - 303 - 191 - 214 365 - 152	3.066 26.537 30.167 -6.136 1.600 -8.066 -6.717 -9.430 -19.975 -6.676 -60.357 	3 27 33 1 1 3 7 7 60 30
224 226 228 230 231 232 -233 234 236 239 244	9999999999	CS CS CS CS CS CS CS CS CS	11 55 11 55 11 11 11 11 11 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM2 CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BNECOMPZ- CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO HAINT DS CO HAIN SPT DS CO HO/SVC (CAL) (TASCOM) CET HAINT MGT (SPT BCE)	29134667136 29134673960 (29137679436 (29137679436 2913968(34 2913968(34 29146694436 29147694436 29147694436 2924686648 2924686648 2924686648	3112003 3112960 3112940 3112940 3113240 3113240 3115640 3115640 3116740 3116740 3113704 31144	151 64 270 134 216 04 101 101 101 214 214 215 137 26	3.066 26.537 30.167 -6.136 1.600 3.066 6.717 -9.436 -19.975 -5.676 -60.357 30.170 -1.000	3 27 33 1 1 3 7 7 20 60 30
224 226 228 230 231 232 -233 234 236 239 244	9999999999	CS CS CS CS CS CS CS CS CS	11 55 11 55 11 11 11 11 11 11	CO HVY EQUIP HNT GS ARMS CO HVY EQUIP HNT-GS-COM2 CO COLL CLASS CO COLL CLASS HHG SPT SVC BN ARMY HHC SPT SVC BNECOMPZ- CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO HAINT DS CO HAIN SPT DS CO HO/SVC (CAL) (TASCOM) CET HAINT MGT (SPT BCE)	29134667136 29134673960 (2913767848 (29137678436 2913968634 2914669444 2914769444 2914769446 2914769446 2914769446 2924686648 2924686648	3112003 3112960 3112940 3112940 3113240 3113240 3115640 3115640 3116740 3116740 3113704 31144	151 64 270 134 216 04 101 101 101 214 214 215 137 26	3.066 26.537 30.167 -6.136 1.600 3.066 6.717 -9.436 -19.975 -5.676 -60.357 30.170 -1.000	3 27 33 1 1 3 7 7 7 60 30
224 226 228 230 231 232 -233 234 236 239 244 246	99999999999		11 55 11 55 11 11 11 11 11 11	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM S CO COLL CLASS CO COLL CLASS HNG SPT SVC BN ARMY HNC SPT SVC BN ARMY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC PCOMPZ+ CO LT MAINT DS CO MAIN SPT DS CO MO/SVC (CAL) (TASCOM) CET MAINT MGT (TASCOM)	29134667136 29134673960 729137678498 729137670436 2913968634 2914669448 2914669448 2914769448 2914769448 292765270 2924688649 29264187364 29463764468	3112003 3112960 3112960 	151 - 64 - 890 - 134 - 161 -	3.066 26.537 30.167 -6.136 1.608 3.068 6.717 -9.436 -19.975 -5.676 -6.357 30.178 -1.008 -1.008	3 27 33 4 1 3 7 7 20 60 30
224 226 228 231 231 232 234 236 239 244 246 248	999999999999	CS CS CS CS CS CS CS CS CS CS CS CS CS C	11 55 11 55 11 11 11 11 11 11 11	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM2 CO COLL CLASS CO COLL CLASS HNG SPT SVC BN ARMY HNC SPT SVC BN ARMY CO SUPPLY-SERVICE ARMY CO SUPPLY-SERVICE ARMY CO SUPPLY-SVC >COMMZ+ CO LT MAINT DS CO MAIN SPT DS CO MO/SVC (CAL) (TASCOM) CET MAINT MGT (SPT BCE) DET MAINT MGT (SPM CCMD) DET MAINT MGT (S-M CCMD)	29134667136 29134673960 729137678498 729137670436 2913968654 2914669448 2914669448 2914769448 2914769448 292765270 2924636448 292641376364 2944376448 2944376448	3112003 3112960 3112960 	151 64 290 134- 216 101 101- 101- 214 205 214 205 214 205 214 205 216 216 216 216 216 216 216 216 216 216	3.066 26.537 34.167 -6.176 1.690 3.066 6.717 -9.430 -19.975 -5.676 64.357 30.176 -1.696 -1.696	3 27 33 1 1 1 20 60 30
224 226 228 231 231 232 234 236 239 244 246 248	999999999999	CS CS CS CS CS CS CS CS CS CS CS CS CS C	11 55 11 55 11 11 11 11 11 11 11	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM2 CO COLL CLASS CO COLL CLASS HNG SPT SVC BN ARMY HNC SPT SVC BN ARMY CO SUPPLY-SERVICE ARMY CO SUPPLY-SERVICE ARMY CO SUPPLY-SVC >COMMZ+ CO LT MAINT DS CO MAIN SPT DS CO MO/SVC (CAL) (TASCOM) CET MAINT MGT (SPT BCE) DET MAINT MGT (SPM CCMD) DET MAINT MGT (S-M CCMD)	29134667136 29134673960 729137678498 729137670436 2913968654 2914669448 2914669448 2914769448 2914769448 292765270 2924636448 292641376364 2944376448 2944376448	3112003 3112960 3112960 	151 64 290 134- 216 101 101- 101- 214 205 214 205 214 205 214 205 216 216 216 216 216 216 216 216 216 216	3.066 26.537 34.167 -6.176 1.690 3.066 6.717 -9.430 -19.975 -5.676 64.357 30.176 -1.696 -1.696	3 27 33 4 1 3 7 7 20 60 30
224 226 228 231 231 232 234 236 239 244 246 248 250	9999999999999	C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C\$ C	11 55 11 55 11 11 11 11 11 11 11 11	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM CO COLL CLASS CO COLL CLASS HHC SPT SVC BN ARMY HHC SPT SVC BNECOMPZ— CO SUPPLY-SERVICE ARPY CO SUPPLY-SVC PCOMPZ+ CO LT MAINT DS CO MAIN SPT DS CO MO/SVC (CAL) (TASCOM) CET MAINT MGT (SPT BCE) DET MAINT MGT (SPT BCE) CO STOCK CONT (SPT BDE)	29134667136 29136673960 2913767838 2913767838 2913767838 2914669338 2914669338 2914769388 2914769388 2927692 C 29226418638 2942376436 2942376436 2942376436	3112003 3112960 3112960 3112960 3113290 3113290 3119690 3116700 3113700 31140 	151 64 298 134- 216 101 101- 101- 303 191- 214 205- 129- 26- 26- 26- 26- 26- 26- 26- 26- 26- 26	3.066 26.537 34.167 -6.176 1.690 3.066 -6.717 -9.430 -19.975 -5.676 -64.357 30.170 -1.046 -1.046 -1.050	3 27 33 1 1 -3 -7 -7 -9 -20 -6 60 30 1 1
254 226 230 231 232 235 234 236 239 244 246 240 250 250 252	99999999999999		11 55 11 55 11 11 11 11 11 11 11 11 11 1	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM2 CO COLL CLASS CO COLL CLASS HHC SPT SYC BN ARMY HHC SPT SYC BN ARMY CO SUPPLY-SERVICE ARPY CO SUPPLY-SERVICE ARPY CO SUPPLY-SYC >COMPZ+ CO LT MAINT DS CO MAIN SPT DS CO MO/SYC (CAL) (TASCOM) CET MAINT MGT (SPT BCE) DET MAINT MGT (TASCOM) CO STOCK CONT (SPT BOE) CO MAINT SPT DS	29134667138 29136673980 2913767838 2913767838 29139686334 2914669336 2914769386 2914769386 2924768638 29226418638 2942376336 2942376336 294376436 294376436 294376436 294376436	3112003 3112960 3112960 3112960 3113260 3113260 3113600 3116700 3113700 311400 -311700 311700 311700 311700 311700 311700 311700 311700	151 64 290 134- 216 101 101- 101- 214 205 214 205 214 205 214 205 216 216 216 216 216 216 216 216 216 216	3.066 26.937 36.167 -6.136 1.690 3.066 -6.717 -9.430 -19.975 -5.676 -66.357 30.170 -1.000 -1.000 -1.000 -1.000 -1.000	3 27 33 1 1 1 7 7 20 60 30
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224 226 230 231 232 234 236 239 244 246 240 250 250 252 252 254	999999999999999	CS	11 55 11 55 11 11 11 11 11 11 11 11 15 55	CO MYY EQUIP MNT GS ARMS CO MYY EQUIP MNT-GS-COM2 CO COLL CLASS CO COLL CLASS HHG SPT SYC BN ARMY HHC SPT SYC BNECOMPZ— CO SUPPLY-SERVICE ARMY CO SUPPLY-SERVICE ARMY CO SUPPLY-SYC >COMPZ+ CO LT MAINT DS CO HAIN SPT DS CO HO/SYC (CAL) (TASCOM) CET MAINT MGT (SPT BCE) DET MAINT MGT (TASCOM) DET MAINT MGT (SPT BOE) CO STOCK CONT (SPT BOE) CO MAINT SPT DS CO LABOR SERVICE COMMZ	291346671086 29136673980 29137678188 29137678186 29139686181 291396861818 29146691818 2914769188 2914769188 2924768618 2926418618 2946376368 2946376368 2948376418 2948477363 2948768618 294877866	3112003 3112960 3112960 3112960 3113260 3113260 3113600 3114600 3113700 311400 -311700 311700 311700 311700 311700 311700 311700 311700 311700 311700 311700	151 64 290 134- 216 04 101 101 214 305 137 26 32- 107 224 26	3.066 26.937 36.167 -6.136 1.690 3.066 -717 -9.430 19.975 -6.357 30.176 -1.016 -1.016 -1.020 -1.020 -1.020 -1.020 -1.020 -1.020 -1.030 -1.030	3 27 33 4 1 3 7 7 80 60 30 1 1 1
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999 9 MD 11 DET VCT SHL ANIMAL MOSP		3504+90	16	1.000 1	
532 9 PO 11 OFT VET SHL ANIPAL DISP	113693699	1299100 -		3.011	20-00
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506 9 NO-11 HOSP FIELD		-8273240	- 244 -	2.705	_
516 9 MD 11 MOSP GEM 1070 BED		3273400	500	16.716 17	
-912 9 MO-11 HOSP STA 361-060		I 1		7.429	-
SLA 9 MO 11 MOSP STA SLE BEDECOMP?		3273464	335	6.463 6	
SEE 9 NO 11 HOSPITAL COMPAT SUPPORT				14.000	
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-822 9 MO 11 MMO CONVELESCENT CENTER			. 504	2.700	-
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829 9 MI 11 TH CENSORSHIP	36638640F11	3.330993	10	1.600 1	
-532 9 HI 11 OFT ACR/SEP IN BOE	30114400.00	3337703 -	- 32	4.640	-
534 9 MI 11 MI CO DIVERNI/ARMO/MECH+	36_17Hu1568	3 33 3 700	43	7.000 7	
- 636 9 MI 11 MI CO COSP				1-604	
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566 9 MP 11 MIC PH/CTV INT INFO CEN I		3351536		1.600	
598 9 00 11 MIC ANNO GROUP!FASCOM+		3301630	91	.617	
909 9 00 11 MMC AMMO GACUPYTASCOP+		3301646			
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-641-9-00-11 CO SP AMPO GS-05		3304000	274	1,000
636 9 00 55 CO TIRE REPAIR .		3395330	91	1.606 1
607 9 00 11 CET HSL HAINT CAAD	9554634466	346522-	- 45 -	10.076
618 9 OD 11 DET GA EXPL DSP FASCON 8	9528G9GAL1	33992-6	13	5.000 5
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612 9 00 11 9ET GB EOD CENTROL &	95 24 696 841	3377600	11	1.076 1
-613 9 00 11 DET MUNIT SAFETY CON 0		3442740-		1.062
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-615 9 00 11 OFT TH SHILLLAGH MAT CTO		3422560 -	_	14.576
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619 9 00 11 DET ET REDEVENNT CT DSGS.		3432504	-	301226 27
- 620 -9 PI 11 DET FLO PRESS CENS AD A		3427530		1.000
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- 623 9 00 11 DET EL CHAP HAT CT 6		344 526;		12.25
		34364	65	1.600
- 626 9 PO 11 ON PSTOP (STRATEGIC) - 3		34255		1.600
627 9 00 11 DET EN VULCAL PAT CT	9553G8E#uu	345596		13.566 11
-620 9 PO 11 ON PSYOP (COASOL)	35 uu ME 2 0 66	14115	166-	
630 9 PO 11 CO PSYOP (TACTICAL)	75 0 C HC 4 C 6 6	34350	63	15.000 15
- 631 9 PO 11 BN PSYOP (TACTICAL!) - 3	3500HJ\$666	34314	-45	3.000
632 9 OM 11 MMD PETEL GROUP 1	202678086	3451360	74	1.000
-635 9 00 11 DET EN FAAR MNT-CT-SPT- 4	9557 GOENO#	3412500		14,400
637 9 PO 11 CO PRINTING 3:	3500HJ6566		54	1.003
650 -0 OH -11 MIC PETRL -SUP- BN		3451900-	-	
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- 644 9 0" 11 CO PETEL SUP	22769444			5.305
656 9 OH 55 CO LAUNDRY READY (COMPT)		34567	73	9. 01 9 16
- 640 9 CH 11 DET PA 89 OC SALES10			_	
				3,497
652 9 OM 11 DET BA BO BC SALES REAR 1		3468632	19	5,676 6
- 666 9 OH -11 - DET LAW-CRY -ANC -BATH		3467990-		*.709
678 9 OH 11 DET JE PETRL LAR MEDILE 1		346.6580	. 7	1.606
-671 9 SC 11 PLT FWO AREA			-51	9.009
			1110	1.600
673 9 SC 11 CO CONSTRUCTION			510	····
675 9 SC 11 HHC CONSTRUCTION DN 1	16 50 60 60 60 60	750 70		1.000 1
-676 9 SC-11 ON DIV 48/IN/NECH	10 75 MG + GO +	1 20 0 6 64	445-	7·++
600 9 SC 11 ON APRY APEA 11	13 05 60 - 16 - 1	350 2 900	275	9.200
-663 9 SC 11-1010 SIGNAL DN	111666-600 -	359 26	-50 -	4,522-5
-643 9 SC 11-1440 SIGNAL DN	117671100	351 4506	363	2.316 2
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- 717 9 TC -11 HHC POTGO TRANS BOY	-11690660 - I	15562	439	
718 9 TO 11 AGET MOVEMENT CONTROL ST	1600M.6C66	196.730	623	1.000
-722 9 TC-11 HOY CON CEN 25P7- 006-55		19772		
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-726 9 TC 11-HHD-EN-HTG-TRANS-FASCON 51		1555700-	-	5,174
727 9 TC 11 MMD BN MTR TRANS TASCON SE		1555742	44	4.641

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-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -0.25 -0.0	-0.25 -0.25 -0.25 -0.25 -0.0	-0.25 -0.29 -0.25 -0.25 -0.29 -0.6	-0.25 -0.25 -0.25 -0.25 -0.26 -0.0	-0.25 -0.25 -0.25 -0.3 -0.0	-0.25 -0.25 -0.25 -0.0 0.0 0.0 0.0 CNO M	-J. 25 -8. 25 -0. 25 -0. 6 -0. -0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25	
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -0.25 -0.0	-0.25 -0.25 -0.25 -0.25 -0.0	-0.25 -0.29 -0.25 -0.25 -0.29 -0.6	-0.25 -0.25 -0.25 -0.25 -0.26 -0.0	-0.25 -0.25 -0.25 -0.3 (.0 0.0	-0.25 -0.25 -0.25 -0.0 0.0 0.0 0.0 CNO M	-J. 25 -8. 25 -0. 25 -0. 6 -0. -0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25	
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -6.25 -6.25 -6.3 -6.3 -6.3	-0.25 -0.25 -0.25 -0.25 -0.0 -0.0	-0.25 -0.29 -0.25 -0.28 3.0 0.0 0.0	-0.25 -0.25 -0.25 -0.25 -0.26 -0.0	25 - 6 . 25 - 7	-0.25 -0.25 -0.25 -0.0 0.0 0.0	-J. 25 -8. 25 -0. 25 -0. 0 -0. r>-0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	-0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -6.25 -6.25 -6.3 -6.3 -6.3	-0.25 -0.25 -0.25 -0.25 -0.0 -0.0	-0.25 -0.29 -0.25 -0.28 3.0 0.0 0.0	-0.25	25 - 6 . 25 - 7	-0.25 -0.25 -0.25 -0.0 0.0 0.0	-J. 25 -8. 25 -0. 25 -0. 0 -0. r>-0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	-0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -6.25 -6.25 -6.3 -6.3 -6.3	-0.25 -0.25 -0.25 -0.25 -0.0 -0.0	-0.25 -0.29 -0.25 -0.28 3.0 0.0 0.0	-0.25	25 - 6 . 25 - 7	-0.25 -0.25 -0.25 -0.0 0.0 0.0	-J. 25 -8. 25 -0. 25 -0. 0 -0. r>-0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	-0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -6.25 -6.25 -6.3 -6.3 -6.3	-0.25 -0.25 -0.25 -0.25 -0.0 -0.0	-0.25 -0.29 -0.25 -0.28 3.0 0.0 0.0	-0.25	25 - 6 . 25 - 6 . 25 - 6 . 3 - 6 . 9	-0.25 -0.25 -0.25 -0.0 0.0 0.0	-J. 25 -8. 25 -0. 25 -0. 0 -0. r>-0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	-0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25
-0.25 -0.25 -0.25 -0.25 -0.6	-3.25 -3.25 -6.25 -6.25 -6.25 -6.3 -6.3 -6.3	-0.25 -0.25 -0.25 -0.25 -0.0 -0.0	-0.25 -0.29 -0.25 -0.28 3.0 0.0 0.0	-0.25	25 - 6 . 25 - 6 . 25 - 6 . 3 - 6 . 9	-0.25 -0.25 -0.25 -0.0 0.0 0.0	-J. 25 -8. 25 -0. 25 -0. 0 -0. r>-0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	-0.25 -0.25 -:.25 -0.0	-0.25 -0.25 -0.25

```
RHS
                C9. 2
     PHS
                C9:5
     PHS
                C3.6
     PHS
                C9 7
     CHS
                C9 3
     PHS
                C919
     RHE
                C923
     PHS
                C924
      2
                C924
     , He
                6590
     RHS
                C932
                C938
                C943
                6949
                            .2.3
                2951
                TCSTOL
    PHS
                TSSTRL
    SHR
                TESTAL
                TCCSTL
    RHS
    RHS
                TSCRIL
               TECSTL
    PHS
                            .3236.278
ENCATE
```

Appendix B

DESCRIPTION OF CONGEN AND ITS ROUTINES

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Appendix B

DESCRIPTION OF CONGEN AND ITS RUUTINES

OVERVIEW

This appendix, together with the listing of the CONGEN source program in Appendix C, documents the CONGEN program as it is operational at USAMSSA.

CONGEN is written entirely in the FORTRAN IV language for operation on USAMSSA's IBM 360/65 computer system. It is also operational on RAC's CDC 6400 computer system. There are several differences between the programs at the two installations. These differences are not documented here.

The program is overlayed, and some data is packed.

Figure Bl is the general logic flow of CONGEN execution. Assuming an understanding of the modeling system as described in Volume I and the text of this volume, and relying on the following detailed discussion of each routine, the figure is self-explanatory. The sequence of data input in subroutine INIT and its subroutines is shown in Fig. 18 in Chapter 3.

Table Bl defines the CONGEN input and output units. Normally, unit 7 is concatenated with unit 4 and then with a data set of right hand side (RHS) values prepared by the user to form the complete LP matrix file for input to MPS/360 or OPTDM.

Figure B2 portrays the general relationship of CONGEN routines, and it also defines the program overlays.

156

Table B2 lists the entry points for each routine.

Table B3 is an incidence table of possible calls by each CONGEN routine.





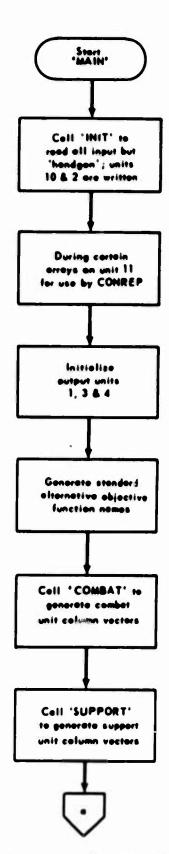


Fig. 81 - General Logic Flow of CONGEN Execution

157

CONTRACTOR CONTRACTOR

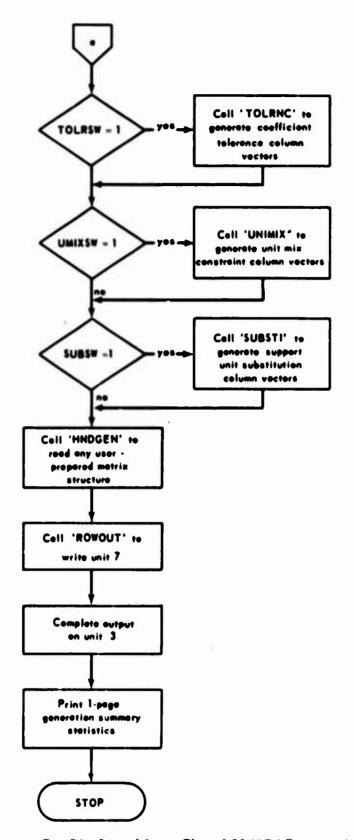


Fig. B1 - General Logic Flow of CONGEN Execution (cont'd)

Table Bl

DEFINITION OF CONGEN I/O UNITS

Disposition	r names May aid some solution strate- gies using OPTIMA.	titles, Input to CONNEP as FT11F001.	Input to MPS/360's INSERT or OPTIMA'S MAPIN.	a data set of RHS values to form the LP model for input to MPS/360 or OPTDM.	Ė	ė	a data set of RHS values to form the LP model for input to MPS/360 or OPTDM.	POOL
Definition	List of model column vector names generated.	List of unit DTM numbers, titles, SRC, numbers and TPSNs.	List of advanced start bases vectors.	List of matrix coefficients generated.	System input; all CONGEN card- image imput.	System Output; 1-page genera- tion summary statistics.	List of model row vector names generated.	Battalion Slice model FTWOF001 produced by APROG; source of
Formstred or binery	Forms tted	Forms tted	Formatted	Forms thed	Porms tted	Pormatted	Forms thed	Binary
Input or output	Output	Output	Output	Output	Input	Output	Output	Input
File	1	-	-	7	7	н	1	-
FORTRAN logical unit	1	N	m	4	~	9	-	∞

Table Bl (Cont'd)

Disposition			May be input to a subsequent (from a previous) CONGEN run to bypass the reading of unit 8.	Input to CONNET as PTO4POOL.
Definition	Battalion Slice model FT/5F001 produced by APROG; B-matrix data.	Battalion Siice model FI65F001; cost factors.	Dump of certain CONCEN arrays storing basic structural data.	Dump of certain CONCEN arrays.
Formatted or binary	Binery	Binery	Binery	Binery
Input or Output	Input	Input	Output/ Binery Input	Output
File	2	٣	-	-
FORTRAN logical unit	80	©	10	n

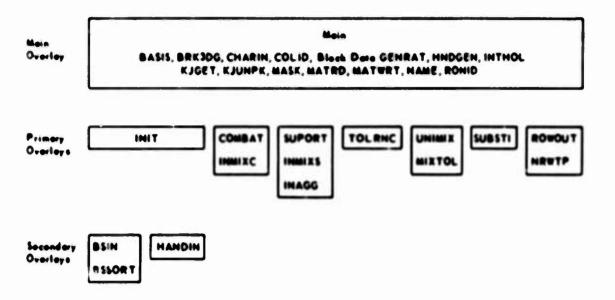


Fig. B2—General Relationship of CONGEN Routines, and Definition of Overlays

DAS

Table 82

ENTRY POINTS OF CONGEN ROUTINES

Routine	Entry points
Mein	Main
BASIS	MASIS
BRK3DG	BRK3DG
CHARIN	IN1, IN2, IN3, IN4
COLID	COLID
IDIDGET	HOLDGEN
INTHOL	INTHOL
KJGET	KJŒT
KJUNPK	KJURPK
MASK	MASK
MATRD	MATRD
HATVRT	MATURT
NAME	NAME
ROWID	ROWID
INIT	INIT
BSIN	BSZN
BSSORT	DSSORT
HANDIN	HANDEK
COMBAT	COMBAT
IMIXC	DOCINC
SUPORT	SUPORT
IMMIXE	INCIXS
INAGG	INAGG
TOLRNC	TOLRNC
UNDIX	UNIMIX
MIXTOL	MIXTOL
SUBSTI	SUBSTI
ROWOUT	ROWOUT
NRWTP	NRVTP

Table B3
POSSIBLE CALL BY EACH CONGEN ROUTINE

,													S	311e	Called Routine	utin															
Calling restine	nieM Sisaa	PBK3DC BVSIS	CHVEIN(INI)	CHARIN(IN2)	CHVEIN(IN3)	CHARIN(IN4)	COLID	HADGEA	INLHOP	KIGEL	KINNEK	INDEK	GRTAM	THWTAM	INVIGE.	ROWID	TINI	NIST	BSSOLT	HANDLU	TAST/OD	TIE/LXC	THOTUS	SXIENI	DOAMI	TOLRNC	NIMIK	MIXLOF	SUBSTI	TUOWOR	STWAN
Main	``	:<													:<		×				×		≻ :			×	×	^	×		
PASIS												×																			
PRI:3DG									×																						
CHARIN(INI)																															
CHARIN(IN2)																															
CHARIX (IN3)																															
CHARIN(IN4)																															
COLID												×																			
HNDGEN						5	×						×	×		×															
II:THOL																															
KJGET																															
KJUDEK																															
MASK																															
CATRD															×																
MAYIMIT												×																			

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4	ì	-
ŝ	1	0

Table B4 defines the possible normal CONGEN terminations. CONGEN does not perform extensive checking for bad or inconsistent data; it is possible for CONGEN to terminate abnormally.

All common variables are in labeled common blocks. Table B5 is an incidence table of labeled common blocks in each routine. Table B6 defines the labeled common blocks in terms of a listing of the variables and arrays in each. Table B7 is an incidence table of variables and arrays in common blocks. This allows easy determination of the block containing a particular variable. Table B8 contains definitions of each common variable and array. The next sections discuss each routine in turn, in the order in which they were listed in the preceding tables.

DESCRIPTION OF ROUTINES

Main

In general, the main routine controls CONGEN execution by calls to subroutines. It does however, perform some initialization and matrix generation itself. The order of execution of the main routine is:

- (a) Initialize matrix size counters.
- (b) Call subroutine INIT to read all input data but any user-prepared matrix structure. INIT and its subroutines produce output units 2 and 10.
- (c) Write the binary file of data on unit 11 to be passed to CONREP.
 - (d) Initialize output units 1, 3 and 4.
- (e) Generate the 6 or 7 standard alternative objective function names and insert them into the advanced start basis (unit 3) by calls to subroutine BASIS.
- (f) Call subroutine COMBAT to generate column vectors representing the number of each combat unit type in the force, and optionally, short- and longfalls from their right-hand side (RHS) values.
- (g) Call subroutine SUPORT to generate column vectors representing the number of each support unit type in the force, and optionally, force and requirements short- and longfalls.

RAC

Pable B4

POSSIBLE "NORMAL" CONGEN TERMINATIONS

Termi	Termination	Routine	Message/Condition
CALL	CALL EXIT	Main	Normal exit, "successful" matrix generation.
STOP 0001	1000	SUPORT	"Support unit xxx requires more than 100 percent of itself." A bed B-matrix coefficient was input.
STOP	STOP 0002	ROWID	"RNAMES has overflowed." An attempt was made to generate a model with more rows than for which arrays RNAMES and RTYPES have been dimensioned. Current dimensioning allows up to 3000 rows.
STOP 0003	0003	INTHOL	"INTHOL called with I \neq (0,1,,9)." Other than a 1-digit integer was input to function INTHOL for conversion to a Hollerith character.
 STOP 0004	1 000	KJGET	"KJGET called with ID not in array DIM." Other than the DIM number of a unit to be modeled was input to function KJGET for the calculation of the sequence number of the unit.
STOP	STOP 0005	BSIN	"Coefficient storage capacity exceeded with NANZ = xxxxx." An attempt was made to read and store more A-matrix coefficients than for which arrays KJCOEF and COEF were dimensioned. NANZ is the count of A-matrix coefficients read so far. Current dimensioning allows up to 8000 total A- and B-matrix coefficients.
STOP	STOP 0006	BSIN	"Coefficient storage capacity exceeded with NBNZ = xxxxx". An attempt was made to read and store more total A- and B-matrix coefficients than dimensioning allows, while reading B-matrix coefficients. NBNZ is the count of B-matrix coefficients read so far.



Table B5

INCIDENCE OF LABELED COMMON BLOCKS IN CONCES NOVILVES

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	SMUN	×	-	<												×	
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	TOTORN	×									×	t					×
ł	ENCLANC	×										ŧ.					H
3100	72489	×	×													×	
		×															
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Ü	SEALUS!	×				×	ŀ	×					×	×		×	
	MIX	×															×
	INSKS	×	×			×				×			×	×			×
	GROUP	×															×
	EFF	×															×
	TAIVE	×															×
	DESCH	×								×							×
	CRF	×															×
	COLCUT	×				×											
	TAE	×	×				×										
	ALP!(A	×					×		×								
	LIA	×												×			
_	DOA	∺					3										×
	Fortine	ila in	25015	BAK3DG	CHARIN	COLID	Pleck Da	35011	TOLLET	KUCET	KJUNEK	:35K	CATAD	PATAR	TATE	ROWID	Till

Tible Py (continued)

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* * * * *	×								×		×						
× × ×	×	×							×	*	*					×	
* *	×	×	×	×	×	×	×	•	×	×	×	×					×
×	×			×													×
•	×		×	×	×	×	×		×	×	×	×			×		×
	×			×													×
II:VCC X																	
X X X Datase	×				×			, ,	×	×	×	H					
CHILITY X X				×	×							×					
MIXTOL X X				×	×							×					
SUBSTI					×							×		×			
ROWOUT X			×				×	×			×	L					
X dimin			×	122								×	• •				

Table B6
DEFINITION OF CONGEN LABELED COMMON BLOCKS

Block	Definition
AOG	AGGRSW, NAGGR, AGGROT(750), INDAGG, INNAGG(20,2), AGLAB(25)
AIJ	MAIJ
ALPHA	NU(35)
BET	STR, LGL
COLCWI	LSTCOL
CSL	CSTYP(60),CSPER(60),CLTYP(60),CLPER(60)
DESCRP	STRUTH(760), DIM(760), COST(760)
DEVIAT	CSSW, CLEW, SRSSW, SRLSW, SFSSW, SFLEW
EFF	neff, efflab(6, 3), eff(60, 6)
GROUP	GRPSW,GROUP(760),IGROUP(760,2)
LPS YS	IANGSW, PRBNAM(2), DATSOR
MIX	UNIXEW, NMIXES, MIXES (100, 3), INIXES (100)
NAMES	NVAR1, NVAR2, NROW1, NROW2, NNX, NNN
NCON	ncon(60), rescon(6)
OBJS	OBNAME(7,2), NOBJ
PRBCT	INDEX
REQFAC	COEF(8000), KJCOEF(8000), NAWZ, NBNZ
REQUOL	TOLRSW, TOLS (2350, 3), NTOLS, ALRTYP
RESOLU	NCOMBT, NSURPT, NPRAM, NPRAMU
ROWS	RNAMES(3000,2), RTYPES(3000)
SIGN	NEG, PLUS, ZERO, BLK, FREE
SPAN	NCNT
SPTSUB	SUBSW,SUB(100),KJSUB(100,2),NSUBS
SSL	SDVTYP(700), SRSPER(700), SRLPER(700), SFSPER(700), SFLPER(700)
TITLE	ITITLE(7), ISRC(3), ITPSN(2)
IMPMIX	MXIND, IIMMIX(10)

Table 27

ENCINEERCE OF CONCERN VARIABLES IN LABORATE COMPICES SECURIORS

		1																	
	KIMBAL																		
	MITIT																		
	193																		
	HUSTIS	1																	
	KATS																		
	SICM					×													×
	BOAR																		
ł	rionidi																		
	PERCEO				×														
	DATIPAR									×									
	PRBCE																		
	2010																		
M	NCOM																		
Comon block	8391711																		
8	XTM																		
ö	elsei														×				
	40080																×	H	
	AAT																		
١	LYLASKI							×					H						
	DESCIA										×			٠		H			
	780						H		×			×		×					
	IAOTOO																		
1	750																		
	MMIA																		
	LIA																		
1	And ALPIN MET MET COLCUT	×	×	H															
ī																			
	Verioble	A00PCT(750)	ACCEA	AGLAE(25)	ALPERO	BLK	CLTER(60)	CLSV	رديع (وو)	(8000)	(150)	csrzn(6c)	7650	cs:n (∞)	DATSOR	DTX(76c)	EFF (60,6)	E77.43(5,3)	FFEE

Table 57 (cont'e)

											00	8	Correr bleck											1	
er Cable	909	LIA	AITLIA	324	Thomas	าฆ	DESCUS	TAIVE	441	dionis	reals	XIM	SEDIM	MOOM	erao	TOBH4	DAMPAN	TOTORE	WIOSE:	ROMB	NATS	EUSIAS	22F	ATTIT	XIMML
NZ NZ																	×					Ì		1	
12 15																	×								
5																					×				
1000																		^	×						
(09)100														4											
127									×																
23																				×					
1703												H													
TAIC		H																							
13													×												
ĸ													×												
200														•	×										
10764																		~	K						
PPANCE																		×	L						
non													H												
30.2													H												
22.72																						H			
24675																		^	×						
2701																		×							
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Table 57 (Cont.4)

										18	1	Comment of the Park	1				ĺ		1				ı	l	1
Verlable	DOY	LIA	ANTIA	340300	TES	DESCRIP	TAIVAG	ME	GROI P		XIM	E304/V	исом	BUSO	PRBCT	вижемс	MCLOS	U.J.O.2301	BMONE	MOIS	NATE	avers	788	MITIT	XIMDAI
12(32)		*													İ								1		1
PVAP1												×													
ETAR2												×													
TXE(7,2)														×											
HH																				×					
PSX.A4(2)										×															
NESCOSI(6)													×												
EX38(3000,2)																			×						
(000)																			×						
\$27 777 (700)																							×		
S727EN(700)																							×		
35.75							K																		
SFSTER(700)																							×		
3							×																ı		
SRLF2N(700)																							×		
SPLSU							_	L 4																	
\$75727(700)																							×		
ACSUS.																							f		

Table 37 (Command)

											8	000	Comon block	*												
"ariable	1004	LIA	LIA LIA AUTIA THE	2200	with.	ารว	DESCRIP	DV1 ASO	AME	GROUP		XIN	SOLVII	NOON	OBJC	TOERE	DANPAIN	มวาบธภ	MOCIN	SMON	SIGN	NAGE	iusiae	222	AITIT	KIMBUL
K::0				×																						
STREETH (760)							H																			
SE (100)																							×			
2.38																							×			
****																		×								
7015(2350,3)																		×								
2000												K														
0																					×					

Table B6

DEFINITION OF CONGEN COMMON VARIABLES

Name	Dimension	type	Imput or intermal	Definition
Accros	(054)	Alpha & Integer	Imput	Two-character label for, packed types of 2 model rows for, and DTM numbers of units included in each support unit aggregate.
ACCREM		Integer	Input	Switch indicating whether or not support unit aggregates are to be modeled.
AGLAB	(22)	Alpha	Internal	Two-character label for each support unit aggregate, passed to CONNEP.
ALRETP		Integer	Input	Type of all allocation rule rows.
2		Alpha	Internal	A Hollerith blank used in row and column names and row types.
CLPER	(09)	Rea 1	Input	Coefficients of basic combat units columns in rows limiting combat unit longfalls.
CLSV		Integer	Input	Switch indicating whether or not combat unit longfalls are to be modeled.
CLTTP	(∞)	Alpha	Imput	Type of each row limiting combat unit longfalls.
COEF	(8000)	Ree 1	Input	A- and B-matrix allocation rule coefficients.
TSOO	(20)	Peel	Input	Unit cost of each combat and support unit type modeled.
SPER	(09)	Ree 1	Input	Coefficients of basic combat unit columns in rows limiting combat unit shortfalls.
ASSO		Integer	Input	Switch indicating whether or not combat unit shortfalls
CSTYP	(%)	Alphe	Input	Type of each row limiting combat unit shortfalls.

Table B8 (Cont'd)

İ				
ž.	Disension	Type	Input or internal	Definition
DATSOR		Integer	Input	Indicator of the source of basic structural data.
N. Car	(160)	Integer	Input	DTM number of each combat and support unit modeled.
E	(9,09)	Ĩ.	Input	Coefficient of each combat unit modeled in each effectiveness index modeled.
EFFLAB	(6,3)	Alpha	Input	Two-part row name and row type for each combat unit effectiveness index.
TREE		Alpha	Internal	Hollerith "F" used as an unconstraining row type indicator.
CHOUP	(20)	Res 1	Input	
Assesso.		Integer	Input	Switch indicating whether or not to generate a unit group constraint.
IGROUP	(760,2)	Integer	Imput	
XDedi	(01)	Integer	Internal	Sequence numbers of the unit mix constraints in which a unit is included.
DATIONS	(100)	Integer	Input	DTM numbers of units included in each unit mix constraint.
INDAGG		Integer	Internal	Number of aggregates in which a support unit is included.
INDEX		Integer	Internal	Number of model rows generated
INCHOC	(20,2)	Alpha	Internal	Two-character label and packed row types for each aggre- ente in which a support unit is included.
ISBC	(3)	Alpha	Input	SRC number of a combat or support unit.
Trimes	(1)	Alpha	Input	Title or label of a combat or support unit.
NS-LLI	(2)	Alpha	Input	TPSN of a combat or support unit.
KJCOEP	(8000)	Integer	Input	Packed DTM numbers of the supported and supporting units of each allocation rule coefficient.

Table B8 (Cont'd)

1				
Nome	Dimension	17pe	Imput or internal	Definition
KUSUB	(100,2)	Integer	Input	DTM numbers of the two units of each supp., t unit substi-
LANGSH		Integer	Imput	Indicator of the MPS in whose formst the matrix is generated.
13		Alpha	Internal	Hollerith "LCL" used in generating the advanced start basis.
LSTCOL		Alpha	Internal	Number of model columns generated.
MIXES	(100,3)	Pea 1	Input	Mix entry and the lower and upper tolerance for each unit in each unit mix constraint.
MOKIND		Integer	Internal	Number of unit mix constraints in which a unit is included.
MOCR		Integer	Internal	Number of support unit aggregates modeled.
MAK		Integer	Internal	Musber of A-matrix allocation rule coefficients.
MBMZ		Integer	Internal	Number of B-matrix allocation rule coefficients
NCH		Integer	Internal	Number of advanced start basis vectors generated.
MCOMBT		Integer	Input	Number of combat unit types modeled.
MOON	(%)	Alpha	Input	Type of basic model row for each combat unit type.
MEST		Integer	Input	Number of combat unit effectiveness indices modeled.
SQ.		Alpha	Internal	Hollerith "-" used as row type indicator and as sign of matrix coefficients.
MUDES		Integer	Inte-ral	Number of unit mix constraints modeled.
MAIS		Integer	Internal	Number of matrix coefficients generated.
MACH		Alpha	Internal	Sign of metrix coefficients.
MO		Alpha	Internal	Type of model rows.
MORA		Integer	Internal	Number of standard alternative objective functions.

Table B8 (Cont'd)

	Section 1			
None	Disension	न्धरा	Input or intermal	Definition
KPRAK		Integer	Input	Number of Battalion Slice model parameterized units.
KPRANU		Integer	Input	Number of unique Battalion Slice model parameterized units.
MROWL		Alpha	Interral	First & characters of a model row name.
WROW?		Alpha	Internal	Second & characters of a model row name.
MSURS		Integer	Internal	Number of support unit substitutions modeled.
KSUPRI		Integer	Input	Number of support unit types modeled.
MOLS		Integer	Internal	Number of allocation rule coefficients for which tolerance is modeled.
N	(35)	Alpha	Internal	Basic character set for model row and column names.
WARI		Alpha	Internal	First & characters of a model column name.
MAR		Alpha	Internal	Second & characters of a model column name.
OBUME	(7,2)	Alpha	Internal	Two-part names of standard alternative objective functions.
PLUS		Alpha	Internal	Hollerith "+" used as row type indicator and as sign of matrix coefficients.
PRBNAM	(2)	Alpha	Imput	Six-character mame for model generated.
PERSON	(9)	Alpha	Input	Type of row of each basic resource constraint.
RAMES	(3000,2)	Alpha	Internal	Two-part name of each model row generated.
RTIPES	(3000)	Alpha	Internal	Type of each model row generated.
SPATTA	(100)	Alpha	Input	Packed types of rows limiting all types of deviation for each support unit.
SPLYER	(200)	Rea 1	Input	Coefficients of basic support unit columns in rows limiting force longfalls.

Table B8 (cont'd)

Name	Disension	Type	Input or internal	Definition
SPLSV		Integer	Input	Switch indicating whether or not support unit force long- falls are to be modeled.
SPSPER	(200)	Real	Input	Coefficients of basic support unit columns in rows limiting force shortfalls.
2555		Integer	Input	Switch indicating whether or not support unit force short-falls are to be modeled.
SRLYER	(100)	2	Input	Coefficients of basic support unit columns in rows limiting requirements longfalls.
SRISH		Integer	Input	Switch indicating whether or not support unit requirements longfalls are to be modeled.
SRSPER	(200)	Re 1	Input	Coefficients of basic support unit columns are rows limiting requirements shortfalls.
SRSSW		Integer	Input	Switch indicating whether or not support unit requirements shortfalls are to be modeled.
ST.		Alphe	Internal	Hollerith "STR" used in generating the advanced start basis
STRITH	(292)	Real	Input	Unit strength of each combat and support unit type modeled.
SUS	(100)	Nee 1	Input	Nate of substitution for each support unit substitution modeled.
SUBS		Integer	Input	Switch indicating whether or not support unit substitutions are to be modeled.
TOLISM		Integer	Imput	Switch indicating whether or not tolerance on individual allocation rule coefficients is to be modeled.

Table B6 (Cont'd)

Page 1	Dimension (2350,3)	Linteger Linteger Linteger	Imput or internal Imput Imput	Packed DIM numbers of supported and supporting units and and the lower and upper tolerance on allocation rule coefficients on which tolerance is allowed. Switch indicating whether or not unit mix constraints are to be modeled. Hollerith "O" used in model row and column names.

- (h) Optionally call subroutine TOLRNC to generate column vectors representing lower and upper deviation from specified allocation rule coefficients.
- (i) Optionally call subroutine UNIMIX to generate column vectors representing unit mix constraints.
- (j) Optionally call subroutine SUBSTI to generate column vectors representing substitution of support unit type in satisfaction of allocation rule and other requirements.
- (k) Call subroutine HNDGEN to read any user-prepared matrix structure (matrix coefficient data cards only).
- (1) Call subroutine ROWOUT to write the list of model row names (unit 7).
 - (m) Terminate the advanced start basis file (unit 3).
- (1) If an OPTIMA format, simply write the "EMDFILE" cardinage.
- (2) If in MPS/360 format, read the vector names on unit 3 so far, ignoring row names, and associating a row name not on unit 3 with each column name on unit 3. The new list of column names and associated row names is now written on unit 3.
 - (n) Print a one-page summary of generation.
 - (o) Call EXIT.

BASIS

BASIS is a subroutine that is called during matrix generation to generate the advanced start LP basis file (unit 3). The calls determine the specific structural and logical vectors to be included in the basis. There are three calling arguments:

- (a) MTYP, the type of the vector--either "STR" or "LGL".
- (b) NBAS1, the first half of the vector name (4 concetenated characters).
 - (c) NBAS2, the second helf of the vector name.

Since the matrix is generated column-by-column, BASIS need not check for uniqueness of structural vectors input to it. It must, however, make sure that logical vectors are not duplicated. BASIS is always called for logical vectors before a call to BOWID for the vector. Thus, BASIS checks array RNAMES to see if the vector has already been

stored by a call to ROWID, and if it has, assumes that it is already in the basis file, and therefore does not write it in the basis file again.

For input to MPS/360, the basis file written here is processed in the main routine after matrix generation is completed, to put it in the correct format for use with MPS/360's INSERT.

CHARIN

CHARIN is called to pack alphameric data. It inserts a leftjustified blank-filled Hollerith character into byte 1 of a specified word. There are two calling arguments:

- (a) A, the character to be inserted.
- (b) XR, the word into which it is to be inserted.

The byte into which the character is to be inserted is specified by the entry point of CHARIN. There are four entry points -- IN1, IN2, IN3 and IN4 -- for the four bytes.

COLID

COLID is called once for each column generated to write the file of column names (unit 1). Since the matrix is generated column-by-column, there is no need for COLID to check for uniqueness of column names. COLID also increments the count of the number of columns.

Block Data GENRAT

This is the only Block data subprogram in CONCEN. In it are initialized common variables NCST, MPTSTA, MPTSTA, NU, NEG, PLUS, ZERO, BLK, FREE, STR and LGL.

NCST, NPTSTA and IPTSTA are only used in reading the Battalian Slice extraction from the FCB. They are therefore equivalenced to an array not used until after this step.

The other variables are used to form row and column names and to define their types.

HNDOW

MINIMAL is a subroutine that is called once from the main routine after matrix generation but before writing of the row identification file to accept any matrix data prepared by the user (coefficient data cards only). HNDGEN calls subroutine MATRD repeatedly until a blank row name is encountered. For each coefficient input, subroutine ROWID is called to insert the row into the row identification file if it is not already there. Then subroutine MATWRT is called to write the coefficient onto unit 4. All columns input here are assumed to be new to the model, and all coefficients in the column must be contiguous. Subroutine COLID is called each time the column name is different than the one last read to write it onto the list of column names (unit 1). Thus, if an "old" column is read here it will be written on unit 1 twice. If all coefficients in a column are not contiguous, the column will be written onto unit 1 a number of times equal to the number of "new appearances" in the data set.

INTHOL

Function INTHOL is called by subroutine BRK3DG to convert a 1-digit integer to a Hollerith character.

KJGET

Function KJGET calculates the sequence number of a unit in the model by searching array DTM until a match is found with the DTM number input as the single calling argument.

KJUNPK

Subroutine KJUNPK unpacks the DTM numbers of the two units corresponding to an ellocation rule coefficient from one of two arrays. There are four arguments:

- (a) IARRAY specifies which of the two errays is to be unpacked.

 IARRAY = 1 specifies array KJCOEF; otherwise array TOLS (1,1) is unpacked.
 - (b) LOC is the word of the array to be unpacked.
 - (c) ID1 is the returned DTM number of the supported unit.
 - (d) ID2 is the returned DTM number of the supporting unit.

MASK

Function MASK masks byte i of an imput word and returns it as left-justified with blank fill. MASK is used to unpack alphaneric data. There are two calling arguments:



- (a) XR, the input word.
- (b) I, the byte to be masked.

MATRD

Subroutine MATRD is called by subroutine HNDGEN to read matrix coefficient data cards prepared by the user in an MPS/360 or OPTIMA format. The row and column names, row type, and sign of the coefficient are passed through common variables. The absolute value of the coefficient is passed by the single calling argument.

MATWRT

Subroutine MATWRT is called once for each matrix coefficient to be written on unit 4. The two-part row and column names, row type and sign of the coefficient are passed by common variables. The absolute value of the coefficient is passed by the single calling argument.

NAME

Function NAME concatenates four left-justified blank-filled Hollerith characters to form one half of the 8-character model row and column names.

ROWID

Subroutine ROWID is called once for approximately every matrix coefficient generated. ROWID checks the name of the row of the coefficient against all rows stored so far in array RNAMES, and if this is the first occurrence of the row in the model, ROWID stores its name in array RNAMES and its type in array RTYPES, and increments the count of model rows.

INIT

Subroutine INIT is called once from the main routine to read all input data except for any hand-prepared matrix structure. INIT may call subroutine BSIN or HANDIN to read some of the data. INIT also writes a binary file (unit 10) that may be used to restore certain data on a subsequent CONGEN run, and it initializes arrays RNAMES and RTYPES. The entry points IN1, IN2, IN3, and IN4 of subroutine CHARIN may be called to pack some alphanumeric data.

BSIN

Subroutine BSIN may be called once from subroutine INIT to read Battalion Slice model data files. It reads:

- (a) Battalion Slice unit 40 produced by APROG as file one on CONGEN unit eight.
- (b) Battalion Slice unit 75 produced by BPROG as file two on CONGEN unit eight.
- (c) Battalion Slice card-deck troop list produced by DPROG as the next data on system input.
- (d) Battalion Slice unit 85 (extraction from the FCIS) as file three on CONGEN unit eight.

BSSORT

Subroutine BSSORT is called once from subroutine BSIN to sort the allocation rule coefficients -- arrays KJCOEF and COEF -- into supported unit order.

HANDIN

Subroutine HANDIN may be called once from subroutine INIT to read basic structural data from that prepared by the user rather than from Battalion Slice model data or restoration of data from a previous CONGEN run.

COMBAT

Subroutine COMBAT is called once from the main routine to generate all column vectors for combat units. The order of generation for each unit is:

- (a) Column "Cijk" representing the number of the unit in the force.
 - (1) Coefficient in row TFSTRN.
 - (2) Coefficient in row TCSTRN.
 - (3) Coefficient in row TFCOST.
 - (4) Coefficient in row TCCOST.
 - (5) Coefficient in each of NEFF effectiveness index rows.
 - (6) "1.0" in row with same name as column.
 - (7) For each support unit required by the combat unit:
 - (i) Coefficient in row "Sijk".

and the same of the same of

- (ii) "-1.0" in row "ijkTlmnX" if tolerance is allowed on the coefficient.
- (8) "-1.0" in row "MijkXlmn" for each unit mix constraint in which the combat unit appears.
 - (9) Coefficient in row TFSTRL.
 - (10) Coefficient in row TCSTRL.
 - (11) Coefficient in row TFCSTL.
 - (12) Coefficient in row TCCSTL.
- (13) Coefficient in row GROUP if the unit group constraint option is selected and this unit is to be included.
- (14) Coefficient in row "CijkSP" if combat unit shortfalls are to be modeled.
- (15) Coefficient in row "CijkLP" if combat unit longfalls are to be modeled.
 - (b) Column "Cijk3" if shortfalls are modeled.
 - (1) Coefficient in row "TDEV".
 - (2) "1.0" in row "Cijk".
 - (3) "-1.0" in row "CijkSP".
 - (c) Column "CijkL" if longfalls are to be modeled.
 - (1) Coefficient in row "TDEV".
 - (2) "-1.0" in row "Cijk".
 - (3) "-1.0" in row "CijkLP".

INMIXC

Subroutine INMIXC may be called from subroutine COMBAT to determine in which unit mix constraints a specific combat unit appears. The single calling argument specifies the DTM number of the combat unit. The number of mixes in which the unit appears is returned in common variable MXIND. The sequence numbers of the mixes in which the unit appears are returned in common array IDMMIX(10). Except for name, is identical to subroutine INMIXS.

SUPORT

RAC

Subroutine SUPORT is called once from the main routine to generate all column vectors for support units. The order of generation for each unit is:

- (a) Column "Sijk" representing the number of the unit in the force.
 - (1) Coefficient in row TFSTRN.
 - (2) Coefficient in row TSSTRN.
 - (3) Coefficient in row TFCOST.
 - (4) Coefficient in row TSCOST.
- (5) For each support unit required by this support unit and for this unit:
- (i) Coefficient in row Sijk"; "-1.0" or "coefficient -1.0" for this unit.
- (ii) "-1.0" in row "ijkTlmnX" if tolerance is allowed on the coefficient.
- (6) "-1.0" in row "MijkXlmn" for each unit mix constraint in which the support unit appears.
 - (7) Coefficient in row TFSTRL.
 - (8) Coefficient in row TSSTRL.
 - (9) Coefficient in row TFCSTL.
 - (10) Coefficient in row TSCSTL.
 - (11) For each support unit aggregate in which the unit appears:
 - (i) Coefficient in row "abSTR".
 - (ii) Coefficient in row "abCST".
- (12) Coefficient in row GROUP if the unit group constraint option is selected and this unit is to be included.
- (13) Coefficient in row "SijkRSP" if support unit requirements shortfalls are modeled.
- (14) Coefficient in row "SijkRLP" if support unit requirements longfalls are modeled.
- (15) "1.0" in row "SijkF" if force short- and/or longfalls are modeled.
- (16) Coefficient in row "SijkFSP" if support unit force short-falls are modeled.
- (17) Coefficient in row "SijkFLP" if support unit force long-falls are modeled.
 - (b) Column "SijkRS" if requirements shortfalls are modeled.
 - (1) Coefficient in row TDEV.

- (2) "-1.0" in row "Sijk".
- (3) "-1.0" in row "SijkRSP".
- (4) For each aggregate in which this unit appears:
 - (i) Coefficient in row "abSTRRD"
 - (ii) Coefficient in row "abCSTRD".
- (c) Column "SijkRL" if requirements longfalls are modeled.
 - (1) Coefficient in row TDEV.
 - (2) "1.0" in row "Sijk".
 - (3) "-1.0" in row "SijkRLP".
 - (4) For each aggregate in which the unit appears:
 - (i) Coefficient in row "abSTRRD".
 - (ii) Coefficient in row "abCSTRD".
- (d) Column "SijkFS" if force shortfalls are modeled.
 - (1) Coefficient in row TDEV.
 - (2) "1.0" in row "SijkF".
 - (3) "-1.0" in row "SijkFSP".
 - (4) For each aggregate in which the unit appears:
 - (i) Coefficient in row "abSTRFD".
 - (ii) Coefficient in row "abCSTFD".
- (e) Column "SijkFL" if force longfalls are modeled.
 - (1) Coefficient in row TDEV.
 - (2) "-1.0" in row "SijkFL".
 - (3) "-1.0" in row "SijkFLP".
 - (4) For each aggregate in which the unit appears:
 - (i) Coefficient in row "abSTRFD".
 - (ii) Coefficient in row "abCSTFD".

INMIXS

Subroutine INMIXS is identical to subroutine INMIXC except for the name. INMIXS may be called from subroutine SUPORT. This logic is duplicated to facilitate program overlaying.

INAGG

Subroutine INAGG may be called from subroutine SUPORT to determine in which support unit aggregates a specified unit appears. The single

calling argument is the DTM number of the unit. Common variable INDAGG returns the number of aggregates that include the unit, and common array INNAGG(20,2) returns the two-character name of the aggregate and the types of the two rows for the aggregate. The two row types are still packed into the first two bytes of the word.

TOLRNC

Subroutine TOLRNC may be called once from the main routine to generate column vectors representing lower and upper deviation from individual allocation rule coefficients. The order of execution of TOLRNC is:

- (a) For each A-matrix coefficient:
- (1) Generate column "ijkTlmnL" representing lower deviation if allowed for that coefficient.
 - (i) Coefficient in row "ijkTlmnX".
 - (ii) Coefficient in row "Slmn".
- (2) Generate column "ijkTlmnU" representing upper deviations if allowed for that coefficient.
 - (i) Coefficient in row "ijkTlmnX".
 - (ii) Coefficient in row "Slmn".
 - (b) For each B-matrix coefficient:
- (1) Generate column "ijkTlmnL" representing lower deviations if allowed for that coefficient.
 - (i) Coefficient in row "ijkTlmnX".
 - (ii) Coefficient in row "Slmn".
- (2) Generate column "ijkTlmnU" representing upper deviations if allowed for that coefficient.
 - (i) Coefficient in row "ijkTlmnX".
 - (ii) Coefficient in row "Slmn".

UNIMIX

Subroutine UNIMIX may be called once from the main routine to generate column vectors representing unit mix constraints. The order of generation for each mix is:

- (a) Column "MIXijk" representing the mix; for each unit in the mix:
 - (i) Coefficient in row "MijkXlmn".

- (ii) "-1.0" in row "MijkTlmn" if lower and/or upper tolerance is allowed on the unit's entry in the mix.
- (b) Call to subroutine MIXTOL to generate columns representing tolerances on the mix entries.

MIXTOL

Subroutine MIXTOL is called from subroutine UNIMIX once for each unit mix constraint to generate column vectors representing tolerances on the mix entries. Calling arguments specify the sequence number of the mix and the location of the specification of the mix and its tolerances in array MIXES(100,3). The order of execution is:

- (a) For each entry of the mix.
 - (1) If upper tolerance is allowed, generate column "MijkUlmn".
 - (i) Coefficient in row "MijkXlmn".
 - (ii) Coefficient in row "MijkTlmn".
 - (2) If lower tolerance is allowed, generate column "MijkLlmn".
 - (i) Coefficient in row "MijkXlmn".
 - (ii) Coefficient in row "Mijktlmn".

ROWOUT

Subroutine ROWOUT is called once from the main routine after all matrix coefficients have been generated to write the model row file (unit 7). ROWOUT writes the "NAME" or "FILE" card for the whole model, then the alternative objective function names stored in array OBNAME, and then the row names and types stored in arrays RNAMES and RTYPES. Before writing, function NRWTP is called for each row to convert its type from the internal "+", blank, "-" or "F" to the type indicators actually required by MPS/360 or OPTIMA.

NRWTP

Function NRWTP is called from subroutine ROWOUT once for each model row to convert its type from the internal "+", blank, "-" or "F" to that required by MPS/360 or OPTIMA.

Appendix C

CONGEN SOURCE PROGRAM LISTING

The CONGEN Source Program (IBM 360 FORTRAN IV) is listed here. The order of routines and the page numbers on which they begin is:

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INMIXC	233
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ž				FOMGEN RUN(S)	C	3301133
0000			301.3E40EH	TOTOLIT NUTTO		3001123
-	11	TAPE11	RINADY CI	LE OF DATA TO B	F PASSED TO	3031133
č	* 4	INCLAIR	CONREP	CC OI DAIR TO C		30 311-3
-			COMER			0001150
C	•	DUTPUT	CVETEM N	TPUT-INCLUDED A	T DAC ONLY	0001150
L		001731	STSIEM U	TIPOT-INCEDDED A	I NAC UNLY	0007100

```
MEMBER NAME CONSEN
                               TO GET SYSTEM DIAGNOSTIC PESSAGES IN
                                                                    30011733
                               EVENT OF FURTRAN/SYSTEM TYPE ERROR
                                                                    OCULTED-
                                                                    30311900
                                                                    20215:22
22215527
                                                                    30012332
                      POSSIBLE EXECUTION TERMINATIONS
                                                                    JJU1240.
                                                                    30012501
                                                                    100.6611
   NORMAL
                                                                    30012700
                                                                    UUULEBIJ
                         CONGEN (MAIN)
                                                                    00012900
            CALL EXIT
                                                                    2001 1632
 ABNORYAL
                                                                    06013160
                                                                    03013230
                         SUPORT / SUPPORT UNIT --- REQUIRES MORE THAN USULBBUL
            STOP GOOL
                                 100 PERCENT OF ITSELF /
                                                                    06013403
                                                                    33013501
                               / RNAMES HAS OVERFLOWED / . ATTEMPT TOUGLOOJS
STORF MORE ROW NAMES THAN DIMENSION OGGS 1703
            STOP 0002
                                 OF ARRAYS RNAMES, RTYPES
                                                                    3031383
C
                                                                    36363933
                         STOP 0033
Č
                                                                    LLIPIUDE
                                / KJGET CALLED WITH ID NCT IN ARRAY
            STOP 3034
                         KJGET
                                                                    35014250
Ċ
                                 DTH /
                                                                    00014360
                                                                    U30144JJ
            STOP 3005
                                / COEFFICIENT STORAGE CAPACITY
                         BSIN
                                                                    ひひしゃ ランン
                                 ERCEEDED AITH NANZ = ---- / . DIMEN-DOOLAGE
                                 SION OF ARRAYS COEF, KJCCEF
                                                                    60014700
C
                                      EXCEPDED WHEN REACING BA SLICE OUDIABUL
                                 MUDEL A-MATRIX TAPE
                                                                    0001-400
                                                                    30315000
                                / COEFFICIENT STORAGE CAPACITY
            STOP 0006
                         BSIN
                                                                    」じい コレリン
                                 EXCECDED WITH NONE . ---- / , DIMEN-JODISZOO
                                 SION OF ARRAYS COEF. FUCCEF.
                                                                    30313333
                                      EXCEEDED WHEN RESCING COEFFI-
                                                                    101.2471
                                 CIENT NBNZ FROM AN SLICE MUDEL
                                                                    13015500
                                 B-MATRIX TAPE
                                                                    20015000
                                                                    33015100
                                                                    رده د انانان
د دن د دن د
                                                                    330.013.
        THIS IS THE MAIN ROUTINE OF CONGEN
                                                                    00010200
                                                                    3331635-
     THE PURPOSE OF THIS SUBROUTINE IS TO PERFORM SOME INITIALIZATION
                                                                    300.0900
     AND TO SET UP THE CALLING SEQUENCE OF THE CONGEN SUPROUTINES
                                                                    U0016500
                                     THE INPUT DATA GENERATE
     WHICH
                     READ
                                                                    زده و زن کار
     THE MATRIX REPRESENTATION OF A GIVEN FORCE MODEL
                                                                    36010703
C
     LINEAR PRUGRAMMING MODEL, AND OUTPUT THIS MODEL
                                                                    33010077
                                                                    じょじしょりょっ
     COMMON /AGG/AGGRSW,NAGGR.AGGRGT17501,1NDAGG.1NNAGG120.21.AGLAH1251JJJJ176JJ
                                                                    33047100
     COMMON VALIANMALIA
     COMMON /ALPHA/NUL351
                                                                    00017200
     COMMUN /BET/STR.LGL
                                                                    UJU1733.
     COMMON /COLCAT/LSTCOL
                                                                    JUUL 1700
```

Market Street, Street, St.

```
MEMBER NAME CONGEN
      COMMON /CSL/CSTYP(63).CSPER(63).CLTYP(63).CLPER(63)
                                                                             20017533
      COMMON /SSL/SDVTVP(700). SRSPER(700), SPLPER(700), SFSPER(700).
                                                                             0001 /600
                   SFLPERI 7001
                                                                             J00177JJ
      COMMUN /DESCRP/STRNTH(76C).DTM(760).COST(760)
                                                                             0641743
      COMMUN /UEVIAT/CSSW.CLSW.SKSSW.SRLSW.SFSSW.SFLSW
                                                                             0001790u
      COMMON /EFF/NEFF.EFFLANIE.31.EFF160.61
                                                                             60014000
      COMMON JGROUP/GRPS4, GROUP(760), 1 GROUP(760,2)
                                                                             33018100
      COMMON /LPSYS/LANGSA.PRANAMIZI.DATSOR
                                                                             JC 01 6200
      COMMON /MIX/UMITSM.MMIRFS.MIRFS(100.3).IMIRES(100)
                                                                             3001030-
      COMMON INAMESINYARI, NVARZ, NACHI, NROMZ, NNX, NNN
                                                                             3001.433
      COMMON /NEIN/NEUNI 601, RESCUNI 61
                                                                             06014500
      LECHICS, THANKED TOUROS
                                                                            LUGALIANA
      COMMON /PRHCT/INDEX
                                                                             Jule 70.
      COMMON TRESPACTORERE ACCOUNTIONER I BOOOL MANZINANZ
                                                                             3604 3803
      COMMON /REQUOL/FILASH, TOLS(2350, 3), NTOLS, ALATYP
                                                                            00014407
      COMMON TRESOLUTINCOMATAN SUPRTANPRAMANIRAMU
                                                                             JC 01 4000
      COMMON /AUHS/RNAMES(3000,21, RTYPES(3000)
                                                                             00019100
      COMMON /SIGN/NEG.PLUS.ZERO.BLK.FREE
                                                                             30314233
      COMMON /SPAN/NENT
                                                                             U00113300
      COMMON /SPTSUS/SUBSW.SUBILION.FJSUB1100,21,NSUBS
                                                                             CL019460
      COMMON /TITLE/ITITLE(7). (SRC(3). (TPSN(2)
                                                                             35014503
      COMMON /THPHIX/MXIND. LIMMIX(10)
                                                                             0001 4660
                                                                            00619700
      DIMENSION DUM1(4500).DUM2(4500)
                                                                             30019803
      EQUIVALENCE COUNTILLIBUCE CONTINUES SANDANTUES
                                                                             7671 9977
                                                                             60023003
      INTEGER NUML. DUMS
                                                                             X 343133
      INTEGER GPRSH, UMI XSW, SUBSH, FREF, DTM, DATSOR, PLUS, ZERO, BLR, RNAMES
                                                                             ひ ひとり とっょ
      TYTEGER ATTPES, PABYAN, STR. LGL, ORNAME, TOLASH
                                                                            סטעצע שעט
       INTEGER CSSA,CLSW, SRSSW, SALSW, SFSSW, SFLSW
       INTEGER CSTYP, CLTYP, SOUTYP
                                                                            22242522
                                                                            00026600
      INTEGER AGGRSW. 15GRST
                                                                            0002573
      INTEGER AGLAS
      INTEGER EFFLAB.ALRTYP.RFSCON
                                                                             33323833
      REAL MIXES, LWTOL
                                                                            3002- 430
                                                                            OOULICUS
CCCCCCCCCCCC
                                                                            30021130
CCCCCCCCCCCC
                                                                            06021200
      CALL ASKERK
                                                                            00021360
                                                                             26.22.43.
22222222222
                                                                             3034.533
222222222
                                                                            00021000
      INITIALIZE MATRIE SIZE COUNTERS
                                                                            063217-1
                                                                            30341633
                                                                            6665147
      INDEROL
      LSTCOL .O
                                                                            30055030
                                                                             36 424 2 4 3
      MMA LJ-0
                                                                            00022200
      NCNT-0
      NOSJ . 6
                                                                             79755797
                                                                             36322933
                                                                            63622533
CCC
         CALL SUBROUTINE INIT TO READ ALL IMPUT DATA EXCEPT MANDGEN
                                                                            2202263-
                                                                            20011733
                                                                            0032243-
      CALL INIT
                                                                            30022400
C C ::
                                                                            2002 1322
         WRITE BINARY FILE -- TAPELL -- UF DATA TO BE USED BY REPORTER
                                                                            ひっつとうしつっ
                                                                            36623201
```

```
MEMBER NAME CONGEN
      WRITE (11) STRNTH.DTM.COST
                                                                          00023300
      WRITE (111) COEF
                                                                          30023310
      WRITE (11) KUCHEF
                                                                           ひしょとうろとょ
      WRITE CILL NANZ, NANZ, NCOMAT, NSUPRT
                                                                          06023333
      WRITE (11) WEFF, CFFLA3, EFF
WRITE (11) NAGGR, AGLAB
                                                                           10023340
                                                                          06757470
                                                                          ひらいとろうしょ
Cisco
                                                                          00023000
      INITIALIZE MATRIX ELEMENT FILE /TAPEA/ ACCORDING TO
                                                                          00023730
      THE MATHEMATICAL PROGRAMMING SYSTEM FORMAT OF THIS RUN AS
                                                                          30023630
      SPECIFIED AY INPUT DATA VARIABLE LANGSW
              LANGSH . 1 ... MPS/360
                                                                          63324333
                        2. . . OP114A
                                                                          00024100
                                                                          644244
      IF (LANGSY.EQ.1)
                        WRITE (4,120)
¢
                                                                          00024400
      INITIALIZE COLUMN IDENTIFICATION FILE /TAPEL/ ACCORDING TO LANGSW JOUZ450J
                                                                          JU02451J
      IF (LANGS . EQ. 1)
                         WRITE 11,1201
                                                                           00024711
                                                                          00026400
      INITIALIZE ADVANCED START BASIS FILE /TAPES/ ACCORDING TO LANGSW
                                                                          16124411
                                                                          36362333
      IF ILANGSW.EQ. 21
                         WRITE (3.130)
                                                                          20025100
C
                                                                          00025200
         CONSTRUCT ALTERNATIVE OBJECTIVE ROWS FOR ROW IDENTIFICATION
                                                                          11127311
        FILE (TAPET) AND ENTER THEM INTO ADVANCED START LP BASIS
                                                                          ひじいとうもひょ
        FILE (TAPES)
¢
                                                                          00023500
                                                                          06.025 Eury
                 TESTAN - TOTAL FORCE STRENGTH
                                                                          36325733
      DHYAME(1.1) . MAMEE NUL 291, NUL 151, NUL 281, NUL 2911
                                                                          ישב ב געינים.
      DENTALLES - NAME (NOTS 1) - NOTES 1 - BLK - BLK)
                 TESTRY - TOTAL COMBAT FORCE STRENGTH
C
                                                                          LLLasiul
      08NAME(2.1) . MAME(MU(29).NU(12).NU(28).NU(29))
                                                                          30020100
      DONAMETS'ST . MARELANTSLINATER . 15'21' ALK'RE
                                                                          00020200
                 TSSTAN - TOTAL SUPPORT FORCE STAFAGTH
C
                                                                          3032033-
      DBNAME(3.1) . MAMELAUCZALAUCZALAUCZALAUCZALAUCZALA
                                                                          00026400
      OBMANEL 3.21 . MINEL VUL 271, NUL 231, NLK, HEKT
                                                                          30060377
C
                 TECOST - TOTAL FORCE COST
                                                                          03026030
      DHNAME(4.1) - NAME(MU(29),NU(15),NU(12),NU(24))
                                                                          00025100
      DANAMELA, 21 . NIMELAULZBI, NULZMI, HLK, BLKI
                                                                          30026435
                 TCCOST - TOTAL CCHRAT FURCE CUST
C
                                                                          ひしいとっきょう
      DBNAME(5.1) . MAMELMULZ91.NUL121.NUL121.NUL2411
                                                                          06027-00
      DBNAME (5.21 . NAME (NUIZA), NUIZO) . HLK. BLK)
                                                                          36327133
                 TSCUST - TOTAL SUPPURT FORCE COST
                                                                          36327233
      DBNAME(6.11 - NAME(MULZ9), NULZA), NULZ3) NULZ4))
                                                                          3302730U
      DAMAMETA. 21 . MAMET VUIZATANUIZATANEKA HEKA
                                                                          00027-00
                 THEY - TOTAL DEVIATIONS ILONGFALLS + SHORTFALLS)
                                                                          30327530
      IF ICSS 4.LE.D.AND.CLSK.LE.D.AND.SRSSW.LE.D.4HD.SRLSW.LE.D.AND.
                                                                          00027360
        SFSS4.LE.O.AVJ.SFLSW.LE.O1 GO TO 210
                                                                          33327753
      T . LACK
                                                                          30021000
                 .11 . NAMEL MULZ 91 . NULL 131 . NULL 41 . NULL 13:11
      DONAME 17
                                                                          00017400
                 .21 . BL4
      DINAME IT
                                                                          30350133
210
      00 10 1 - 1.NO9J
                                                                          GUJEBIJJ
      CALL BASIS (LGL, ORNAME (1, 11, OBNAME (1, 21)
                                                                          22259600
10
                                                                          JE 02 = 335
                                                                          77-59-77
                                                                          3342634
```

```
MEMBER NAME CONGEN
         MPS/360 FUR MAT
                                                                            JJJ346JJ
                                                                            30034730
              READ BASIS FILE CONSTRUCTED BASED ON OPTIMA LOGIC AND
                                                                            1603480v
              STORE IN THO PARTS--LGL AND STR. ARRAYS KJCOEF AND IGROUP DOUG+900
              ARE USED FOR THIS STORAGE.
                                                                            00033000
      REWIND 3
                                                                            30035230
      ILGLPT = 0
      ISTRPT = 0
                                                                            60035433
20
      READ (3,149,END=50) IND,NBAS1,6BAS2
                                                                            60032500
      READ (3,143) IND, NBAS1, NBAS2
C 20
                                                                            J0035 auu
      [F (EDF, 3) 50, 30
                                                                            טטטכנ000
      IF (IND.EQ.LGL) GO TO 40
30
                                                                            00035900
      ISTRPT = ISTRPT + 1
                                                                            JUUJOJU
      DJM1(ISTRPT) = NRAS1
      DUM2([STRPT) = NBAS2
                                                                            00036200
      GO TO 20
                                                                            00036300
      ILGLPT = ILGLPT + 1
40
                                                                            30336400
      IGROUP(ILGLPT, 1) = NBAS1
                                                                            00036500
      IGROUP(ILGLPT, 2) = NBASZ
                                                                            10030000
      GD TO 20
                                                                            03036703
                                                                            30330803
              LOOK AT EACH GENERATED ROW (LESS OBJECTIVE FUNCTIONS--
                                                                            03036904
C
             ARRAY RNAMES) AND IF IT IS NOT IN THE GENERATED BASIS , ASSOCIATE IT WITH A COLUMN IN THE BASIS. THE ASSOCIATED
                                                                            00037000
                                                                            00037100
              ROWS ARE STORED IN THE SECOND HALF OF ARRAY KJCDEF.
C
                                                                            30037200
                                                                            JUU3 730J
50
                                                                            00037400
      K = 1
      NROW = INDEX - 1
                                                                            30037533
      DU 70 I = 1.NROW
                                                                            30037000
      D3 60 J = 1, 1 LGL PT
                                                                            33637760
      IF (RNAMES(1,1).E3.IGROUP(J,1).AND.RNAMES(1,2).EQ.IGRCUP(J,2))
                                                                            30337833
              GO TO 73
                                                                            36337931
60
      CONTINUE
                                                                             30038000
      DUM1(4+3100) = RNAMES(1+1)
                                                                            00038100
      DU42(K+3100) = RNAMES(1,2)
                                                                            30038230
              NOW WRITE OUT COLUMN NAMES WITH ASSOCIATED RCW NAMES
C
                                                                            70078307
              AS THE BASIS FILE -- STILL TAPES
C
                                                                            0003#50J
      K = K + 1
70
      CONTINUE
      REWIND 3
                                                                            DODBASON
      WRITE (3, 150)
      DO 80 1 = 1.1STRPT
                                                                            03039133
      WRITE (3,160) DUM1(1), DUM2(1), DUM1(1+3100), DUM2(1+3100)
80
      CONTINUE
                                                                            03039300
      WRITE (3,170)
                                                                            00039400
      GJ TO 100
                                                                            20039500
                                                                            30039630
         OPTIMA FORMAT
                                                                            00339733
90
      WRITE (3, 180)
                                                                            33334833
      COMPUTE AND PRINT GENERATION SUMMARY STATISTICS ON LOGICAL
                                                                            33340303
      O TIPU
                                                                            33343131
                                                                            60340200
```

MAC

```
MEMBER NAME CONGEN
                                                                        03028733
                                                                        Jú J2adúu
      START GENERATION OF LOGICAL SUB-MATRICES
                                                                        10020733
C
                                                                        30029356
         CALL SUBROUTINE COMBAT TO GENERATE THE LOGICAL SUB-MATRIX OF
                                                                        20253122
        COLUMN VECTURS THAT REPRESENT THE COMBAT MODULES OF A FORCE
                                                                        J332923J
        MODEL .
                                                                        JC 029300
C
                                                                        UUU2940U
      CALL COMBAT
                                                                        00029500
                                                                        J00295JU
         CALL SUBROUTINE SUPPORT TO GENERATE THE LOGICAL SUB-MATRIX OF
C
                                                                        66624763
        COLUMN VECTORS THAT REPRESENT THE SUPPORT UNITS OF A FORCE MODELOGIZAGIO
Ċ
                                                                        33029933
      CALL SUPORT
                                                                        00033000
                                                                        333333
         IF TOLERANCE IS ALLOWED AT ALL ON INDIVIDUAL ALLOCATION RULE
                                                                        いじい30200
        COEFFICIENTS (FOLRSW # 1) , CALL SUBROUTINE TOLRNO ONCE TO GENERATE MATRIX STRUCTURE
                                                                        ひしょうきょうき
                                                                        JじょうじゃJひ
        REPRESENTING ANY USER SPECIFIED MAXIMUM LOWER AND/CR UPPER
                                                                        ندززوزون
        DEVIATIONS FROM THOSE REQUIREMENTS.
                                                                        CCOCECCO
C
                                                                        03333753
      IF (TOLRSW.EQ.1)
                        CALL TOLRNC
                                                                        00030650
C
                                                                        30030400
         IF UNIT MIX CONSTRAINTS MAY BE REPRESENTED AT ALL (UMIXSW = 1) 00031000
       CALL SUBROUTINE UNIMIX ONCE TO GENERATE MATRIX STRUCTURE
                                                                        20031122
       REPRESENTING ALL USER SPECIFIED UNIT MIXES.
                                                                       00031200
                                                                       30031350
      IF (UMIXSW.EQ.1)
                         CALL UNIMIX
                                                                        10001400
C
                                                                       00031500
                                                                       53331655
        IF SUPPURT UNIT SUBSTITUTIONS IN SATISFACTION OF ALLOCATION
                                                                        ノレンシェアンン
       RULES ARE ALLOWED AT ALL (SUBSW = 1) . CALL SUBROUTINE SUBSTI
                                                                       00031835
       TO GENERATE THE SUBMATRIX OF ALLUWABLE SUBSTITUTIONS
                                                                       30031905
                                                                       ひひじろ2000
C
                                                                       00032103
      IF (SUBSW.EQ.1) CALL SUBSTI
                                                                       00032200
                                                                       33332333
                                                                       00032453
        CALL SUBROUTINE HNDGEN TO ACCEPT ANY HAND-PREPARED MATRIX
                                                                       00032500
        STRUCTURE.
C
                                                                       30332733
      CALL HNDGEN
                                                                       J0032900
      OUTPUT THE ROW IDENTIFICATION FILE IN THE MPS LANGUAGE AS
                                                                       COLECUOU
      SPECIFIED BY INPUT DATA VARIABLE LANGSW AS /TAPET/
                                                                       33333203
     BY A CALL TO SUBROUTINE ROWOUT
                                                                       3003330
      CALL ROWOUT
                                                                       00033500
C
                                                                       3003370-
00034000
      END ADVANCED START BASIS FILE /TAPES/ ACCORDING TO INPUT DATA
                                                                       00034100
C
      VARIABLE LANGS#
                                                                       30034230
C
                                                                       33334355
                        GO TO 90
      IF (LANGSW.NE.1)
                                                                       JUU3+4UL
```

```
MEMBER NAME CONGEN
 ... 100 . MSIZE = INDEX + NUBJ - 1
                                                                                 30043303
         WRITE (6,193) NCOMBT, NSUPRT, MSIZE, LSTCOL, NNAIJ, NCNT
                                                                                 300+3433
                                                                                 000-1504
         CALL EXIT
                                                                                 23042632
   C
                                                                                 6304.763
                                                                                 33343855
   120
         FORMAT (THEOLUMNS, 73X)
         FORMAT (1x, 4HF ILE, 5x, 5+TAPE3, 65x/1x, 5HBASIS, 74X)
   130
                                                                                 30041300
   140
         FORMAT(1X, A 3, 4X, 244, 64X)
                                                                                 33341135
   150
         FORMAT (4HNAME, 10X, 54TAPE3,61X)
                                                                                 30041203
   160
         FORMAT(1X, 2HXL, 1X, 244, 2X, 2A4, 58X)
   170
         FORMATIGHENDATA, 74X)
 ...180
         FORMAT (1x, THENDFILE, 72X)
         FORMAT(1H1///////H , 61x, 7HCCNFORM/1H0, 51x, 28HLP MATRIX GENERATIODU41600
   190
         ON SUMMARY////H +54%,13,18H CCMBAT UNIT TYPES/1H +54%,13,19H SUPPODO41700
         #URT UNIT TYPES////IH .15x,20HTOTAL ROWS GENERATED,16x,16,12x,31HROJJ04_800
         *WID IS FORTRAN LUGICAL UNIT 7//IH ,15x,34HTOTAL STRUCTURAL COLUMNSOCO41900

◆ GENERATED, 2x, 16, 12x, 15HCOLID IS UNIT 1//1H ,15x,34HTOTAL NCN-NULLJUU42JJ

         * MATRIX COEFFICIENTS, 2x, 16,12x, 29HMATRIX ELEMENT FILE IS UNIT 4//10042100
         *H .15x,29HTOTAL CANDIDATE BASIS VECTORS,7x,16,12x,30HADVANCED STARUUG+22UU
*T BASIS IS UNIT 3///1H ,24x,65HNOTE—EXCEPT FOR NUMBER CF COMBAT JUG+23UU
         #AND SUPPORT UNIT TYPES MODELED./IH .30X.59HSUMMARY STATISTICS INCLUDE242400
         *UDE ANY HAND-PREPARED MODEL (MATRIX)/1H ,30X,48HSTRUCTURE INPUT TODO 042500
         * THE CONFORM MATRIX GENERATOR.)
                                                                                 30042000
                                                                                 G00427JJ
                                                                                 00042300
          SUBROUTINE BASIS (NTYP. NBASI. NBASZ)
                                                                                 35547455
   C
                                                                                 30343333
   C
                  CONGEN
                                        6 JUNE 72
                                                                                 33343150
                                                                                 00343233
                                                                                 00043500
         SUBPRIGRAM TO GENERATE THE FILE OF UNIQUE BASIS NAMES - TAPES
                                                                                 00 43434
____ C
         THIS IS A LIST OF CANDIDATE LP BASIS VECTORS THAT IS OF SIZE M.
         AND IS THE OPTIMAL SOLUTION FOR A CLASS OF MODELS
                                                                                 00043600
                                                                                 00043704
         COMMON /BET/STR.LGL
                                                                                 JC 043 pJU
         COMMON /ROWS/RNAMES(3000,2),RTYPES(3000)
         COMMON /SPAN/NCNT
                                                                                 UL 344333
         COMMON /LPSYS/LANGSW.PRBNAM(2),DATSOR
                                                                                 00 044100
         COMMON /PRBCT/INDEX
                                                                                 30 344 234
                                                                                 00044331
         INTEGER PRONAM. DATSOR
                                                                                 0004+430
         INTEGER RNAMES, STR. LGL, RTYPES
                                                                                 33344530
   C
                                                                                 000+4130
            IF THIS VECTOR IS A ROW VECTOR, DO NOT INCLUDE IT IN THIS LIST 30044633
   C
            IF IT IS ALREADY IN THE ROW IDENTIFICATION FILE - RNAMES
   C
                                                                                 10444911
         IF (NTYP.EQ.STR) GO TO 10
                                                                                 00045100
         00 5 I = 1, INDEX
         IF (RNAMES(1,1).EQ.NBAS1.AND.RNAMES(1,2).EQ.NBAS2)
                                                                                 نند د د ۹۵ من
   5
         CONTINUE
                                                                                 33343434
                                                                                 じししゃちきじょ
   C
   10
         IF (LANGSW.EQ.2) GO TO 25
                                                                                 ひじひゃさのこひ
..._ C
                                                                                 33045733
   č
                             MPS/360 FORMAT
                                                                                 16 U+ > 8 i .
         WRITE (3,45) NTYP, NBAS1, NBAS2
                                                                                 300+253
         GO TO 30
                                                                                 30446033
```

RAC

```
MEMBER NAME CONGEN
                         OPTIMA FORMAT
                                                                           00046100
      17 = MASK( NBAS2 . 3 )
                                                                           33340200
      IB = MASK( N9452 , 4 )
                                                                           00045300
      WRITE (3.50) NTYP.NBAS1.NBAS2.17.18
                                                                           00046400
                                                                           30046533
30
      NCNT=NCNT+1
C
                                                                           00646733
      RETURN
                                                                           00046800
Ċ
                                                                           00040 100
                                                                           00047630
45
      FORMAT(14, 43, 4x, 244, 644)
                                                                           00047100
      FORMAT (1x, A3, 6x, A4, 42, 1H., 2A1)
50
                                                                           33347233
                                                                           00047300
      SUBRUUTINE BRK 3DG(1.11.12.13)
                                                                           000+7400
C
                                                                           10047500
C
              CONGEN
                                   6 JUNE 72
                                                                           30347630
                                                                           00047733
         BRK3DG IS A FORTRAN IV FUNCTION SUBPROGRAM THAT ACCEPTS
                                                                           J0J478JJ
Č
        A 3-DIGIT INTEGER AS ONE CALLING PARAMTER AND RETURNS THE
                                                                           20047932
        3 DIGITS AS 3 HOLERITH CHARACTERS AS FORMAL PARAMETERS.
                                                                           20044633
CCCC
         BRK3DG CALLS FUNCTION INTHOL AND IS USED TO PREPARE UNIT
                                                                           しいりゃおしょう
        IDENTIFICATION NUMBERS FOR USE IN MODEL ROW AND CCLUMN NAMES.
                                                                           00640201
                                                                           06 048 300
                                                                           00048400
CCC
             I ...3-DIGIT INTEGER INPUT FOR BREAK-UP AND CONVERSION
                                                                           J064853J
                  FROM INTEGER TO HOLERITH.
                                                                           00048000
             11...LEFT-MOST DIGIT RETURNED AS A HOLERITH CHARACTER
Č
             12...SECOND DIGIT RETURNED AS A HOLLERITH CHARACTER
                                                                           10143831
C
             13... RIGHT-MOST DIGIT RETURNED AS A HOLLERITH CHARACTER
                                                                           36048330
0000
                                                                           03349634
                                                                           30047103
              BREAK APART DIGITS
                                                                           00044205
                                                                           00049300
      [1 = [ / 100]
                                                                           360+9400
      13 = 1 - (1/10)*10
                                                                           00049500
      12 = { 1 - (11+100 + 13) } / 10
                                                                           00049600
Ç
                                                                           UG 0497JJ
              CONVERT EACH DIGIT FROM INTEGER TO HOLLERITH BY A CALL
                                                                           JUJ498JJ
C
             TO FUNCTION INTHOL.
                                                                           00049900
                                                                           00050000
      I1 = INTHOL(I1)
                                                                           しじじっひょうじ
      12 = INTHOL ( 12 )
                                                                           10053200
      I3 = INTHOL(I3)
                                                                           JJ JJ J J J J J
C
                                                                           30050430
      RETURN
                                                                           00050500
C
                                                                           00050600
      END
                                                                           00050733
      00022000
                                                                           JUJ209J0
                                  13 JUNE 72
                                                                           30051300
                                                                           00051100
C
         CHARIN IS A SUBROUTINE SUBPROGRAM THAT INSERTS A LEFT-JUSTIFIEDUUGO1200
         BLANK-FILLED HOLLERITH CHARACTER (A) INTO CHARACTER POSITION I DJUBIBDU
         OF INPUT WORD (X4) . THE CHARACTER POSITION IS SPECIFIED
                                                                           30021430
         BY THE ENTRY POINT NAME.
                                                                           00021500
                                                                           30051600
      LOGICAL+1 A.X(4)
                                                                           00021733
      INTEGER XR
                                                                           30051800
```

	R NAME CONGEN		
			000319
	EQUIVALENCE (NTEMP, X)		000520
			000520
	EVTRY [N1(/XR/,/A/)	ia (1. (1. (1. (1. (1. (1. (1. (1. (1. (1.	
	NTEMP = XR		000>24
	X(1) = A		300023
	XR = NIEMP		000024
	RETURN		000525
			000526
	ENTRY IN2(/XR/,/A/)		000527
	NTEMP = XR		000528
	X(2) = A		JU 05 29
	XR = NTEMP	•	JU 053.
	RETURN		000531
			JJ J J J J J J J J J J J J J J J J J J
	ENTRY [N3(/XR/./A/)		300553
	NTEMP = XR	·	030534
	X(3) = A		330535
	XR = NTEMP		00053c
			ÚÚU 237
	RETURN	a agree to the contract of the	303538
	FNTRY IN4(/XR/+/A/)	2 5 4 4 5 5 6	300539
	NTEMP = XR		000540
	X(4) = A	10 mm and 11 mm at 12	J00541
	XR = NTEMP		JU 0542
	RETURN		_ 000543
			JJ 0544
	END		030545
	SUBROUTINE COLID		000548 000548
-	SUBROUTINE COLID		000548
	SUBROUTINE COLID		
	SUBROUTINE COLID	6 JUNE 72	000548 000547
	SUBROUTINE COLID		000548 000548 000548 000548
	CONGEN .	6 JUNE 72	000348 000547 000548 000547
	CONGEN SUBPROGRAM TO STORE, COU	6 JUNE 72	000541 000541 000548 00054 00055
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS.	000548 000548 000548 00055 00055 00055
<u>-</u> ··	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS.	000548 000548 000548 00055 00055 00055
	CONGEN CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS	000548 000548 000548 00055 00055 00055 00055
	CONGEN CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS	000546 000546 000546 00055 00055 00055 00055
	CONGEN CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS.	000546 000546 000546 00055 00055 00055 00055
- ··	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSH,PR COMMON /NAMES/NVAR1,NVA	6 JUNE 72 INT THE MATRIX COLUMNS	000548 000548 00055 00055 00055 00055 00055 00055
	CONGEN CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR	6 JUNE 72 INT THE MATRIX COLUMNS	000346 000546 00056 00035 00035 00035 00035 00035 00035
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSH,PR COMMON /NAMES/NVAR1,NVA	6 JUNE 72 INT THE MATRIX COLUMNS	000346 000546 000556 000350 000353 000353 000355 000355
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSH,PR COMMON /NAMES/NVAR1,NVA	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REASSUMED; REASSUMED; REASSUMED; REASSUMED;	000548 000548 000558 000551 000551 000553 000556 000556
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSH,PR COMMON /NAMES/NVAR1,NVA	6 JUNE 72 INT THE MATRIX COLUMNS	000346 000546 00055 00035 00035 00035 00035 00035 00035 00035
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSW.PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1	6 JUNE 72 INT THE MATRIX COLUMNS. LE ASSUMED) LB NAM(2), DATSOR LR 2, NROW1, NROW2, NNX, NNN	000546 000546 000556 00055 000556 000556 000556 000556
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSW.PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1	6 JUNE 72 INT THE MATRIX COLUMNS. LE ASSUMED) LB NAM(2), DATSOR LR 2, NROW1, NROW2, NNX, NNN	000346 000546 00055 00035 00035 00035 00035 00035 00035 00035
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSW.PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REASSUMED; REASSUMED; REASSUMED; REASSUMED;	000546 000546 000556 00055 000556 000556 000556 000556
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) RENAM(2),DATSOR RR2,NROW1,NROW2,NNX,NNN	00056 00054 00054 00055 00055 00055 00055 00056 00056
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCWT/LSTCOL COMMON /LPSYS/LANGSW.PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) RENAM(2),DATSOR RR2,NROW1,NROW2,NNX,NNN	000546 000546 00055 00055 00055 00055 00055 00055 00055 00055
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSH, EQ. 2) GO T	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) RENAM(2),DATSOR RR2,NROW1,NROW2,NNX,NNN	000346 000546 00055 00055 00055 00055 00055 00055 00055 00055 00056 00056
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) RENAM(2),DATSOR RR2,NROW1,NROW2,NNX,NNN	000346 000546 00055 00055 00055 00055 00055 00055 00055 00055 00056 00056 00056
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ. 2) GO T MPS360 FORMAT	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000346 000546 00055 00055 00055 00055 00055 00055 00055 00055 00056 00056 00056
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSH, EQ. 2) GO T MPS360 FORMAT WRITE (1,135) NVAR1, NVA	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000546 000546 00055 00055 00055 00055 00055 00055 00055 00055 00056 00056 00056
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ. 2) GO T MPS360 FORMAT	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000546 000546 000556 000556 000556 000556 000556 000556 000556 000566 000566 000566
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ.2) GO T MPS360 FORMAT WRITE (1,135) NVAR1, NVA RETURN	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000346 000546 000354 000356 000355 000356 000356 000556 000566 000566 000566 000566 000566 000566
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSH, EQ. 2) GO T MPS360 FORMAT WRITE (1,135) NVAR1, NVA	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000546 000546 000556 000556 000556 000556 000556 000556 000566 000566 000566 000566 000566 000566 000566 000566
	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ. 2) GO T MPS360 FORMAT WRITE (1.135) NVAR1, NVA RETURN OPTIMA FORMAT	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000546 000556 000556 000556 000556 000556 000556 000556 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 0005666 0005666 0005666 0005666 0005666 0005666 00056666 0005666 0005666 0005666 0005666 0005666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 000566666 000566666 000566666 000566666 0005666666 0005666666 00056666666 00056666666 00056666666 00056666666 00056666666 00056666666 00056666666 000566666666
5	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ. 2) GO T MPS360 FORMAT WRITE (1,135) NVAR1, NVA RETURN OPTIMA FORMAT I7 = MASK(NVAR2 , 3)	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REAMM(2), DATSOR RR2, NROW1, NROW2, NNX, NNN ON FILE /TAPE1/	000546 000556 000556 000556 000556 000556 000556 000556 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 0005666 0005666 0005666 0005666 0005666 0005666 0005666 00056666 0005666 0005666 0005666 0005666 00056666 00056666 00056666 000566666 00056666 000566666 0005666666 0005666666 0005666666 00056666666 00056666666 000566666666
5	CONGEN SUBPROGRAM TO STORE, COU (UNIQUE COLUMN NAMES AR COMMON /COLCHT/LSTCOL COMMON /LPSYS/LANGSH, PR COMMON /NAMES/NVAR1, NVA INTEGER PRBNAM, DATSOR LSTCOL=LSTCOL+1 WRITE THIS COLUMN NAME IF (LANGSW.EQ. 2) GO T MPS360 FORMAT WRITE (1.135) NVAR1, NVA RETURN OPTIMA FORMAT	6 JUNE 72 INT THE MATRIX COLUMNS. RE ASSUMED) REASSUMED) REASSUMED) ON FILE /TAPE1/ TO 15	000546 000556 000556 000556 000556 000556 000556 000556 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 000566 000566 000566 000566 000566 000566 000566 0005666 000566 0005666 0005666 0005666 0005666 0005666 0005666 00056666 0005666 0005666 0005666 0005666 0005666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 00056666 000566666 000566666 000566666 000566666 0005666666 0005666666 00056666666 00056666666 00056666666 00056666666 00056666666 00056666666 00056666666 000566666666

4 E M B	ER NAME CONGEN		
	RETURN	3005773	
;		0005783	
35	FORMAT (4X, 2A4, 68X)	7702147	
40	FORMAT (1%, 3HSTR, 6%, A4, A2, 1H., 2A1, 61%)	じししがおりょ	
		り じひきお13	
	END	J0 J5 82 J	
	BLUCK DATA	Ucocodo	
	BLOCK DATA GENRAT	3035843	
		0005850	
	CONGEN 6 JUNE 72	0000560	
	DIMENSION IPISTA(32.2)	0009670	
		3005863	
	COMMON /ALPHA/NU(35)	3605893	
	COMMON /BET/STR.LGL	3005930	
	COMMON /SIGN/NEG.PLUS.ZERO.BLK.FREF	3305913	
	COMMON/REQTOL/TOLRSW, TOLS(2350,3), NTOLS, ALRTYP	000592	
	OS TRANTES TO SET USAN TO SET	00 35 9 3 3	
		UÚÚŠ94 J	
	INTEGER NEG, PLUS, ZERO, BLK, FREE	0005950	
	EQUIVALENCE (VCS1 , TOLS(1,1))	0005960	
	EQUIVALENCE (APTSTA, TOLS(2,1))	0005973	
	EQUIVALENCE (IPTSTA(1,1),TOLS(3,1))	0005983	
		JC 0599	
	DATA NCST/ 32 /	0000000	
	DATA NPTSTA/ 6 /	0006013	
	DATA IPTSTA/ 0,1,1,1,C,0,0,0,1,1,0,0,0,1,	0006023	
	* 1,1,1,1,1,1,1,1,0,1,1,1,0,0,0,1,1,1,	0006030	
	+ 14*1 , 18*3 /	U000040	
		0006053	
	THE PRINCIPAL CONGEN NON-BLANK MNEMONIC CHARACTER SET	ეებისიე	
		JJU0J7 J	
	DATA NU/1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9,1HA,1HB,1HC,1HC,1HE,1HF,1HG,1HH,1H1,1HJ,1HK,1HL,1HM,1HN,1HO,1HP,1HQ,1HR,1HS,1HT,1HU,		
	21HV,1HW,1HX,1HY,1HZ/	3000100	
		0000110	
	PLUS AND MINUS SIGNS, A BLANK, AND A ZERO USED FOR ROW TYPES	JU 06 1 23	
	SOMEN OF THE STATE	3000133	
		0000143	
	DATA NEG/1H-/, PLUS/1H+/, ZERO/1HO/, BLK/1H /	3006153	
		0000160	
	A FREE (UNCONSTRAINED) TYPE ROW INDICATOR	3006170	
	A THE TOTAL THE NOT THE NOT THE TOTAL	0006180	
	DATA FREE/ 1HF /	3006193	
	DATA FRECE INF F	3300200	
		J005200	
	STRUCTURAL AND LOGICAL VECTOR INDICATORS USED IN MAKING UP THE	3003213	
	LIST OF CANDIDATE LP BASIS VECTORS (TAPES)	0006233 0006240	
	DATA CTO /DUCTO / 1 CL /DULCL /	00002.0	
	DATA STR/3HSTR/.LGL/3HLGL/	0000250	
		3000200	
		0006270	
	END	ULU0280	
	SUBROUTINE HNOGEN	2006237	
		333630 0	
	CONGEN 6 JUNE 72	0006310	
		Jú (6 3 2 j	
		Juu6335	
	SUBRUUTINE TO GENERATE THE CALLS TO MATRO, ROWID, MATWRT, COLID	000634U	

```
MEMBER NAME CONGEN
          FOR ACCEPTANCE OF ANY USER PREPARED MATRIX STRUCTURE - HANDGEN 30063500
 C
                                                                              00001600
        NAMES/NVARI, NVAR2, NROW1, NROW2, NNX, NNN
                                                                              00063733
        COMMON /SIGN/NEG, PLUS, ZERO, BLK, FREE
                                                                              30363800
 C
                                                                              00003900
        INTEGER NEG, PLUS, ZERO, BLK, FREE
                                                                              00064000
 C
                                                                               30304103
        LSTVR1 = 0
                                                                              00264200
        LSTVR2 = 0
 C
                                                                              20204444
        CALL MATRD(VAL)
                                                                              00004500
        IF (NRUW1.EQ.BLK.AND.NROW2.EQ.BLK)
                                               RETURN
                                                                              30004630
        CALL ROWID
                                                                              JJJJ0647JJ
        CALL MATWRTIVAL)
                                                                              30364800
        IF (NVAR1.EQ.LSTVR1.AND.NVAR2.EQ.LSTVR2)
                                                     GO TO 5
                                                                              00004900
        LSTVR1 = NVAR1
        LSTVR2 = NVAR2
                                                                              30065103
        CALL COLID
                                                                              00065200
        GO TO 5
                                                                              30005333
 C
                                                                              30062433
                                                                              00065500
        FUNCTION INTHOL(I)
                                                                              00065633
 C
                                                                              30005733
 Č
                                      6 JUNE 72
                                                                              J0005800
                CONGEN
.....
                                                                              00005933
           INTHOL IS A FORTRAN IV FUNCTION SUSPROGRAM THAT ACCEPTS AS
                                                                              30000000
          A FORMAL PARAMETER AN INTEGER DIGIT (0,1,...,9) AND RETURNS
                                                                              JJU6610J
 C
          THE HULLERITH CHARACTER FUR THAT DIGIT (ZERO OR NU(I) FOR 1=1,9)00066200
                                                                              60066300
 C
           I ... INTEGER 0, 1, ... OR 9
 C
                                                                              00036503
 C
                                                                              JU06650
        COMMON /ALPHA/NU(35)
                                                                              00066700
        COMMON /SIGN/NEG, PLUS, ZERO, BLK, FREE
                                                                              U0604000
 C
                                                                              00066900
        INTEGER NEG, PLUS, ZERO, BLK, FREE
                                                                              00367333
 C
                                                                              0000/100
                                                                              30067230
           IF I IS NEGATIVE OR GREATER THAN 9, PRINT AN ERROR MESSAGE
                                                                              33007300
 CSC
          ON LIGICAL UNIT 6 AND TERMINATE FOMGEN EXECUTION BY STOP 0003
                                                                              33067460
                                                                              00067500
        IF (I.LT.O.OR.1.GT.9)
                                 GO TO 20
                                                                              03067633
 C
                                                                              UUU67735
 C
                                                                              00007600
           IF I IS 1.2...OR 9. ITS HOLLERITH CHARACTER IS IN ARRAY NU.
                                                                              00067933
        IF (1.EQ.0)
                                                                              Ú0000000
                      GO TO 10
                                                                              00668100
        INTHOL = NU(I)
        RETURN
                                                                              30363233
 C
                                                                              30008303
           IF I IS O. ITS HOLLERITH CHARACTER IS VARIABLE ZERO.
 C
                                                                              JÚÚ6540J
                                                                              00068500
        INTHOL = ZERO
 10
                                                                              3000 3653
        RETURN
                                                                              Jú 368 700
 C
                                                                              J066380U
                                                                              30368933
 23
       WRITE (6.30) I
                                                                              60069000
       FORMAT(1H1////1H ,42H++++ FUNCTION INTHOL WAS CALLED WITH I = ,100U6910J
 30
                                                                              JC J642JJ
       *5.18H (NOT 0.1...DR 9))
```

```
MEMBER NAME CONGEN
      STOP 0003
                                                                            JU J6930J
                                                                            30009433
                                                                            36009530
                                                                            00009600
      FUNCTION KIGET (10)
                                                                            ÚÚ JO 7 7 JU
C
                                                                            36 069800
                                    6 JUNF 72
              CONSEN
                                                                            06369903
                                                                            UJÚ7UJÚU
         KUGET IS A FIRTRAM IN FUNCTION SUBPROGRAM THAT ACCEPTS AS A
                                                                            35073135
        CALLING PARA ITER AN EXTERNAL IDENTIFICATION NUMBER OF A UNIT
                                                                            00070200
        (DIM NUMBER) AND DETERMINES THE FOMGEN INTERNAL IDENTIFICATION
                                                                            UCU1333
        NUMBER--1,2,..., NOOMBT , NOOMBT+1,..., NOOMBT+NSUPRT.
                                                                            JUJ7J400
         EYTERNAL UNIT ID NU 48ERS ARE STORED IN COMMON ARRAY DTM(600) -- 00070500
        FOR NOUNDE COMBAT MODULES, THEN FOR NSUPER SUPPORT UNITS.
         AN ERROR MESSAGE IS WRITTEN ON UNIT 6 AND FOMGEN EXECUTION IS
                                                                            00070703
        TERMINATED BY STOP 0004 IF PARAMETER ID IS NOT FOUND IN
                                                                            U037380J
C
        ARRAY DIY
                                                                            06076955
                                                                            30071303
C
               ID... EXTERNAL UNIT IDENTIFICATION NUMBER
                                                                            36671103
                                                                            JJ3712JJ
C
                                                                            00071300
      COMMON /CESCRP/STRNTH[763],OTM(763),COST(763)
                                                                            30371433
      COMMON /LPSYS/LANGSW. PRBNAM(2).DATSOR
                                                                            00071500
      CUMMON /RESULU/NCOMBT. NSUPRT, NPRAM, NPRAMU
                                                                            JUU716JU
C
                                                                            03071700
      INTEGER DIM
                                                                            000/1800
C
                                                                            JJU719JJ
C
                                                                            33372333
      NUNIT = NCOMBT + NSUPRT
                                                                            00072100
      DO 10 I = 1. NUNIT
                                                                            00072200
C
                                                                            33072330
      IF (DIMITI) AT
                           GD TO 10
                                                                            30u124uu
      KJGET = I
                                                                            00072500
      RETURN
                                                                            30372000
                                                                            00072700
10
      CONTINUE
                                                                            00072600
CCC
                                                                            00372933
                                                                            33373633
      WRITE (6,20) 1D
                                                                            JJJ7316J
      FORMAT(1H1////1H +42H***** FUNCTION KJGET WAS CALLED WITH ID = +100073200
20
     +5,26H WHICH IS NOT IN ARRAY DIMI
                                                                            25073330
      STOP 0004
                                                                            30073400
                                                                            10073500
C
C
                                                                            26073600
                                                                            00073700
      END
      SUBROUTINE KJUNPK( | ARRAY, LOC, | D1, 102)
                                                                            000/3800
C
                                   6 JUNF 72
                                                                            00073900
      COMMUN /REGEAC/COEF(6000).KJCOEF(8000).NANZ.NBNZ
                                                                            0607+600
                                                                            00074100
      CUMMON /REQTOL/TOLRSW, TOLS (2350, 3), NTOLS, ALRTYP
      INTEGER TOLS
                                                                            Júu74203
      IF (IARRAY.NE.1)
                        GO TO 10
                                                                            00074300
      101 = KJCOEF(LOC) / 1000
                                                                            JUJ7443J
      102 = KJCOEF(LOC) - 101 + 1000
                                                                            33374533
                                                                            00074000
      RETURN
10
      101 = TOL3(LOC,1) / 1000
                                                                            30374700
      ID2 = TULS(LUC,1) - IC1 + 1000
                                                                            03674800
      RETURN
                                                                            60074900
      CVB
                                                                            00375603
```

MEMO	ER NAME CONGEN		
п спо-		30375133	
•		30075203	
č	13 JUNE 72		
C	13 JUNE 72	0001330	
C		JUU7540.	
C	MASK IS A FUNCTION SUBPROGRAM THAT MASKS-OFF CHARACTER I	JJ 37550.	
00000	OF INPUT WORD XP AND RETURNS IT AS LEFT-JUSTIFIED AND	0007500	
С	BLANK-FILLED FUNCTION VALUE	05 07570.	
Ċ		GGU7580.	
•	LOGICAL+1 X(4),Y(4)	0007590.	
	INTEGER XR. BLANK/6H /	3007630	
	EQUIVALENCE (ITEMP, X), (JTEMP, Y)	GJ 07030.	
	EQUIVALENCE (TIEMPOA)(JIEMPOY)		
C		JO 07620.	
	ITEMP = BLANK	0007630	
	JTEMP = XR	J UU704J	
	X(1) = Y(1)	6337053.	
	MASK = ITEMP	0007360.	
	RETURN :	30076733	
4*	END	JUJ7080.	
	المناف ال	LUU7090.	
C		JU07700.	
č	CONGEN 6 JUNE 72	60077100	
•	CONDEN O JUNE 12		
CCC	•	0007720	
٥		00077300	
C	SUBROUTINE SUBPROGRAM TO READ HAND-GENERATED STRUCTURE OF THE MATRIX ELEMENT FILE, FROM	0007740	
	STRUCTURE OF THE MATRIX ELEMENT FILE, FROM	00 07750	
C	/TAPE5=INPUT/	0007760	
C		3601770	
•	COMMON /LPSYS/LANGS#.PRBNAM(2).DATSOR	3307780	
	COMMON /NAMES/NVAR1, NVAR2, NROW1, NROW2, NNX, NNN	00077900	
c ·	COMMON MANUES MA		
C	INTEGER BURNAY DATEOR	0007400	
	INTEGER PRBNAM, DATSOR		
C		00078200	
		00073303	
C		JÚJ7840J	
C	MPS/360 FORMAT	00076500	
C		0007460.	
	READ (5,25) NNX, NVAR1, NVAR2, NROW1, NROW2, NNN, VAL	06 37373	
	RETURN	0007480.	
С		0007490	
č		06 079303	
	Grijna furnaj		
C	BEAR 15 301 MMW MOS MOS MOS MOS MOS MOS MOS MOS MOS MOS	0007410	
15	READ (5,30) NNX,NR1,NR2,NR3,NR4,NR5,NR6,NR7,NR8,NV1,NV2,NV3,NV4,	00079202	
	* NV5,NV6,NV7,NV8,NNN,VAL	0307930	
	NROW1 = NAME(NR1,NR2,NR3,NR4)	30079433	
	NROW2 = NAME(NR5,NR6,NR7,NR8)	0007950	
	NVAR1 = NAME(NV1, NV2, NV3, NV4)	6067960	
	NVAR2 = NAME(NV5, NV6, NV7, NV8)		
	RETURN	0007973.	
С	THE PARTY	30379903	
<u>_</u>		30077703	
ç			
C		0000010.	
25	FJRMAT(A1, 3x, 244, 2x, 244, 2x, 41, F11.6)	0008320.	
30	F)RMAT(A1,9x,6A1,1x,2A1,1x,6A1,1x,2A1,1x,A1,F11.6)	0008131.	
	END	JC 00C40.	
	SUBROUTINE MATWET (VAL)	CJOBJÓU.	
C		CJUBJBJL	
č	CONGEN 6 JUNE 72	00383702	
Č		0604180	

```
MEMBER NAME CONGEN
          SUBROUTINE SUBPROGRAM TO WRITE THE MATRIX ELEMENT FILE (TAPE4) 00040900
         COEFFICIENT BY COEFFICIENT AS CALLED. IN THE FORMAT OF THE LP
C
                                                                             00081000
C
         SYSTEM SPECIFIED BY INPUT DATA VARIABLE LANGSW
                                                                              30001100
C
                                                                              000812UÚ
C
                                                                              30081303
      COMMON /ALJ/NYALJ
                                                                              00381430
      COMMON /LPSYS/LANGSH.PRANAM(2).DATSOR
                                                                              20381203
      COMMON /NA 4ES/NVAR1, NVAR2, NROW1, NROW2, NNX, NNN
                                                                              00081600
      COMMON /SIGN/NEG, PLUS, ZERO, BLK, FREE
                                                                              J0081733
C
      INTEGER NEG, PLUS, ZERO, BLK, FREE
                                                                              30081955
      INTEGER PRBNAM, DATSOR
                                                                              30 182333
C
                                                                             00082100
      NNAIJ = N'AIJ + 1
                                                                              00082200
      IF (LANGSW-EQ. 2)
                          GO TO 15
                                                                             30382333
CCC
                                                                             00082400
                    MPS/360 FORMAT
                                                                             30382530
                                                                             60382633
      WRITE (4,25) NVAR1, NVAR2, NROW1, NROW2, NNN, VAL
                                                                             06382700
      RETURN
                                                                             00082800
C
C
                    OPTIMA FORMAT
                                                                             00083600
                                                                             00083100
      17 = MASK( NROW2 , 3 )
                                                                             00083200
      18 = MASK( NROW2 , 4 )
                                                                             00083300
      J7 = MASK( NVAR2 , 3 )
                                                                             00003400
      J8 = MASK( NVAR2 , 4 )
                                                                             00083500
      WRITE (4,30) NRUW1, NROW2, [7, 18, NVAR1, NVAR2, J7, J8, NNN, VAL
      RETURN
                                                                             0008370u
C
                                                                             00083800
C
                                                                             00083930
25
      FORMAT(4X,2A4,2X,2A4,2X,A1,F11.6,41X)
                                                                             00004000
30
      FDRMAT(1X, 3HAIJ, 6X, 44, A2, 1H., 2A1, 6X, 1H., 4A2, 1H., 2A1, 6X, 1H=, A1,
                                                                             00084100
              F11.6.26X1
                                                                             UUU842UJ
                                                                             00084300
      END
      FUNCTION NAMEL/AL/./42/./A3/./A4/)
                                                                             60004400
0000000
                                                                             30084533
                                   13 JUNE 72
                                                                             30084630
                                                                             UJU847UJ
          NAME IS A FUNCTION SUBPROGRAM THAT CONCATENATES FOUR (4)
                                                                             30384833
         LEFT-JUSTIFIED HOLLERITH CHARACTERS TO FORM ONE-HALF
                                                                             10344433
          OF CONGEN LP MODEL ROW AND COLUMN VECTOR NAMES.
                                                                             00085000
Ċ
                                                                             30085135
      LJG1CAL *1 A1, A2, A3, 44, X(4)
                                                                             ひじひもってひょ
      INTEGER XR
                                                                             00085300
      EQUIVALENCE (XR,X)
                                                                             JC 38543J
                                                                             30389533
      X(1) = A1
                                                                             بالكولونين
      X(2) = A2
                                                                             00365733
      X(3) = 43
                                                                             33305800
      X(4) = A4
                                                                             00085900
      NAME = KR
                                                                             36 006030
      RETURN
                                                                             300000130
      END
                                                                             00030200
      SUBROUTINE ROWID
                                                                             3333033
                                                                             33386433
000
                                    6 JUNE 72
               CONGEN
                                                                             UDUBUDUS
                                                                             JJJdseJJ
```

```
MEMBER NAME CONGEN
         SUBROUTINE TO GENERATE THE FILE OF UNIQUE ROW VECTOR NAMES (ARRAY RNAMES, RTYPES) TO BE WRITTEN IN SUBROUTINE FOWOUT AS
                                                                                    00345703
                                                                                    じろしゅっとろう
C
         THE MODEL ROW IDENTIFICATION FILE (TAPET)
                                                                                    30386900
                                                                                    00087000
Ċ
                                                                                    60087100
       COMMON /NAMES/NVAR1.NVAR2.NROW1, NROW2.NNX.NNN
                                                                                    00007200
       COMMON /PRECT/INDEX
       COMMUN /ROWS/RNAMES(30CO.21.RTYPES(3000)
                                                                                    30087430
C
                                                                                    J0J875JJ
       INTEGER RNAMES, KTYPES
                                                                                    00087660
C
                                                                                    33387703
CCC
                                                                                    33387833
           IF THIS ROW VECTOR NAME HAS BEEN PREVIOUSLY GENERATED. DO NOT
                                                                                    J0087900
         INSERT IT INTO THE LIST NOW
                                                                                    20289107
       DO 15 KX = 1. INDEX
                                                                                    00088205
       IF (RNAMES(KX, 1).EQ.NROW1.AND.RNAMES(KX,2).EQ.NROW2)
                                                                                    JJJ883JJ
       IF (KX.NE.INDEX) GO TO 15
                                                                                    30338433
                                                                                    ひじしゃおうひょ
C
          STORE THE NAME AND TYPE OF THIS ROW VECTOR, AND INCREMENT THE
                                                                                   CCUSSOOU
         COUNT OF ROWS GENERATED
                                                                                    06 340430
       INDEX=INDEX+1
                                                                                    CCERROOD
       (F (INDEX.GT.3000)
                               GO TO 30
       RNAMES(KX,1) = NRUW1
                                                                                    DU 189133
       RVAMES(KX+2) = NROW2
       RTYPES(KX)
       RETURN
15
       CONTINUE
                                                                                    03484500
30
       WRITE (6,23)
       STOP 0002
                                                                                   UL UAS MOU
                                                                                   CUP1 4000
20
       FORMAT(1H1, 23H/RNAMES/ HAS OVERFLOWED)
                                                                                   30345333
C
                                                                                    30093100
                                                                                   60040200
       SUBROUTINE INIT
                                                                                    しいしているひょ
C
                                                                                    33393433
                CONGEN
                                       6 JUNE 72
                                                                                   00090500
                                                                                    77787977
       SUBROUTINE SUBPROGRAM WHICH BY ITSELF AND BY OPTICNAL SURROUTINE OUD93600 CALLS PERFORMS SOME INTERNAL VARIABLE INITIALIZATION AND READS 36693963
       ALL INPUT DATA AND LOGICAL VARIABLES (EXCEPT FOR HANGGEN WHICH
                                                                                    36341000
       IS READ LATER AND RIGHT HAND SIDE, BOUND AND/OR RANGE DATA WHICH
                                                                                   90041190
         IS REFERENCED OUTSIDE OF FOMGEN ITSELF)
                                                                                   30091230
                                                                                   20041227
       ALL NECESSARY VARIABLE INITIALIZATION IS PERFORMED DUPING
       EXECUTION OF FORGEN AND NONE IS ASSUMED TO MAVE OTHERWISE OCCURRED PAIGR TO FUNGEN EXECUTION.E.G.. RY CDC SYSTEM
                                                                                   20261302
                                                                                    70741077
       COMMAND CLEAR.
                                                                                   06091700
                                                                                   30091 800
       THE ORDER OF THE FORTPAN READ STATEMENTS WITH ASSOCIATED
                                                                                   22241477
       COMMENTS AND FORMAT STATEMENTS (LISTED AT THE END OF THE
                                                                                   00092000
       SUPPRIGRAM) PRESENTS BOTH THE ORDER AND FORMAT OF DATA IMPUT
                                                                                   ú6 092 1 Ju
       TO FONGEN VERSION 1.0
                                                                                   36045503
                                                                                   JC 392330
                                                                                   33045407
```

```
MEMBER NAME CONGEN
Jungana
                                                                           30072130
      COMMON /AGG/AGGRSW.NAGGR,AGGRGT: 7501.1NDAGG,1NNAGG(20,2).AGLAR(25100.092600
      COMMON /CSL/CSTVP1501.CSPER1601.CLTVP1601.CLPER1601
                                                                           11145677
      COMMON /SSL/SDVTYP(730), SRSPER(703), SRLPER(730), SFSPER(730),
                                                                           30043000
                   SFLPER(700)
                                                                           00093130
      COMMON IDEVIATIOSSHICLSHISRSSHISRLSHISFSSHISFLSH
                                                                           00043.30
      COMMON /OFSCRP/STRUTH(763).0TM(763).COST(763)
                                                                           CCERNCE
      COMMUN /C. F/GEFF. EFFLARIG. 31.EFF (60.6)
                                                                           00043400
      COMMON TRESOLUTICOMATA VSUPRT, NORAM, NORAMU
                                                                           30,04 15 10
      CONION THE SEACTCHEFT 80001 . KUCHEFT (# 100) . NANZ. NBNZ
                                                                           ULGERUCO
      COMPAN TRESTAL FLUR RSW. TOUSIZESO, BIONTOUS, AURTYP
                                                                           U004 1730
      COMMON IMIKAUMINSH. WHINES, MINESCICO. 31. IMINESCICO.
                                                                           DOUVIOU
      COMMON /LPSYS/LANGSW.PRRNAM(2).DATSOR
                                                                           ......
      COMMON /ROWS/RNAMESIBOCO, 21, RTYPESIBOOOL
                                                                           00094030
      COMMON /GROUP/SRESA, GROUP! 7601.1 GROUP! 760.21
                                                                           3334130
      COMMON INCONINCONIESTI RESCUNTAT
                                                                           00044200
      CHURN (S. OOL ) BUR LA. LOOL ) FUR . LEHUZ LEUR TIRL MONICO
                                                                           20074300
C
                                                                           30044400
      DIMENSION BEGTOL(2).FNDTOL(2).BEGMK(2).ENDMK(2).LSTMK(2)
                                                                           10064011
      DIMENSIUN MEGGRALZI. ENDGRALZI. MEGSUBIZI. ENDSUBIZI
                                                                           06494644
      DIMENSION BEGAGREZI.ENDAGREZI
                                                                           33394733
      DIMENSION IDVI 4P(633)
                                                                           בנסספים בנ
                                                                           3664446
      DIMENSION ITOLS(2350,3)
                                                                           ひとひゃっじこっ
      INTEGER SUBSWINEGSUNIENTSUB
                                                                           6674277
      INTEGER BEGGAP, ENDGAP, GAPSW
                                                                           UUJ452UJ
      INTEGER BEGTOL, ENDITH
                                                                           00099333
      INTEGER ENDMY, REGMY
                                                                           63692733
      INTEGER REGACK , ENDAGE
                                                                           3334>533
      EQUIVALENCE (ITOLS(1.1). TOLS(1.1))
                                                                           16 445 010
      EQUIVALENCE (FD/TYP(1), RTYPES(1))
                                                                           ひいいかってひい
                                                                           66465822
      DATA BEGTOL/ 4HCOEF . 4HTOL
DATA ENDTOL/ 4HENDS . 4HFTOL
                                                                           J0095900
                                                                           2666000
      DATA SEGUE! SH 4 . SHIE
                                                                           06040133
                                                                           06040200
                   SHENDY . SHIR
      DATA ENDME!
      DATA LSTMA!
                   SHENDY . SHIEFS
                                                                           LCEOPULC
      DATA SEGGRP/ 4H G . SHEDUP
                                                                           10090477
      DATA EHOGRE! 4HENDG . 4H4DUP
                                                                           00040500
      DATA BEGSUAY 4HUNIT . 4HSUSS
DATA ENDSCHAPE ANDS . 4HUNS
                                                                           22040670
                                                                           00046700
      DATA BEGAGE! SHASGE . SHEGAT !
                                                                           36046630
      DATA ENDACA! SHENUA . SHEGRE !
                                                                           3001613
                                                                           20071000
C
                                                                           00047100
      INTEGER TOLASH
      INTEGER UNIES
                                                                           36 391233
      INTEGER CSS 4.CLSW, S4SSW, SRLSW, SFSSW, SFLSW
                                                                           33367333
      INTEGER CSTYP.CLTYP
                                                                           00041-35
      INTEGER SOUTYP
                                                                           30091500
      INTEGER /GGASA, AGGAGT
                                                                           30391633
      INTEGER ICLAS
                                                                           56041735
                                                                           JC 397632
      REAL LATOL
      AFAL MINES
                                                                           33341433
                                                                           36676000
      INTEGER DIN.ALRIVE. FFFLEB. RESCON
                                                                           JUGGOLUS
      INTEGEN PRENAM, DATS 1:
                                                                           Justacia
```

DAG

```
MEMBER NAME CONGEN
              INTEGER RNAMES, STYPES
                                                                                                                                                                  LJ694434
 C
                                                                                                                                                                  66090000
                                                                                                                                                                  dictelia
           1
C
                                                                                                                                                                  66396633
                  PRRNAM
                                                         MODEL NAME TUP TO & CHARACTERS) WRITTEN AS
                                                                                                                                                                  JC-MANJA
                                                         LABEL OF MOW IDENTIFICATION FILE - TAPET
                                                                                                                                                                  00091000
C
                                                                                                                                                                  00094100
                                       READ (5,255) PRINAMELLI, PRINAMEZI
                                                                                                                                                                  90944597
C
                                                                                                                                                                  60044363
č
                                                                               INTEGER IALPHANUMERICI
                                                                                                                                                                  ひじいかくもひと
                                                                              COL 1-6 LEFT JUSTIFIED
                                                                                                                                                                   3000000
                                                                              ONE CAND
                                                                                                                                                                  20.490.00
                                                                                                                                                                  06000100
ccettical and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction and a contraction an
                                                                                                                                                                  22-44477
                                                                                                                                                                  00133555
CCCCCCCC
                  LANGSU
                                                                                                                                                                  63177177
                                                                                                                                                                  33.33.55
                                                        LANGUAGE LOGICAL SWITCH WHICH SPICIFIES THE
                                                                                                                                                                  00100100
                                                         MATHEMATICAL PROGRAMMING SYSTEM FCHMAT IN
                                                                                                                                                                  03130-03
                                                         WHICH THE GENFAATED MATRIE WILL BE WHITTENS
                                                                                                                                                                  3313532
                                                                                 LANGSW . 1 ... MPS/360 FCRMAT
                                                                                                                                                                  00100000
                                                                                                     2. . . OPTIMA
                                                                                                                                                                  03103763
                                                                                                                                                                  03133050
                                      READ (5.250) LANGSW
                                                                                                                                                                  307 30433
:
                                                                                                                                                                  031-100-
                                                                              INTEGER
                                                                                                                                                                  05131133
                                                                              COL S
                                                                                                                                                                  721-11777
                                                                              ONE CARD
                                                                                                                                                                 00101300
                                                                                                                                                                  00131000
                                                                                                                                                                  33131555
02101733
                                                                                                                                                                  2212100-
                                                                                                                                                                  30131750
                                                                                                                                                                  00132000
                  DATSOR
                                                                                                                                                                 00132103
                                                        PRINCIPAL CATA SOURCE LOGOCAL SWITCHI
                                                                                                                                                                  0717597
                                                                            DATSOR . 1 ... BN SLICE MODEL
                                                                                                                                                                 05132300
                                                                                                2... HAND PREPARED
                                                                                                                                                                 00105470
                                                                                                3... FASTALS MODEL
                                                                                                                                                                  30102303
22220
                                                                                                S ... ARRAYS COFF. CJCOFF, DTH
                                                                                                                                                                  ろう さいとのひろ
                                                                                                          AND STRATH ARE RESTORED
                                                                                                                                                                 36132700
                                                                                                          FROM A BINDRY FILE
                                                                                                                                                                 30102000
                                                                                                          (TAPELO) PACOUCED DY A
                                                                                                                                                                 00175402
Ċ
                                                                                                          PREVIOUS FCPGEN AUN.
                                                                                                                                                                 00101000
                                                                                                                                                                 00177770
                                      READ 15.2501 DATSOR
                                                                                                                                                                  321-1177
C
                                                                                                         FOR NOW DATSOR MAY ONLY
                                                                                                                                                                 COLCORON
                                                                                                         BE 1.2 DR 5
                                                                                                                                                                 33133+06
                                                                                                                                                                 9917777
                                                                                                                                                                 30103003
3060300
                                                                                                                                                                 00101900
                                                                                                                                                                 0010-000
```

(BAG)

```
MEMBER YAME CONGEY
                 BASIC STRUCTUPAL DATA
                                                                 3310-1--
                                                                 22100101
        IF DATA SOURCE IS AN SLICE MOMEL OUTPUT, CALL SUBPOUTINE
                                                                 ひじとじゃろじょ
       PSIN TO READ AN SLICE TAPES AND CARDS
                                                                 しいというもいい
                                                                 Klussia
     IF COATSOR. E. .. II CALL PSIN
                                                                 0010466.
2
                                                                 6-13-10-
Č
        IF DATA STIRLE IS HAND PREPARED DATA, CALL SUBPORTINE HANDEN TOUTUNES
       READ DATA
                                                                 3613-73.
C
                                                                 3010306-
     IF IDATSOR. EJ. 2) CALL HINDIN
                                                                 IF DATA SUNACE IS BIVERY DUMP OF FOMGEN ARREYS, PESTORE THESE
                                                                 - Leeste
                                                                 30103000
                                                                 3513775
     IF COATSOL NE. SI
                      30 Tu 15
                                                                 63103660
     READ (10) HC3411.YSUPRI.NENZ.NONZ
                                                                 33133732
               C 35 6
     READ (13)
                                                                 27122000
     AFAD (12) < JCOCF
                                                                 6610190-
     WIC ICLI GASA
                                                                 0-10000
     READ (10) STRATH
                                                                 30.0013.
     READ (10) COST
                                                                 651-04-3
C
                                                                 30100300
                                                                 ------
65100000
Č
                                                                 22.20702
C
                                                                 30,00000
                                                                 30166 -33
15
     vililio.
     11 (MEFF .LE. 51 53 17 440 CO CO
                                                                 .......
                                                                 631-71-
200
     READ (5.220) ((FFIL.J).J-1.NEFF)
                                                                 60107200
                                                                 ----
                                                                 06131-5.
33101000
ċ
                                                                 Jululla.
C:::C
       NCON
                                                                 L-0161-0
               THE TYPE OF THE CONSTRLINT ON FACH COMPAT WHIT TYPE
                                                                 .....
                               ... CUMANT UNIT TYPE I . RIGHT HEND
                      . IIINGSP
                                                                 ----
                                  SIDE VALUE OF ITS CCASTAAINT
                                                                 Dutuatus
                              ... COMPAT UNIT TYPE I " HIGHT HAND
                                                                 ---
                                  SIDE VALUE OF ITS CONTRAINE
                                                                 .....
                              -... COMPLT UNIT TYPE I I BIGHT HAND
                                                                 20110011
                                  SIDE VALUE OF ITS CCASTABLAT
                                                                 ---
                              F... COMPAT UNIT TYPE I UNCONSTRATIVED
                                                                 3-----
                                  BY THE BHS VALUE OF ITS CONSTRAINTSULUSTSU
C
                                                                 331386--
443
      READ (5,265) (VCOV(1),1-1,4C0461)
                                                                 . د د د د د د د د
                                                                 6312+032
C
                              INTEGER
                                                                 33.091.0
¢
                              COL 1.11.21....
                                                                 .......
:
                              ETCHT VALUES PER CARD
                                                                 ------
                              NCOMST / " CAMPS
                                                                 20109000
2
                                                                 ......
     4F40 15,2651 1455CON111,1-1,61
                                                                 30036000
                                                                 JOLJ97 ..
```

```
MEMBER NAME CONGEN
     READ 15.2651 ALRTYP
                                                                     30104807
                                                                     60137933
                                                                     COLLICO
3011-200
                                                                     DOLLOS
        TOLRSW
                                                                     Distusi.
                        REQUIREMENTS TOLERANCE LOGICAL SWITCH.
                                                                     63113562
                        TOLRSW . I ... LOWER AND/OR UPPER TOLERANCE MAY
                                                                     Julian
                                    ME GENERATED. SUBROUTINE TOLANCE IS CALLED CNCE FROM THE MAIN
                                                                     30113700
                                                                     CULLICAUL
C
                                    ROUTINE FCMGEN.
                                                                     30110900
                               OTHERWISE ... SUBROUTINE TCLANC IS NOT
                                                                     03111357
                                           CALLED.
                                                                     0311110
                                                                     30111233
                READ (5.250) TOLRSW
                                                                     00111331
C
                                                                     03111432
C
                                 ONE CARD
                                                                     30111500
                                 CUL 2
C
                                                                     331160-
                                 INTEGER
                                                                     30111765
                                                                     00111803
00112000
                                                                     0011510-
                        IF TOLERANCES MAY BE SPECIFIED ITCLESM . 1)
                                                                     0311115
                        READ TOLERANCE DATA FROM LOGICAL UNIT 5.
                                                                     03112+0-
                                                                     0311150
      IF ITOLASM.NE. 1. OR. TOLASM.EQ. 1. AND. DATSOR.EQ. 21
                                                     GO TO 70
                                                                     00.11.00-
t
                                                                     -0111100
     NTOLS . O
                                                                     0511285-
     MOTH . D
                                                                     93175697
     READ (5.270) IND1. IND2. IOTP. JOTM. UTOL. LTOL
                                                                     0311300-
      IF (INDI.E).BEGTOL(1).AND.IND2.EQ.BEGTOL(2))
                                                  GO TO 69
                                                                     6311110-
      IF (IND1.62.ENDTOL(11.AND.IND2.EQ.ENDTOL(21)
                                                 60 10 73
                                                                     034-323-
C
                                                                     0311110_
     00 90 1 . 1.NCOEF
                                                                     60113465
      CALL "JUNPELL, IK, JE)
                                                                     -64460
      IF (IK.NE.IDTN.OR.JT.NE.JDIN) GO TO 97
                                                                     . 0011100
     NTOLS . NTOLS . 1
                                                                     3311373.
      IF INTOLS.61.23501
                         60 TO 95
                                                                     COLLIED
      STOLSCHTOLS. 11 . TOTH . 1000 . JOTH
                                                                     0211141-
      TOLSENTOLS.21 - LTOL
                                                                     3311-33.
      TOLSINTOLS, 31 - UTOL
                                                                     3341-10-
     60 10 69
                                                                     0311-20.
      IF [4014.60.11
                    GO TO 60
                                                                     0511-30.
     NOT4 - 1
                                                                     2341442
     WEITE 16,4301
                                                                     0311+30-
     63 10 60
                                                                     J$11.00.
..
     CONTINUE
                                                                     3311-10-
                                                                     3311-43.
6:
        IF TOLERANCE WAS SPECIFIED FOR A NON-EXISTENT COEFFICIENT.
                                                                    6611-40.
       WRITE A DIAGNOSTIC MESSAGE ON UNIT & . IGNORE THE TOLERANCE .
                                                                    0011330-
CC
       AND PROCEED
                                                                     3341513.
                                                                    U01132U.
     WR. TE 14,2751 JOTH, 10TH
                                                                    6011535.
     60 13 43
                                                                    33113-3-
                                                                    0-11333.
```

(BAS)

```
MEMBER NAME CONGEN
                                                                00112903
70
     CONTINUE
                                                                 35115733
                                                                 33113630
35115-33
C
                                                                 35116133
       SUBSW
                                                                 30116200
CSS
               SUPPORT UNIT SUBSTITUTION LOGICAL SWITCH
                                                                00110300
                      SJUSH . 1... SUPPORT UNIT SURSTITUTIONS
                                                                00110400
C
                                SPECIFIED BELOW WILL BE REPRESENTED 30114533
                            OTHERWISE ... NO PERMISSIBLE SUBSTITUTIONS ULLIBOUR
Ċ
                                      WILL BE REPRESENTED
                                                                03110733
C
                                                                 36110633
     KEAD (5.253) SUBSW
                                                                DUTTOAN
                                                                00117000
C
                                                                33147130
30117333
CCC
                                                                00117400
                                                                0011/503
    10
        IF SUPPORT UNIT SUBSTITUTIONS MAY BE REPRESENTED AT ALL
                                                                00117665
       ISUBS4 = 11 READ SUBSTITUTION DATA FROM LOGICAL 5 AND COUNT
C
                                                                 34117734
       THE NUMBER OF PERMISSIBLE TYPES OF SUBSTITUTIONS SPECIFIED
C
                                                                30111433
                                                                0011790J
     IF (SUBSW.NE.1)
                     GO TO 130
                                                                33114335
C
                                                                00118177
     NSURS . 0
                                                                00118200
                                                                00118335
     READ (5,270) IND1.IND2.IDTM.JDTM.ENTRY
                                                                GULLUGUS
     IF (IND1.E3.BEGSUB(1).AND.IND2.EQ.BEGSUB(2))
                                               GO TO 140
                                                                00118555
     IF (INDI.E4.EYDSUB(1).AND.INDZ.EQ.ENDSUB(2))
                                               GO TO 130
                                                                CULLIBOUS
C
                                                                00118700
     NUNIT - NCONST + NSUPRT
                                                                CCBPTTOC
     INTHE - 0
                                                                00119307
     DO 150 1 . 1. NUNIT
                                                                00119000
     IF (IDTM.NE.DTM(I))
                         GO TO 150
                                                                33119100
     IDTHE - 1
                                                                00119200
     GU TO 160
                                                                3311433
150
     CONTINUE
                                                                03119433
     JOTHE - 0
                                                                30114330
     DD 170 1 - 1. NUNIT
                                                                00119605
     IF IJOTH.NE.DTMIIII
                         GO TO 170
                                                                30116137
     JOTHE . 1
                                                                00114400
     63 10 100
                                                                30114933
170
     CONTINUE
                                                                00123333
                                                                OF 15710?
1 80
     IF (INTYK.EU.O.OR.JOTYK.EU.O)
                                  GO TO 140
                                                                00120200
     NSUB3 - NSUBS + 1
                                                                ひろんといろろう
     KJSUBINSUBS.11 - IDTM
                                                                30123400
     KJSUMINSUBS. 21 . JOTH
                                                                90150277
      SUBINSUBSI
                  - ENTRY
                                                                30166000
     GO TO 140
                                                                0312J700
C
                                                                00123833
1 30
     CONTINUE
                                                                35160477
                                                                00121000
                                                                00121100
7215177
```

```
MEMBER NAME CONGEN
C
     11
                                                                      33121430
       UMIXSW
                                                                      00121500
                        UNIT MIX LOGICAL SWITCH.
CCCC
                                                                      J01416Ju
                        UMIXSW = 1...UNIT MIXES WITH OR WITHOUT TOLERANCES MAY BE REPRESENTED
                                                                      30121703
                                                                      00121800
                                     IN THIS MODEL. INPUT DATA CARDS
                                                                      J0121 300
                                     SPECIFYING MIXES WILL BE READ
                                                                      JULIZODD
                                     NEXT. SUBROUTINE UNIMIX WILL BE
                                                                      UU12210J
                                     CALLED ONCE FROM THE MAIN ROUTINE 03122203
                                     FOMGEN TO GENERATE MATRIX
                                                                      ひひょ こと きりじ
                                     STRUCTURE REPRESENTING USER
                                                                      30122400
                                     SPECIFIED MIKES.
                                                                      30122500
                                OTHERWISE ... NO MIXES WILL HE REPRESENT-JOLEZOJO
                                           ED. NO UNIT MIX DATA CARDS 03122703
                                            WILL BE READ (AND THUS
                                                                      00122800
                                           SHOULD NOT BE INCLUDED IN
                                                                      30122903
                                            THE INPUT DATEL. SUBROU-
                                                                      00123000
C
                                           TIME UNIMIX WILL NOT BE
                                                                      00123100
                                           CALLED.
                                                                      00123200
                READ (5,250) UMIXSW
                                                                      30123333
C
                                 INTEGER
                                                                      33123435
                                 ONE CARD
                                                                      00121500
                                 COL 2
C
                                                                      33123630
                                                                      30123700
00123400
C
                                                                      00124000
¢
     12
                                                                      00124100
                IF UNIT MIX CONSTRAINTS MAY BE REPRESENTED (UMIXSM = 113312+233
                COUNT THE NUMBER OF MIXES SPECIFIED AND READ ALL DATA GO124300
                -- DTM NUMBER, MIX ENTRY, UPPER TOLERANCE, LOWER TOLERANCE 3012440
                FOR EACH ENTRY OF EACH MIX--INTO CENTRAL PEMORY.
                                                                      33124503
C
                                                                      00124600
                        GO TO 30
     IF (UMIXSW.NE.1)
                                                                      0012.703
     NMIXES = 0
                                                                      30124833
     INDEX - 0
                                                                      0012+465
                                                                      30125030
40
     READ (5,260) IND1, IND2, NOTM, ENTRY, UTOL, LTOL
                                                                      30125100
                                                                      00125200
     IF (IND1.EQ.LSTMX(1).AND.IND2.FQ.LSTMX(2))
                                                 GO TO 3C
                                                                      00125300
      IF (IND1.E3.EVDMX(1).AND.IND2.E9.FNDMX(2))
                                                 GO TO 45
                                                                      ひいしとうもいい
      IF (IND1.NE.BEGMX(1).OR.IND2.NE.BEGMX(2))
                                                GO TO 50
                                                                      00125500
     NMIKES - NMIKES + 1
                                                                      00125500
     CP 01 CD
                                                                      00125700
     INDEX . INDEX + 1
45
                                                                      30123830
      IMIXESTINDEX) . 0
                                                                      0015>400
     MIXESCINDEK.11 - 0.3
                                                                      00126330
     MIKESIINDEK, 2) . 0.0
                                                                      00160101
     MIXESTINDEX, 31 - 0.0
                                                                      99150507
     GO TO 40
                                                                      Júl 24 Bús
50
     INDEX - INDEX + 1
                                                                      36126433
     IMINES ( INDEX) - NOTH
                                                                      JU12050-
     MIXESTINDEX. 11 . ENTRY
                                                                     00120634
     MIRESTINDER, 2) - UTOL
                                                                      33140133
     MIXES'INDEX,3) . LTOL
                                                                     00145803
                                                                      30160933
                                                                      30127033
```

```
MEMBER NAME CONGEN
                                                                     00127200
C
                                                                     0012/300
00000000000
                                                                     00127400
    13
       GRPSW
                                                                     00127500
                UNIT GROUP CONSTRAINT LOGICAL SHITCH
                                                                     00127600
                    GRPSW = 1 ... ONE UNIT GROUP CONSTRAINT MAY BE
                                                                     30127730
                               REPRESENTED. AN ATTEMPT TO READ DATA
                                                                     JU1270JJ
                               SPECIFYING THIS CONSTRAINT WILL BE
                                                                     00121100
                               MADE BELOW
                                                                     00128000
                           OTHERAISE ... NO UNIT GROUP CONSTRAINT
                                                                     00 12 d 1 U U
                                      WILL BE REPRESENTED. NO DATA
                                                                     07159527
                                      WILL BE READ BELOW.
                                                                     00126330
                                                                     30128433
30
                                                                     00128500
     READ (5,250) GRPSW
                                 INTEGER
                                                                     00128600
                                                                     33128733
¢
                                COL 2
                                ONE CARD
C
                                                                     20159922
C
                                                                     70159177
                                                                     LLUPSICE
00169200
C
                                                                     33124330
                                                                     06129433
CCC
        IF A UNIT GROUP CONSTRAINT IS TO BE REPRESENTED AT ALL .
                                                                     00129000
       READ DATA SPECIFYING THIS CONSTRAINT
                                                                     JU1296JJ
Č
                                                                     00129700
     IF (GRPSW.NE.1.AND.GRPSW.NE.2) GO TO 120
                                                                     00154800
C
                                                                     00129900
                                                                     3013033
     90 110 [ - 1,600
     GROUPILL = 0.0
                                                                     00140100
                                                                     00133233
     IGROUP(1.1) = 0
                                                                     3013333
     [GROUP(1,2) = 0
110
                                                                     00130400
                                                                     00130500
     INDEX . O
                                                                     00123010
100
     READ (5, 280) INOI, INDZ, NDTM, ENTRY, IDAT
     IF (INDI.EJ.ENDGRP(11.AND.IND2.EQ.ENDGRP(21)
                                                  GO TO 120
                                                                     06136735
     IF (IND1.EQ. HEGGRP(1).AND.IND2.EQ.BEGGRP(2))
                                                  GO TO 100
                                                                     35133650
                                                                     LL601100
     INDEX = INDEX + 1
     GROUP (INDEX) - ENTRY
                                                                     33131600
     IGROUPTINDEX. 11 - NOTH
                                                                     00131135
     IGROUP(INDEX, 2) = IDAT
                                                                     00.31630
     GD TO 100
                                                                     00131333
                                                                     30131400
                                                                     30.313...
27171177
                                                                     30131630
CCCCHOCCC
                                                                     001319-0
    15
                                                                    00132630.
       AGGRSW
                UNIT AGGREGATION LOGICAL SWITCH
                                                                     01135110
                    AGGRSW = 1...ROBS/FQUATTONS IN THE MCCEL WHICH
                                                                     33132233
                                REPRESENT AGGREGATION AND POSSIBLE
                                                                     30125300
                                CONSTRAINT OF SOME CHARACTERISTICS
                                                                     07135-10
                                SUCH AS PERSONNEL STRENGTH OF GROUPS
                                                                    33,32500
                                OF UNITS MAY BE GENERATED. SURROUTINEDOLIZAGE
                                AGGRET WILL BE CALLED AND EQUATIONS
                                                                    VULSEIUS
                                SPECIFIED AY INPUT DATA READ AT THAT
                                                                   11.3481.
                                TIME WILL BE GENERATED.
                                                                    00132900
```

```
MEMBER NAME CONGEN
                             OTHERHISE ... NO UNIT AGGREGATION ROW VECTORSOO133003
                                        WILL BE GENERATED. SUBROUTINE 00133100
                                        AGGRGT WILL NOT BE CALLED.
                                                                       Juisszus
120
     READ (5,250) AGGRSW
                                                                       OULSSION
                                                                       00133405
      NAGGR = 0
                                                                       00133533
      IF (AGGRSW.NE.1) GO TO 300
                                                                       J0133600
      INDEX . O
                                                                       33133730
510
      READ (5,320) IND1, IND2, IND3, IND4, IND5, IND6
                                                                       CCBECIOG
320
      FORMAT(2A4,12X,A2,84,13,2X,A1,2X,A1)
      IF (IND1.EQ.ENDAGR(1).AND.IND2.EQ.ENDAGR(2)) GO TO 330 IF (IND1.EQ.BEGAGR(1).AND.IND2.EQ.BEGAGR(2)) GO TO 340
                                                                       00134000
                                                                       30134103
      INDEX . INDEX + 1
                                                                       00134200
      AGGRET(INDEX) = IND4
                                                                       00134300
      GJ TO 310
                                                                       00134400
340
      NAGGR = NAGGR + 1
                                                                       33144500
      INDEX - INDEX + 1
                                                                       00134630
      AGGRGT(INDEX) = IND3
                                                                       00134700
      AGLANINAGGR) = IND3
                                                                       00134800
      INDEX = INDEX + 1
      CALL INITINDS, AGGRETTINDEXI)
                                                                       2013202
      CALL INZ(IND6, AGGRGT(INDEX))
                                                                       00135010
      GO TO 310
                                                                       03135103
330
      INDEX = INDEX + 1
                                                                       30135233
      AGGRGT(INDEX) = 0
                                                                       00135300
                                                                       00135400
30135633
¢
                                                                       00135700
C
                                                                       30135833
                                                                       30125434
300
    READ 15.2851 CSSW.CLSW.SRSSW.SRLSW.SFSSW.SFLSW
                                                                       00130003
      IF (CSSW .GE.1) READ (5,230) (CSTYP (1), CSPER (1), 1=1, NCOMBI) IF (CLSW .GE.1) READ (5,230) (CLTYP (1), CLPER (1), 1=1, NCCMBI)
                                                                       30136103
                                                                       33230201
      IF (SRSSW.LE.O)
                       GO TO 390
                                                                       00136300
      READ (5,230) (TOVTYP(1), SRSPER(1),1=1, NSUPRT)
                                                                       33136400
     D3 350 1 = 1, NSUPRT
                                                                       30136533
350
     CALL INICIDATYPILLASDATYPILLA
                                                                       00136600
      IF (SRLSW.LE.O) GO TO 400
390
                                                                       00136705
     READ (5, 230) (TOVTYP(1), SRLPER(1), 1-1, NSUPRT)
                                                                       CCdetico
      D3 360 [ = 1, NSUPRT
                                                                       33136933
360
     CALL INZITOVTYPILL, SDVTYPILL)
                                                                       30137000
     IF (SFSSW-LE.O) GO TO 410
400
                                                                       33137130
     READ (5,230) (TOVTYP(1),SFSPER(1),1-1,NSUPRT)
                                                                       0013/235
     D3 370 I . 1. NSUPRT
                                                                       33137333
370
     CALL INSCROVINGE 13. SOUTYPEED
                                                                       JUL 1740J
     1F 1SFLSW.LE.01 GO TO 420
410
                                                                       06117200
     READ (5,230) (TOVTYP(1), SFLPER(1), 1=1, NSUPRT)
                                                                       00137600
     03 380
             I . I. NSUPRT
                                                                       00137733
     CALL IN4(TOVTYP(1),SDVTYP(1))
340
                                                                       03137400
                                                                       30134337
22116227
                                                                       30134333
        DUMP CERTAIN PROGRAM VARIABLES AND ARRAYS FOR POSSIBLE RESTORE 30430400
       IN A LATER RUY. THEY ARE WRITTEN AS A BIMARY FILE - TAPELO.
                                                                       30134300
                                                                       93179970
```

DAG

```
MEMBER NAME CONGEN
      WRITE (10) NCOMBT.NSUPRT.NANZ.NBNZ
                                                                           00138700
                   CUEF
      WRITE (10)
                                                                           00148800
      WRITE (10) KJCOFF
                                                                           00178400
      WRITE (10) DT4
                                                                           30139000
      WRITE (10) STRNTH
                                                                           33139133
      WRITE (10) CUST
                                                                           00139200
C
                                                                           33139350
33134077
C
          INITIALIZE ROW VECTOR NAME AND TYPE STORAGE ARRAYS
                                                                           20139720
        COOLISAAAN CAN IS CCCISAMAN
                                                                           22138977
C
                                                                           33133930
      00 10 1 = 1.3000
                                                                           ひいしゃ よいいい
      RVAMES(1,1) = 3
                                                                           33143103
      RNAMES(1.2) = 0
                                                                           00143200
10
      RTYPESCII
                                                                           00140300
                                                                           0014040
                                                                           00140500
      RETURN
                                                                           36143733
210
      FJRMAT([3,7X,6(A4,A3,1X,A1,1X))
                                                                           03143835
220
      FJRMAT(3x,7x,6(E10.6))
                                                                          001+3432
      FORMAT(10(A1.E7.5))
230
                                                                          03141000
250
      FORMAT (12)
                                                                          00141100
      FORMATIA4,421
255
                                                                          03441200
260
      FRYAT(44,44,2X,13,5X,E12.6,5X,E12.6,5X,E12.6)
                                                                          00141300
265
      FORMAT(BIAL. 9X1)
                                                                          Uu 1414Uu
270
      FORMAT(A4, A4, 14, 13, 2x, 13, 2x, 12x, 5x, E12.6, 5x, E12.6)
      FORMATCINO, 71H+++++ TOLERANCE WAS INPUT FOR THE COEFFICIENT OF ALLJU1+16JU
275
     OCATION OF DIM NO. +13.13H PER DIM NO. +13.2H ./IH .7X.63HTHIS COEDULATION OFFICIENT HAS NUT INPUT. THE TOLERANCE WILL BE IGNORED.)
280
      FORMATIA4, 44, 124, 15, 10x, E12, 6, 10x, 131
                                                                          30141900
285
      FJRYAT(812)
                                                                          33142633
      FORMAT(1HO, 82H+++++ TOLERANCE WAS INPUT FOR MORE THAN 2350 COEFFICOO142130
430
     · IEVIS. THE EXCESS WAS IGNORED. )
                                                                          00142200
C
                                                                          33142333
                                                                          00142400
      SUBROUTINE BSIN
                                                                           30:42500
C
                                                                          30142000
C
                                   6 JUNE 72
              CONGEN
                                                                          001+2730
                                                                          00142800
        BSIN IS A FORTRAY IV SUBROUTINE THAT IS CALLED ONCE FROM SUBROUTINE INIT IF THE HATA SOURCE IS A BN SLICE MODEL RUN
                                                                          Jui42401
                                                                          03143
        LIMPUT DATA VARIABLE DATSOR . II TO READ DATA FROM BY SLICE
                                                                          001+3105
        DUTPUT TAPES AND SOLUTION CARD DECK.
                                                                          30143231
         BSIN CALLS SUBROUTING BSSORT CYCE REFORE RETURN TO INIT TO
                                                                          3014333
        SORT THE ALLOCATION CHEFFICIENT ARRAYS INTO AN ORDER THAT
                                                                          35143402
        MINIMIZES SEARCHING DURING FOMORN EXECUTION.
                                                                          30143632
                                                                          00143700
JU1-3700
                                                                          00144000
      UMARAN, MARAN, TRADITY NCONTINCAM, NERAMO
                                                                          J3144100
      CUMMIN IN: SCRPISTRNING TO 31 . DTM ( 763) . COST ( 763)
                                                                          334.4203
      CUMMUN /REJFAC / SUEFI BOCOL . KUCOFF (ROOD) . NANZ. NBNZ
                                                                          00144300
      CUMMON /RESTOL/TOLASMITULS(2350,3) INTOLS, ALATYP
                                                                          3014443
```

```
MEMBER NAME CONGEN
      CJ440N /TITLE/ITITLE(7), ISRC(3), ITPSN(2) ...
                                                                           33144535
                                                                           3014-03-
      DIMENSION TENEF(60). ITCDEF(60)
                                                                           30144730
      EQUIVALENCE (TCOEF(1).ITCOFF(1))
                                                                           03144800
¢
                                                                           3014-40-
      DIMENSION PRAMID(15)
                                                                           00142006
      DIMENSION ISET (472)
                                                                           J014510_
C
                                                                           33143235
      DIMENSION COST IN(132).4VGCST(32).AVGSTA(6).EPTSTA(32,2)
                                                                           U014230L
      EQUIVALENCE (NCST .TOLS(1.1))
                                                                           33142450
      EQUIVALENCE
                   (NPTSTA, TOLS(2,1))
                                                                           3314550.
      EQUIVALENCE (IPTSTA(1,1),TULS(3,1))
                                                                           0014360
      EQUIVALENCE (COSTIN, TOLS(323,11)
                                                                           03145735
      EQUIVALENCE (AVGCST, TOLS(455,11)
EQUIVALENCE (AVGSTA, TOLS(487,11)
                                                                           00143003
                                                                           00145955
Ç
                                                                           00140000
      INTEGER DIM
                                                                           30140132
      INTEGER PRAMID
                                                                           03140230
C
                                                                           0-14-31-
0014000-
                                                                           JU14073J
SCCCCC THE FOLLOWING DATA IS READ FROM THE BN SLICE A-TAPE -- SCCCCCC BINARY UNIT 40 PRODUCED BY APROG.
                                                                           33140832
                                                                           0014090-
                                                                           0014730
      REWIND 8
                                                                           33:47132
C
                                                                           60147115
         SKIP ONE LOGICAL RECORD -- (ALPH(1).1=1.20)
                                                                           33147123
C
                                                                           00147130
      READ (8)
                                                                           0314714_
C
                                                                          0314715_
         SKIP ONE LOGICAL RECORD -- (ALPH(1),1=1,20), NCONS, LCONS
                                                                           30147100
Ċ
                                                                           0016717-
                                                                           3014718-
                                                                          0014720-
C
         READ THE NUMBER OF COMPAT MODULES MODELED IN THIS BY SLICE RUN 30147332
        AND STORE IT IN FUNGEN COMMON VARIABLE NOOMBT (NCCPBT * 40).
                                                                          0014740
C
                                                                          3314753_
      READ (8) NCOMST
                                                                           3314763.
C
                                                                          0014761
         SKIP ONE LOGICAL RECORD -- NORG(1), NORG(17), (NORG(1), 1-2, 16)
                                                                          0314762-
                                                                          001-703-
      READ (8)
                                                                          60147642
C
                                                                          03147732
0::0
         READ THE DIM NUMBERS OF THE NCOMBT COMBAT MODULES AND STORE
                                                                          35147832
        THEY IN THE FIRST NIGHT WORDS OF COMMON INTEGER ARRAY DIMITORDIDITATION.
                                                                          0014330.
      DO 10 | * 1,"CO"9T
                                                                           33140100
      READ (A) (ITCOFF(J).J-1.25)
                                                                          0314020.
      1TC0EF(2) - (TCDEF(2) + 900
                                                                          0014030.
      DIMILL . ITCOEFIZE
                                                                          03198443
      WRITE (2,163) (ITCOFF(J),J=2,8)
                                                                           00140332
10
      CONTINUE
                                                                          OUL . SOU .
                                                                          22192742
         READ THE DTM NUMBES OF ANY PARAMETERIZED UNITS IN THIS BN SLICEULIAID.
        RUN AND CALCULATE THIS NUMBER. THE NUMBER (* 15) OF PARIMETER- UNIANY).
        IZED UNITS IS STORED IN LICAL INTEGER VARIABLE APRAM. THEIR DTM DULATION
```

```
MEMBER NAME CONGEN
         NUMBERS ARE STORED INITIALLY IN WORDS NCOMBT+1 TO NCOMBT+NPRAM
                                                                                 301+9135
         OF ARRAY DIM. NOTE THAT FOMGEN ULTIMATELY TREATS THESE AS ANY
                                                                                 30149233
         OTHER SUPPORT UNIT.
                                                                                 00149300
                                                                                 001+9400
       READ (B) PRAMID, ISET
                                                                                 00149532
       NPRAM = 0
                                                                                 00144000
       DO 20 1 = 1,15
                                                                                 33143705
       IF (PRANIDIII.EQ. 3)
                               GU TO 30
                                                                                  33144003
       NPRAY = NPKAY + 1
                                                                                 00149900
20
       CONTINUE
                                                                                 00153333
                                                                                 77127177
30
       IF (YPRAM.LE.O)
                           GO TO 32
                                                                                 00150200
       NPRAMU = 1
                                                                                 30150300
       IF (NPRAM.EQ.1)
                           GO TO 32
                                                                                 00120400
       DO 34 1 = 2. YPRAH
                                                                                 00120200
       00 36 J = 2.1
                                                                                 03150000
       IF (PRAMIDIII.EQ. PRAMIDIJ-11)
                                           GO TO 34
                                                                                 33122732
36
       CONTINUE
                                                                                 00150800
       NPRAMU = NPRAMU + 1
                                                                                 301539
34
       CONTINUE
                                                                                 33121337
                                                                                 00151100
          READ THE NUMBER OF SUPPORT UNITS MODELED IN THIS EN SLICE
                                                                                 3612121
         RUN AND STORE IT IN COMMON INTEGER VARIABLE NSUPRT.
                                                                                 JO 1313
         (THIS COUNT INCLUDES NPRAMU PARAMETERIZED UNITS.)
                                                                                 00111400
                                                                                 00151535
32
      READ (8) NSUPRT
                                                                                 22121624
¢
                                                                                 00151013
          SKIP ONE LOGICAL RECORD -- (ICODE(1).1-1.1000)
                                                                                 0012104
                                                                                 20151.33
       READ (8) (1.J-1.1000)
                                                                                 00151043
C
                                                                                 3015165-
          SKIP ONE LOGICAL RECORD -- (JCODE(1).1-1.600)
                                                                                 33131060
Č
                                                                                 30151673
      READ (8) (1.J-1.600)
                                                                                 GOISLOBU
                                                                                 30151700
60
      READ (8) (ITCUEF(1),1-1,5)
                                                                                 06.51430
       IF (ITCOEF(2).GT.998) GO TO 48
                                                                                 66151436
      READ (8) (11COEF(1),1-1.11)
62
                                                                                 44152330
       IF (ITCOEF(1).EQ.4) GO TO 40
                                                                                 30126130
      GO 10 42
                                                                                 00132200
¢
                                                                                 63152333
      READ REQUIREMENTS FOR SUPPORT UNITS PER COMBAT MODULES. STORE 004>2-00 NOV-ZERO ALLOCATION COEFFICIENTS IN COMMON REAL ARRAY COEF160001031>2500 STARTING AT MORD 1. COMMON INTEGER VARIABLE NANZ 15 A COUNT 00432000
:::
                                                                                 Juiszuja
         OF THE NUMBER OF THESE COEFFICIENTS (A-MATRIX CUFFFICIENTS)
                                                                                 30432730
         STORED.
                                                                                 30152630
                                                                                 00125400
      NANZ . O
                                                                                 LUNELLO
       1x - 0
                                                                                 90123177
       DJ 50 1 - L.YSUPRT
                                                                                 90121537
                                                                                 30133300
      READ (8) (11COEF(J).J-1.15)
                                                                                 نده و داند
       1x . |x . 1
       DIMILITANCOMBIL - LICOEFILL
                                                                                 00153500
      WRITE (2,164) (ITCOEF(J).J-1.15)
                                                                                 30153000
       IF (ITCOEF(2).F3.0)
                               50 TO 50
                                                                                 24122144
      READ (8) ITCUEFIJI.J-1.NCUMST)
                                                                                 JULISTON
      184034 . 1 . 10 CO CO
                                                                                 30121430
       IF ITCOEFIJI.LE.O.31
                                60 TO 40
                                                                                 79724777
```

```
MEMBER NAME CONGEN
                                                            00154100
      NANZ = NANZ + 1
                          GO TO 800
      IF (NANZ.GT.6503)
      CDEFINANZ) = TCOEFIJ)
                                                                            0015+301
      KJCOEFINANZ) - DTM(J) - 1000 + DTM(IX+NCDHBT)
                                                                            00154400
50
      CONTINUE
50
      CONT INUE
                                                                            00154600
                                                                            30154733
         READ REQUIREMENTS FOR PARAMETERIZED UNITS PER COMBAT MODULES.
                                                                            UU13480U
        NON-ZERO ALLOCATION RULE COEFFICIENTS ARE STORED IN ARRAY
                                                                            30154933
        COEFIGODOI. THESE COEFFICIENTS ARE TREATED AS PART OF THE
        F-MATRIX. THE NUMBER OF NUM-ZERO COEFFICIENTS STORED HERE
                                                                            00155105
        IS INCLUDED IN THE COUNT STURED IN VARIABLE NAME.
      READ (8)
                                                                            CO155403
      DD 90 1 - 1.12
      READ (B) (TCOEF(J).J=1.NCOPBT)
                                                                             JULDOBJU
      07 100 J - 1, NOMST
      IF (TCOEF(J).LE.O.O)
                             GO TO 1CO
      NANZ - NANZ + 1
      IF (NANZ.GT.8000) GD TO 800
      COEFINANZ) - TCOEFII)
                                                                            00126100
      KJCOEFINANZI - DTM(J) + 1000 + PRAMID(I)
100
      CONTINUE
90
      CONT INUE
  101 READ (8. END-102) IDUMMY
         GO TO 101
  102 CONTINUE
                                                                            30120400
                                                                            09120407
CLCCCCC THE FOLLOWING DATA IS READ FROM THE BN SLICE 8-TAPE
CCCCCC PRODUCED IN BINARY BY BN SLICE MODEL SPECIALLY FOR CONGEN --
                                                                            2212111
CCCCCC UNIT 75 PRODUCED BY BPROG.
                                                                            0015711
                                                                            00157200
         REHIND B
                                                                            30157330
         PAUSE 001
                                                                            JU157460
         REWIND &
                                                                            00157500
       READ REQUIREMENTS FOR SUPPORT UNITS (AND PARAMETERIZEDUNITS)
PER SUPPORT UNITS (AND PARAMETERIZED UNITS). THESE NCN-ZERO
ALLOCATION RULE COEFFICIENTS ARE STORED IN ARRAY CCFF(600)
                                                                            30157730
                                                                            0015740-
        STARTING WITH HORD VANZ + 1. VARIABLE MANZ IS A COUNT OF THE MUH-ZERO COEFFICIENTS STORED HERE.
                                                                            Ju. 5433J
                                                                            00138100
                                                                            00124500
                                                                            22128327
      NONE - 0
                                                                            001>6400
     READ (8.END-140) (17CDEF(1).1-1.5).TCDEF(6)
                                                                            30156500
130
10120001
      IF (EDF. 6)140. 996
                                                                            301>6730
      IF (TCOEFIGI.LE.O.O) GO TO 130
998
      MANE - MONE + 1
      IF (NAME + MAME .GT. BOCO) GO TO B20
COEF (MAME + NAME) - TCOEF(6)
QUICOEF(MAME + NAME) - TCOEF(5) - 1000 + TTCOEF(3)
                                                                            00124000
                                                                            33129102
                                                                            031>4533
      60 TO 130
                                                                            00127300
C
```

```
YEMBER NAME CONGEN
                                                                    33159033
        CALL SUBROUTINE BSSORT TO SORT ARRAYS DTM, COEF, KJCUEF INTO
                                                                    63124432
       AN EFFICIENT ORDER FOR FONGEN EXECUTION.
C
                                                                    U-COLUMBIA
                                                                    60100160
140
     CALL BSSORT
                                                                    34163234
                                                                    33163333
                                                                    -0-1-0-100
63160750
        READ UNIT STRENGTHS AND COMBAT UNIT SOLUTION VALUES FROM ON
                                                                    03100000
        SLICE TROOPLIST CARD DECK ON LOGICAL UNIT 5.
                                                                    Cifcason
                                                                    30161030
     NUNET . NOMAT . NOUPET
     D3 150 1 - 1, NUNIT
                                                                    00101100
     STRNTHELL . 0.0
150
                                                                    30101430
                                                                    00101300
     READ 15, 9991
160
     READ (5.950) IDTM. (!!!TLE(J). J-1.7). (!SRC(K). K-1.3).
                                                                    درودهددن
                ITPSN(J).J-1.21.1STRN.SOL
                                                                    33161633
     IF (1014.EQ.999)
                      GO TO 185
                                                                    00101733
     03 170 | - 1.NUNIT
                                                                    99101079
     IF CIDTM.NE.DIMCTIS
                          GO TO 170
                                                                    30161430
     STRUTHELL . ISTRY
                                                                    07105777
     IF (I.LE.NCOMBI) TCOEFII) - SOL
                                                                    00102100
     60 TO 16)
                                                                    00102300
170
                                                                   00105151
     CONTINUE
     63 TO 163
                                                                    33.02033
C
                                                                    03162553
                                                                    33105000
33162433
                                                                    00102400
        DIVIDE A-MATRIE COFFFICIENTS AS READ BY THE SOLUTION VALUES
                                                                   301613...
       OF THE CORRESPONDING CONSAT MODULES TO DSTAIN LP CEEFFECTENTS
                                                                    2-101177
       OF ALLOCATION PER CUMBAT MODULE.
                                                                   00101200
                                                                   031011
     DO 100 1 . 1, NAME
                                                                   20703477
     IX . KJGFTE KJCOEFIII/1000 1
                                                                   30103333
     COEFELL - COEFELL / TCOEFELE)
                                                                   3310303
1 60
     CONT INUE
                                                                    33103700
                                                                   DG 1 - 1630
                                                                   JU10193.
00106144
                                                                   00104331
        READ COST DATA FROM BY SLICE FETRACTION FROM COSTALS FOR FACH
                                                                   33.043...
        UNIT. A HEIGHTED SUM OF THE 32 BURGET CATEGURIES AND THE & PEACETIME STATIONS IS TAKEN TO PRODUCE ONE (1) UNIT COST FOR
                                                                   6310----
                                                                    30264300
        THIS LP MODEL. ONLY THE SINGLE UNIT COST IS STURED FOR EACH
                                                                    1010000
0.0000
        UNII.
                                                                   30100100
        THIS IS THE SAME AS ON SLICE UNIT OS.
                                                                   00104713
                                                                   9910-477
        REUIND &
                                                                   00104411
        PAUSE DOZ
                                                                   20162000
        AE-IND .
                                                                   201021-1
                                                                   2710257
     READ (5.969) (AVGCST(1).1-1.NCST)
                                                                   0010000
     READ (5. 960) LAVESTACTI. 1-1. 4PTSTAT
                                                                   20102011
```

```
MEMBER NAME CONGEN
    F34MAT(1068.6)
      71 MUN .1 • 1 000 CO
                                                                           9910227
                                                                           0010>00)
210 READ (8.END-290) ID-COSTIN

2 210 READ ( 8) ID-COSTIN

C IF (EDF- 8) 200
                                                                           00165730
                                                                           30105830
                                                                           00102477
      1F (EOF, 8) 290,220
00 230 1 = 1,40411
                                                                           00100000
220
      1F (DTM( 1) .NE . 10) GO TO 230
      K . 0
      DO 240 J - 1.NCST
      IF (IPTSTAID.11.EQ.1) GO TO 250
                                                                           33100333
      K . K . 1
      COSTILL . COSTILL . COSTINIAL . AVGCSTIJE
      GJ TO 249
250
      DJ 260 L - 1. MPTSTA
                                                                           30100930
                                                                           30107333
      COST(1) . COST(1) . COST(N(K) . AVGCST(J) . AVGSTA(L)
260
                                                                           001-710-
240
      CONTINUE
                                                                           001-1533
      COST(1) - COST(1) / 1.064
                                                                           30107333
230
      CONTINUE
                                                                           00167403
      63 TO 210
                                                                           001-750-
C
                                                                           30107733
Ė
                                                                           001-6000
290
    RETURN
                                                                           00100100
                                                                           00104260
                                                                           201-0331
    FDAMAT(14, 7x, 644, 20(1H ))
163
164
                                                                           301-853-
      FORMAT ( 14. 3E. 744. 2E. 344. 3E. 244. (5. F8. 3)
950
...
     FJAMATI 10E1
                                                                           00100700
800
      WRITE 16.0101 NAME
                                                                           00168930
     FORMATILING. SSHOOOO COEFFICIENT STORAGE CAPACITY EXCEPTED WITH MAMOOLOVADA
810
                                                                           00169100
     ·2 ·. 151
      STOP 0005
                                                                           30307200
      SHAN ICE 1.01 STERM
020
.30
      FORMATILING, SSHOOOOO COEFFICIENT STORAGE CAPACITY FECEEDED WITH NOMBOLO-OOD
     . .. 151
                                                                           30107533
      $10P 3006
                                                                           331-9-53
C
                                                                           001-9700
                                                                           30109033
                                                                           30109930
      SUBMOUTINE 65502Y
                                                                           30173133
C
Č
              CONGEN
                                                                           30170200
                                                                           30176300
        DESCRI IS A FORTRAN IN SURROUTINE THAT SORTS FORGEN ARRAYS DIN AND COEFICICOFF AS CONSTRUCTED FROM ON SLICE MODEL OUTPUT
                                                                           00170433
                                                                           0-17353-
        INTO EFFICIENT DADERS FOR FORGEN FRECUTION
                                                                           30173635
                                                                           00173700
C
                                                                           3417305.
      COMMON /RESOLUTHCOMRT, WSUPRT, WPRAM, NPRAMU
                                                                           30170900
      CONTON /DESCRP/STRYTHI 7601 . DTH(760) . COST(760)
                                                                           3017100-
      SHOW, SHOW, 100001 4303L>, 10000145C3\3A693\ MONHOS
                                                                           00171135
C
                                                                           30171200
```

(BAS)

```
TERMER TATE CONSEN
       INTEGER OFF
                                                                                00171300
                                                                                06171403
ununu
                                                                                00111700
          SURT A-MATRIE (FIRST WARE WINDS OF ARRAYS COEF, KJCOEF) INTO
                                                                                2001000
         DADER OF COMBAT MODULES AS GIVEN -- SUAT BY SUPPORTEC UNIT.
                                                                                00171700
       11 . 1
                                                                                33.71+33
       03 40 f - 1. WCOMAT
03 50 J - J1. WAVE
                                                                                00172000
       IF (CJCOFFIJI/1)33.NE.DTM(11) GO TO SO
                                                                                30175535
C
                                                                                00112300
       TEMP . RJCOEF(11)
                                                                                00.72-3-
                 COEFIJII
                                                                                33.72 200
C
                                                                                00174000
      KJCOEFIJII - KJCOEFIJI
                                                                                30172733
         COEFIJE - COEFIJE
                                                                                30.72300
                                                                                00172900
Ç
      COEFIJI - ITEMP
                                                                                30174033
                                                                                30172135
C
                                                                                30173200
      J1 - J1 - 1
CONT ! NUE
                                                                                00171100
50
                                                                                33173433
       CONTINUE
40
                                                                                00173700
                                                                                33171630
                                                                                U. 13733
          SORT B-MATRIC CHORDS NAME-1 TO NAME-NAME OF ARRAYS COEFICACOEFICOLOGICAL
         INTO ORDER OF SUPPORTED SUPPORT UNITS AS GIVEN.
                                                                                30171930
                                                                                30174033
       JI . NAM! . I
                                                                                30114135
      MEND - MANZ - HINT
11 - NCONET - 1
                                                                               00114600
                                                                                33174333
       NUNTT . NCOMOT . NSUPAT
                                                                                0017--00
       11 NUM . 11 . 04 CO
                                                                                30174533
       03 70 J - J1. NEWN
                                                                                33170030
       IF (KJCDEFEJ)/1009.VE.DTM(1))
                                          60 10 70
                                                                               0317-70v
C
                                                                                3017-03-
       ITTHE . KJCOEFEJII
                                                                                30.14933
                COEFIJLI
        TEN .
                                                                                00172000
C
      KJCOFFIJE - KJCOFFIJE
COEFIJE - COEFIJE
                                                                                2011257
                                                                               00173300
C
      COEFIJI - ITEMP
                                                                                33172262
                                                                               33175000
C
                                                                                36113100
      SUPLIACE
                                                                                20112033
70
                                                                               97112477
                                                                               00110303
      CONTINUE
60
                                                                               quilelss
C
                                                                               33170200
      AFTURN
                                                                               4017430v
                                                                               33170433
C
                                                                               0-11-333
       SUBROUTINE RANGETS
                                                                               30170000
                                                                               33170730
200
               CONGEN
                                     ST PHUL &
                                                                               33170033
                                                                               33110430
          MOUTING TO READ FRUM LOGICAL UNIT 5 ARRAYS OTH, SISNIM.
                                                                               JUL 7 1 1 3 3 3
```

```
MEMBER MAME CONGEN
           KJCJEF.CJEF.LWTOL.UPTOL
                                                                                   30177133
           MANDIN IS CALLED DUCE FROM ROUTINE INIT IF INPUT CATA VARIABLE DATSOR . 2 (HAND PREPARED DATA)
                                                                                   30171435
                                                                                   Jú17733.
  C
                                                                                   36177400
  č
                                                                                   3311133-
         COMMON /DESCRP/STRNTHI7631.0TMI7631.COSTI7631
                                                                                   03177-0-
         COMMON /EFF/NEFF, EFFLANIO, 3) . EFF (+0, +)
                                                                                   OULTITUL
         SMAN, SMAN, 100001 13001 ALCCOULTE COLOR OF LOOD OF LOOP ACHIEVE
                                                                                   30.7700.
         COMMON /REGIOL/TOLASH, TULS(2350, 3), NTOLS, ALATYP
         COMMON TRESOLUTION ON THE SUPERT, NERSH, NERSHU
                                                                                   06174333
         COMMON ITTILE/ITTILETTI, ISACTO
                                                                                   00170100
  Ç
                                                                                   06174230
         DIMENSION TEMPISE
                                                                                   36170332
         DIMENSION LIDES(2353.3)
                                                                                   03170-03
         EQUIVALENCE (ITOLS(1,1), TOLS(1,1))
                                                                                   00176500
  C
                                                                                   0017000-
         INTEGER EFFLAB
                                                                                   30174733
         ENTEGER DIN, TOLKSW
                                                                                   001/1100
                                                                                   06170433
  C
         REAL . . REGATI, ENDATI, IND
                                                                                   691:4333
  C
                                                                                   00179100
         DATA BEGALL! OHSEGENEF
                                                                                   20114572
         DATA ENDALL/ SHENDCOEF /
                                                                                   00179335
         REAL LIOL, LATOL
                                                                                   60174-00
 __ C
                                                                                   00174530
  C
                                                                                   JO179-Ju
                       NUMBER OF COMBAT UNIT TYPES
                                                                                   0617473-
  C
                                                                                   06176000
         READ (5.63) NOOMBT
                                                                                   06174930
                                                                                   00141300
  C
                       NUMBER OF SUPPORT UNIT TYPES . .
  C
                                                                                   00100100
  C
                                                                                   00143235
         READ (5,60) NSUPRT
                                                                                   39183190
  C
                                                                                   00140-00
                       UNIT CHARACTERISTICS
                                                                                   3614-133
                                                                                   90101011
         MUNIT - NCOMBT + MSUPRT
         00 10 1 - 1.NUNIT
                                                                                   30140433
         READ 15.70) DIM(1).(1717LE(J).J=1.7).(ISRC(K).K=1.3).(IFFPP.CCST(I):J).a)6.J
         STRATH(1) - ITEMP
                                                                                   00191639
         WRITE (7,110) (ITITLE(J),J-1,7),([SRC(K),K-1,3)
                                                                                   20101.30
  10
         CONTINUE
                                                                                   ......
                                                                                   3618133
  C
                       UNIT ALLOCATION RULE COEFFICIENTS AND POSSIBLE
  C
                                                                                   30141-3-
  C
                      TOLERANCES
                                                                                   00101500
                                                                                   36141435
  C
         INDEX . O
                                                                                   30161733
                                                                                   30.41.30
         NTOLS . 0
         1 . D
                                                                                   20191622
-- 50
         READ (5.80) IND. IDTM. JDTM. AIJ. LTGL. LTGL
IF (IND. EQ. BEGALJ) 30 TO 20
IF (IND. EQ. ENDALJ) GO TO 30
                                                                                   00162000
                                                                                   30.02:30
                                                                                   00106.3.
         I + Jacki - Facki
                                                                                   30102300
         KJCOEF(INDEX) - IDTY + 1COO + JOTH
COEF(INDEX) - ALJ
                                                                                   30105-3-
                                                                                   00142533
                                                                                  001464.
         IF ILTOL.LE.O.O.AND.UTOL.LE.O.O)
                                                GO TO 20
         NTOLS . NTOLS . 1
                                                                                   30.42130
         IF (NTOLS.GT.2350) GO TO 120
                                                                                   00145433
```

```
MEMBER NAME CONGEN
      110L SE 470LS.11 . 19TH . 10CO . JOIN
                                                                             06145400
       THE SENTOLS . 21 . LTOL
                                                                             30143333
       TOUSENTOUS, 31 . UTOL
                                                                              30.63103
      60 10 23
                                                                             05101200
120
      # 1J.EQ. 11
                   an 10 20
                                                                             201013-3
      1 . 1
                                                                             07101011
      welle (4.130)
                                                                             3010353-
      63 10 20
                                                                             JUL B LOUD
                                                                             .....
C:C::
                                                                             ---
                                                                             70101407
                    SORT ARRAYS COEF, KUCOFF INTO SUPPORTED UNIT DADER
                                                                             Pr.C. 91 FD
                    FOR EFFICIENT CONSEN ERECUTION.
                                                                             30104133
                                                                             0010-200
                                                                             00104300
30
      11 . 1
                                                                             0010440
      HANF . O
                                                                             30164553
      NAN/ . 0
                                                                             00104000
      0) 50 | 1 . 1. NUNIT
0) 40 | J . J1. IVDE C
                                                                             30100700
                                                                             DU 1 8 - 800
      IF (AJCOCFEJ)/1000.NE.DTM(II)
                                        60 10 40
                                                                             1010-477
                                                                             receive
      IF II.GT.NCO48II
                          GO TO 90
                                                                             00105100
      MANY - MANE . I
                                                                             ......
      60 10 100
                                                                             00145303
.
      NON! . NON! . 1
                                                                             33143400
                                                                             0016>>3
100
      ITT 4P . AJCOEF 1J11
                                                                             2-19262-
       TEMPELL .
                   COEFIJII
                                                                             00100100
C
                                                                             00163803
      KJCOFFIJI . KJCOFFIJI
                                                                             3314393
        COEFCILI
                       COEFIJI
                                                                             00100000
C
                                                                             00100100
      COEFIJI - TEMPILI
                                                                             30100233
                                                                             30100303
•
                                                                             36140400
      J1 . J1 . 1
                                                                             30186303
      CUNTINUE
40
                                                                             30140033
50
      CONTINUE
                                                                             00100700
                                                                             00100000
Č
                                                                             99100000
      RETURN
                                                                             30107000
                                                                             0016713,
..
      FORMATEISI
                                                                             33.0723.
70
      F 344A1 ( 34, 24, 744, 24, 244, 43, 24, 15, 24, 611, 61
                                                                             00107303
..
      FJP"47( 44.14, 13.24, 13.24, f12.6, 54, E12.6, 54, E12.6)
                                                                             00147403
110
      F38" ( F44. 101. 244. 43. 311)
      FURNATELINO, 82400000 TOL SANCE WAS INPUT FOR MORE THAN 2350 COEFFICULTOOD
113
     OTENTS. THE ERCESS MAS IGNORED. I
                                                                             33107733
Ç
                                                                             33107600
                                                                             35107430
      END
      SUBRUUT THE CHARLE
                                                                             00133333
.....
                                                                             Justalüi
               CONGEN
                                    6 JUNE 72
                                                                             0014420.
                                                                             JU1 48 30J
         THIS IS A SUPROUTINF SUPPROGRAM WHICH IS CALLED CACE FROM
                                                                             33140000
        THE MAIN RUUTINE FUNGEN TO GENERATE THE LOGICAL SUR-MATRIX
                                                                             .Class),
        UP COLUMN VECTORS THAT REPRESENT THE COMMAT MODULES OF A FORCE
                                                                            00144000
```

```
MEMBER NAME CUNGEN
                                                                       30140703
       MUDEL .
                                                                        00144407
      COMMON /ALPHA/NUL351
                                                                        20100027
      CONTON /AFT/STAILGL
                                                                       4310000
      CUMMON /CSL/CSTYPIGOL: SPERIGOL, CLTYPIGOL, CLPERIGOL
                                                                       3010+133
      COMMON IDE SCAPISTANTHE TADE DIRECTOR COSTE TODE
                                                                       33149235
      COMMON INEVIATICSSWICLSWISHSSWISHLSWISFSSWISFLSW
                                                                       0010+130
      COMMON /EFF/NEFF.EFFLASCE, 31,EFF (60.6)
                                                                       03111431
      COMMON /GROUP/GAPSH, GROUP! 7601 . I GATUP! 760 . 21
                                                                       30109>30
      COMMON /MIR/UNITS#. WHITES. MIRES(100.31.1MIRES(100)
                                                                        36101077
      COMMIN INA MESIMARI. NVARZ, NROWL, NROWZ, NNK, NAN
                                                                       60144700
      COMMON INCOMINCONTAGE SCONTAL
                                                                       30144830
      LAUNIES LINAKABASTED NOMPUS
                                                                       0-10447
      COMMON /REGEAC/COEFIGOCO), 4JCOFF 10000) , MANE, MANE
                                                                       00142677
      COMMON /RESTOL/TOLASM, TOLSTESSO, 31, NTOLS, ALRITYP
                                                                       00140100
                                                                       00193233
      COMMON /RESOLUTICO481.4SUPRT.APRAM.APRAMU
                                                                       00141100
      COMMON /SIGN/NES, PLUS, /FAO, BLK.FREE
      COMMON /THPMIX/MEINO. IIMMIE(10)
                                                                       00143400
C
                                                                       03140500
      INTEGER GRPSA
                                                                       90147679
      INTEGER NEG.PLUS. ZERN, BLK. FREE
      INTEGER STRILGL
                                                                       0014383-
      INTEGER DONAME
                                                                       00140400
      INTEGER TULRS#
                                                                        1419144
      INTEGER DIN
                                                                       03.9.10.
      INTEGER UMIXSU
                                                                       00141707
      INTEGER EFFLAB, ALRIVP, RESCON
                                                                       33191303
      INTEGER CSSH,CLSW,SRSSH,SRLSW,SFSSW,SFLSW
                                                                       17.41477
      INTEGER CSTYP, CLTYP
      REAL LATOL
                                                                       36191633
      REAL MIKES
                                                                       30191733
                                                                       00191403
                                                                       00141935
LUISTICL
                                                                       00142200
         IF THERE ARE NO COMMAT MODULES IN THIS MODEL, RETURN CONTROL __ 00192333
C
C
       TO FOMGEN.
                                                                       33185479
C
      IF (NCOMMT.EQ.O) RETURN
                                                                       20145977
      IPOINT - 1
                                                                       30142700
t
        DNE CILLUMN VECTOR IS GENERATED FOR EACH OF NCOMBT COMBAT MODULESSIBLES
C
       TYPES
C
                                                                       UU1931UU
     00 10 1 - 1. WCOMBT
                                                                       00193200
            PREPARE THE DIGITS OF THE DTH NUMBER OF THIS COMEAT MODULE JOIN 1443 FOR USE IN ROW AND COLUMN NAMES.
C
C
                                                                       COSTATOL
      CALL BRK30G(DT4(1).11.12.13)
                                                                       00143730
C
                                                                       20147870
C
             GENERATE THE NAME OF THIS COLUMN VECTOR BY 2 CALLS TO
                                                                       30193400
            FUNCTION NAME TO CONCATENATE 4 CHARACTERS WHICH ARE PASSED JOLY-UJ.
             AS CALLING PARAMETERS.
                                                                       00144100
                                                                       001942-1
     MYAR1 - NAME(MU(12), 11, 12, 13)
                                                                       0014-500
     NVARZ . BLK
                                                                       30194430
```

```
MEMBER NAME CONGEN
                                                                             2-11-27-
C
               ENTER THIS COLUMN INTO THE LIST OF MODEL COLUMNS BY A CALLOGIVANOUS
0
              TO SUBABUTTNE COLID.
                                                                             00144100
                                                                             00144630
      CALL COLID
                                                                              33.9.63.
               ENTER THIS COLUMN THTO THE ADVANCED START BASIS BY A CALL JULY 100
:: 0
              TO SUBAULITINE FASIS.
                                                                              JALASTA
                                                                             35195350
      CALL BASISISTA . YVARL . NVSR21
                                                                             2014247
C
                                                                              JU1953JJ
             ENTER THE STRENGTH OF THIS CCHOAT MODULE INTO ALTERNATIVE OCTASSOUD ORJECTIVE PURCTION ATESTANA BY A CALL TO FUNCTION NAME TO DOLLANDO
2000
              FORM THE OBJECTIVE FUNCTION NAME, AND A CALL TO SUBMOUTINE
                                                                             UU. 43030
              MATART TO WALTE THE MATRIX COEFFICIENT.
                                                                             JULY TO THE
               THIS DBJECTIVE FUNCTION IS THE SUM OF THE STRENGTHS OF ALLJUIVEDJU
              COMMAT "JOULES AND SUPPORT UNITS IN A FORCE.
                                                                             33140.50
              THE CUEFFICIENT IS SCALED IN 10005.
                                                                             00140200
                                                                             66190300
      N40W1 - 03N44F(1,1)
                                                                             30: 30-30
      NAUMS . DANAME(1.2)
                                                                             2714027
      NNN . PLUS
                                                                             00170000
      CALL MATMATISTANTHITI/1000.1
C:::C
                                                                             10160000
               ENTER THE STRENGTH OF THIS COMBAT MODULE INTO ALTERNATIVE JULYANUS
              DEJECTIVE FUNCTION /TCSTRN/ BY CALLS TO NAME AND MATHRE.
                                                                             20141070
               THIS OBJECTIVE FUNCTION IS THE SUM OF THE SIMPNOTHS OF ALLDOLATION
              COMBAT MIDULES IN A FORCE.
                                                                             0-19723-
              THE COEFFICIENT IS SCALED IN 10005.
                                                                             00197333
Č
                                                                             30197400
      MROKE . DONAMETER. 11
                                                                             36147532
      15.513MAZ . OHVAMETS. 21
                                                                             33197030
      CALL MATWATESTANTHEES/1000.1
                                                                             99741199
                                                                             00191101
               ENTER THE COST OF THIS COMBAT MODULE INTO ALTERNATIVE
                                                                             22141420
              OBJECTIVE FUNCTION /TECOST/ BY CALLS TO NAME AND MATURE.
                                                                             30140332
               THIS OBJECTIVE FUNCTION SUPS THE COST OF ALL CCHBAT
                                                                             3019013-
              MODULES AND SUPPORT UNITS IN A FORCE.
                                                                             J.1982J.
                                                                             CULPATON
      MADHI . DANAMETA, 11
                                                                             30149430
      NAOHE . DANAMETA, 21
                                                                             0019630-
                                                                             30140000
      NYN . PLUS
      CALL MATERTICOSTITI
                                                                             20144120
                                                                             2214447
              ENTER THE COST OF THIS COMMAT MODULE INTO ALTERNATIVE
                                                                             3344410
              DEJECTIVE FUNCTION /TCCOST/ BY CALLS TO MAME AND MATHRET.
                                                                             63144333
               THIS ONJECTIVE FUNCTION SUMS THE COST OF ALL COMBAT
                                                                             3611117
              MODULES IN A FORCE.
                                                                             JJ . 4923J
                                                                             60144300
      NROWL - ORNAME(5,1)
                                                                             00154-00
      NAONS . DONAME(5.2)
                                                                             30144300
      CALL MATHRETICOSTIII)
                                                                             3019900-
C
                                                                             00144700
                                                                             30144000
              ENTER THE VEFF UNIT EFFECTIVENESS INDICES (UP TO 6)
                                                                             27146477
             OF THIS CONSAT MODULE INTO NEFF MODEL ROWS. THE NAME AND
                                                                             UJ 2UJJJJ
              TYPE OF EACH ROW IS INPUT DATA.
                                                                             COLUMN
                                                                             33233233
```

```
MEMBER MAME CONGEN
       IF INEFF.LE.OI
                          60 TO 5
                                                                                  06230330
       NNN . NEG
                                                                                  62222427
       00 25 J . L. NEFF
                                                                                  30236550
       NAOHL . EFFLASIJ. LI
                                                                                  00233600
       MADUZ . EFFLABIJ. 21
                                                                                  00236703
       CALL BASISILGE , WEILER , NECHES )
                                                                                  33203030
       MNE - EFFLAA(J.3)
       CALL ROWID
                                                                                  33241434
25
       CALL MATMRTE EFFELLIS 1
                                                                                  00241104
                                                                                  00201233
                INTERSECT A MODEL ROW OF THE SAME NAME AS THIS COLUMN
                                                                                  00201300
               VECTOR WHICH CONSTRAINS THE NUMBER OF COMBAT PODULES OF
              THIS TYPE IN A FONCY. THE SENSE OF THIS CONSTRAINT IS SPECIFIED BY THE VALUE OF ARRAY NCON FOR THIS COMBAT
Č
                                                                                  سلاط لاشتامات
                                                                                  00201000
               MODULE TYPE. NCONTTO ... FOUAL RHS VALUE
                                       ...LESS THAN OR EQUAL PHS VALUE -...GREATER THAN UR EQUAL PHS VALUE
Č
                                                                                  MAJASJA
                                                                                  36231435
                                        F... NO CONSTRAINT IFREE!
                                                                                  33202330
              NO MATTER WHAT NOON INDICATES, IF COMBAT MODULE DEVIATION COLUMNS ARE TO BE MODELED, THE ROW TYPE IS JECUAL TOJ. SUBROUTINE MOWID IS CALLED TO ENTER THIS ROW VECTOR INTO
C
                                                                                  30202100
                                                                                  JUZIZZOU
                                                                                  02505700
               THE LIST OF UNIQUE MODEL NAMES IF THIS IS THE FIRST
               APPEARANCE OF THIS ROW IN THIS MODEL. MATERT IS CALLED TO
C
                                                                                  06202500
              WRITE THE MATRIX COEFFICIENT (+1.0).
                                                                                  33262630
C
                                                                                  33232733
      MROW1 . NVARI
                                                                                  00202000
       NAOHZ . NVARZ
                                                                                  90505497
       HYE . MCONELL
       IF (CSSW.GE.1.OR.CLSW.GE.1) NAX - ALK
                                                                                  4424 A LOU
       IF INNE.NE.BLK! CALL BASISILGL.MONI.NROWE!
                                                                                  2017777
       CALL ROWID
       NNN . PLUS
                                                                                  33233403
       CALL MATURTILLOI
                                                                                  30203503
C
                                                                                  10411001
                                                                                  30203703
33233934
č
                                                                                  U02U460J
                ENTERSECT A MODEL ROW FOR EACH SUPPORT UNIT TYPE FOR
                                                                                  00204100
              WHICH THIS COMBAT MODULE HAS A POSITIVE REQUEREMENT. DOZUGAJO
THE DIGITS OF THE NUMBER (JONCOMBT) OF EACH SUPPORT UNIT AROSZUGASOJ
C
              PREPARED FOR USE IN THE ROW NAME, NAME, ROWID AND MATURT
              ARE CALLED. THE TYPE OF ALL SUCH ROWS IS THE SAME PHO IS VARIABLE.
C
                                                                                  30204333
                                                                                  30204033
              IT IS USUALLY /LESS THAN OR EQUAL/ OR /EQUAL/.I.E..
              /AT LEAST AS MANY/ OR /EXACTLY AS PANY/ SUPPORT UNITS AS
                                                                                  JUE 37 833
              SPECIFIED BY ALLOCATION RULFS. THE MATRIX COEFFICIENTS
                                                                                  30234400
              ARE POSITIVE.
                                                                                  00203000
C
C
                                                                                  205-210-
       IF (MSUPRT.EQ. 3)
                            GO TO 20
                                                                                  30232230
      CALL KJUNPKIL, IPOINT, IPTK, J)
                                                                                  00205300
15
       IF (IPTX.ME.DTM(II) GO TO 20
                                                                                  3020>433
C
                                                                                  0320>500
      CALL BRK3DG(J.J1.J2.J3)
                                                                                  36205630
                                                                                  JUZU57JU
C
       MROWL - MAMEENULZBI.J1,J2,J3)
                                                                                  00205400
      NRUMZ . BLK
                                                                                  30205931
       NNX - ALRTYP
                                                                                  3023-00-
```

```
MEMBER NAME CONGEN
      IS ISRSSW.GE.1.OR.SRLSW.GE.1.OR.SFSSW.GE.1.OR.SFLSW.GF.11 NNE-BLK UUZOOLUJ
      CALL ROWID
                                                                           WCJ620.
      KYN . PLUS
                                                                          OUZ JE JUJ
      CALL MATHRICCEFTIPUINTED
                                                                          00230400
C
                                                                          30 200 500
Caccanonance
              IF TOLERANCE IS ALLOWED IN GENERAL ON REQUIREMENTS FOR
                                                                           reaction
             SUPPORT UNITS BY COMMAT MODULES IND BY SUPPORT UNITS
                                                                          00200700
             ION INDIVIDUAL ALLOCATION RULE COFFFICIENTS)
                                                                          35236835
             TOLASA - 11 . AND IF IN PARTICULAR LOWER AND/OR UPPER JUZUSOUS DEVIATION IS ALLOHED FROM THIS REQUIREMENT (LETOLITPOINT-11)323/005
             AND/OR UPTOLITPOINT-1) C 0.21 . COUPLE THIS COMMAT UNIT
                                                                          33607133
                                                                          00237200
             DEVIATIONISM. THIS COUNTERTION IS BY A -1.0 COEFFICIENT
                                                                          60247343
             IN A SPECIAL MODEL HOW. THE NAME OF THIS ROW IDENTIFIES
                                                                          05637453
             THE CHEFFICIENT ON WHICH TOLERANCE IS ALLOWED BY USING
                                                                          03637533
             THE I AND J NUMBERS. THE A-CHARACTER LIMIT ON THE SIZE
                                                                          03207035
             OF THE ROW NAME PROHIBITS THE USE OF DIM WINBERS HERE.
                                                                          33237703
C
             THE COEFFICIENT IS JENFRATED BY CALLS TO MOUTINES NAME.
                                                                          LEBIESEL
             RUMED AND MATERT.
                                                                          36237455
                                                                          36208033
      IPOINT . IPOINT . 1
                                                                          3020413-
      IF ITOLASM.NE. 11 GO TO 15
                                                                          09504501
      NO 130 INJEC . I. NTULS
                                                                          00204360
      CALL KJUNPKIZ, INDEK, IX, JKI
                                                                          30236437
      IF LIPTX.NE.IK.OR.J.NE.JKI GO TO 130
                                                                          00238500
      IF ITOLS(INDEX.2).LE.O. J.AND. TOLS(INDEX.3).LE.O.O)
                                                             GU TO 15
                                                                          16579077
C
                                                                          33230700
      NROAL - NAME(11.12.13.47/27))
                                                                          00200000
      MANUE . MAMELILIJAN . SMOAM
                                                                          UUZU8433
      NYX . PLUS
                                                                          しいと よるひろっ
      CALL ROWID
                                                                          02524100
      NNY - NEG
                                                                          30234533
      CALL MATHRICI.O.
                                                                          30209335
                                                                          00204405
130
     CONTINUE
                                                                          00204552
      GO TO 15
                                                                          35254033
                                                                          3323 +733
                                                                          JJZ J9 MJJ
20512022
Č
                                                                          0421G164
              IF UNIT MIX SPECIFICATIONS ARE ALLOWED IN THIS MODEL AT
                                                                          ひっとょりとりっ
             ALLIAND IF THIS COMMAT MODULE APPEARS IN ONE OR MORE MIXES. JUZZIJEJJ
             COUPLE THIS COMPAT MIDULE COLUMN VECTOR TO THAT (THOSE)
                                                                          03210463
             COLUMN VECTORIST REPRESENTING THE MIXIEST RY A -1.0
                                                                          JUZZUSJU
             COEFFICIENT IN ONE OR MORE COUPLING MODEL HOWS.
                                                                          Jiżzieji
                                                                          00210706
                         IF NO UNIT MIXES ARE ALLOWED AT ALLISKIP THIS
                                                                          35213830
                       SECTION.
                                                                          33212931
                                                                          00211033
20
     IF (UMIXSW.NE.1)
                         GO TO 40
                                                                          03211133
                                                                          03411233
                        DETERMINE IN HOW MANY UNIT MIXES THIS COMBAT
                                                                          00211300
                       MODULE APPEARS (VARIABLE MKIND). AND IF THIS IS
                                                                          33211433
                       GREATER THAN OF THE SEQUENCE NUMBER (S) OF THAT
                                                                          ******
                       (THOSE) MIXES (STORED IN ARRAY IIPMIX).
                                                                          JU21160J
                                                                          00211735
     CALL INVIXCIII
                                                                          35211855
```

```
MEMBER NAME CONGEN
C
                                                                                 20511407
                           IF THIS COMBAT MODULE DOES NOT APPEAR IN ANY
                                                                                  00213000
                          MIX SPECIFICATIONS, SKIP THIS SECTION.
                                                                                  0251510-
                                                                                  3644223-
       IF (MXIND.EQ.O)
                           GO 10 40
                                                                                 22515307
                                                                                  03212+0-
                          GENERATE A -1.0 CREFFICIENT IN A CRUPLING ROW FOR EACH OF THE MIXING UNIT MIXES IN WHICH
                                                                                  2-24-30-
                                                                                 0951500-
                          THIS COMMAT MODULE APPEARS. THE COUPLING ROWS
                                                                                  00211700
                          ARE TYPE . AND ARE IDENTIFIED BY THE SECUENCE NUMBER OF THE MIX AND THE DTM NUMBER OF THIS
                                                                                  3021283
                                                                                  0251587
              COMBAT MUDULE.
                                                                                 0021300
¢
                                                                                 0321313.
       03 30 J - 1. MXIND
                                                                                  775777
C
                                                                                 03211100
       CALL BRK3DG[[[M4]X[J],J],J2,J3]
                                                                                 0021343
C
                                                                                 20517200
       MRDW1 - MAME( MU(22) . J1 . J2 . J3)
                                                                                 UG21360L
       NROWZ - NAME( NUL 33), 11, 12,13)
                                                                                 0021370
       NNX . BLK
                                                                                 JU213844
       CALL ROWID
                                                                                 00511400
       NNN - NEG
       CALL MATWRT(1.0)
                                                                                 3321410-
C
                                                                                 00214200
30 . CONTINUE
                                                                                 30214330
                                                                                 0341-03-
                                                                                 6021-500
03214700
                                                                                 3021400-
              INTERSECT MODEL ROW /TFSTRL/, WHICH PLACES AN UPPER LIMIT OG244900 CONSTRAINT ON THE TOTAL STRENGTH OF COMBAT MODULES AND 00215300 SUPPORT UNITS IN A FORCE. THE MATRIX COEFFICIENT IS THE 00215100
              STRENGTH OF THIS COMBAT MODULE AND IS POSITIVE. THE TYPE OF DG21>200
              ROW /TFSTRL/ IS '-ROUTINES NAME, ROWID AND MATWRT ARE CALLEDJUZZIDJOJ
              THE COEFFICIENT IS SCALED IN 1000S.
                                                                                 33215430
                                                                                 00212204
40
       NROWL - NAME(MULZ9), NULL5), NULZ8), NULZ9))
                                                                                 03215000
      NROWS - NAME ( VU(271, NU(21), SLK, BLK)
                                                                                 00 215705
       CALL BASIS(LGL , NRU#1 , NRU#2)
                                                                                 00213800
       NNX - RESCON(1)
                                                                                 30215935
      CALL ROWID
                                                                                 00210100
       NNN - PLUS
                                                                                 00210100
       CALL MATERTISTRATH(13/1300.)
                                                                                 30210201
                                                                                 00210300
              INTERSECT MODEL ROW /TCSTRL/+WHICH PLACES AN UPPER LIMIT 03216400 CONSTRAINT ON THE TOTAL STRENGTH OF COMBAT MCDIJLES IN A 03216500
::::
              FORCE.THE MATRIX COFFFICIENT IS THE STRENGTH OF THIS COMBATUU210000
              00215700
                                                                                 U)210000
              THE COEFFICIENT IS SCALED IN 1000S.
                                                                                 30210935
                                                                                 00217300
      NROWL = NAME(NU(29), NU(12), NU(28), NU(29))
                                                                                 00217100
      NROWS = NAME(NU(27), NU(21), BLK, BLK)
                                                                                 00217230
      CALL BASISILGL , NROW1 + NROW2)
                                                                                 36217336
      NYX - RESCON[2]
                                                                                 33217+53
      CALL ROWID
                                                                                 00217500
      CALL MATWRT(STRNTH(1)/1000.)
                                                                                 06217603
```



```
MEMBER NAME CONGEN
                                                                         05217732
              INTERSECT MODIL ROW /TFCSTL/. WHICH PLACES AN UPPER LIMIT JOSLIAGO
             CONSTRAINT ON THE TOTAL COST OF COMBAT MODULES AND SUPPORT UUZI/403
             UNITS IN A FOREF. THE MATRIX COEFFICIENT IS THE COST OF THISOUZIOUS
             COMBAT MIDULE AND IS POSITIVE. THE TYPE OF ROW /TECSTL/ IS "JUZZIELJU
             ROUTINES NAME, ROWID AND MATURE ARE CALLED.
                                                                         30214230
                                                                         90519797
      MROW! . MAYELYU(29). NU(15). NU(12). NU(281)
                                                                         30218400
      NEONS . NAMEENUEZOS. NUEZES BEKIBLKE
                                                                         09519277
      NNK . RESCONIAL
                                                                         00218000
      CALL BASISTEGL . WRONI . WROME!
                                                                         LL 2 # 17 PM
      CALL ROWIN
                                                                         2021483-
      NYN . PLUS
                                                                         20219477
      CALL MATHRETICOSTILLE
                                                                         00574007
                                                                         60219100
              INTERSECT MODEL ROW /TCCSTL/, WHICH PLACES AN UPPER LIMIT JUZZYZOJ
             CONSTRAINT ON THE TOTAL COST OF COMBAT MODULES IN A FORCE. JUL19344
Come
             THE MATRIX COEFFICIENT IS THE COST OF THIS COMBAT MODULE
                                                                         -- 219433
             AND IS POSITIVE. ROUTINES NAME, ROWID AND MATERT ARE CALLED. OUZLY-30.
                                                                         JU214600
      NROWL - NAME(N')(24), NU(12), NU(12), NU(28))
                                                                         03219733
      NROWZ - NAME (MU129), NU121), BLK, BLK)
                                                                         00214807
      CALL BASISTEGE, NROWI , NROWED
                                                                         60518907
      NNX - RESCUNES!
                                                                         00223335
      CALL ROWID
                                                                         001570100
                                                                         33223235
      CALL MATHRT(COST(11)
                                                                         30220333
                                                                         00222440
26257007
0::::0
                                                                         J022C 703
              ENTER SPECIFIED ATTRIBUTE OF THIS UNIT TYPE INTO UNIT
                                                                         60440400
             GROUP CONSTRAINT IF THIS CONSTRAINT IS ALLOWED AT ALL
                                                                         00220400
             IGRPSW - 1 OR 2) AND THIS UNIT TYPE IS INCLUDED IN ONE
                                                                         JJ22103J
            OF THE THO GROUPS OF UNITS CONSTRAINED
C
                                                                         00221100
C
                                                                         30221233
      IF IGRPSW.EQ.21
                        GD TO 50
                                                                         00221355
                        GD TO 110
      IF (GKPSW-NE-1)
                                                                         00221400
                                                                         00221530
C
         TOTAL COMBAT UNITS VERSUS TOTAL SUPPORT UNITS
                                                                         00221633
                                                                         00221700
      INDEX = 1
                                                                         06221833
      G3 TO 70
                                                                         JUZZ1933
C
                                                                         30222003
C
         USER DEFINABLE GROUPS
                                                                         00222100
                                                                         30222233
C
50
      INDEX = 1
                                                                         06222355
57
      IF (IGROUP(INDEX, 11.E0.0)
                                  GO TO 110
                                                                         UU222634
      1K = DTH(1)
                                                                         00222503
      IF (IX.ED. [GROUP(INDEX.1)) GO TO 70
                                                                         30222600
      INDEX - INDEX + 1
                                                                         30222703
                                                                         10222633
      GO TO 57
                                                                         63222900
70
      IGX = IGROUP(INDEX,2)
                                                                         00223000
      VAL = EFF(1,1GX-3)
                                                                         30223133
                     VAL = STRNTH(1)
      IF (IGX.EQ.1)
                                                                         00223233
                     VAL = COST(II)
      IF ( IGX . EQ . 2)
                                                                         00223330
                     VAL = 1.0
      IF (164.EQ.3)
                                                                         20223420
```

```
MEMBER NAME CONGEN
      . VAL . GROUPTINDERT . VAL
                                                                          20223534
       NNN . PLUS
                                                                          30557097
        IF (VAL.LT.O.O) NNN - NEG
                                                                          00225700
       VAL - ABSIVALI
                                                                          0022380-
 C
       NROWL - NAME( VUILE) . NUI 27) . NUI 24) . VUI 30) )
                                                                          30224603
       MEDIS . MAREL MULEST, BLK, BLK, BLK)
       CALL BASISILGL . NROWI . NROWZI
       NYK . NEG
                                                                          D024-101
       CALL ROHID
       CALL MATHRTIVALI
                                                                          0122-511
 C
                                                                          33224660
 0055-400
 C
          COMBAT MODULE DEVIATION (FROM RHS) STRUCTURE
                                                                          03225103
 C
                                                                          00225200
               IF COMBAT MODULE SHORTFALLS ARE TO BE MODELEC, INTERSECT, 00222300
 C
               A RUM THAT LIMITS THE AMOUNT OF SHORTFALL.
                                                                          30225433
 C
                                                                         30223533
                                                                         JU223004
       IF ICSSW .LE.O) GO TO 150
                                                                          30225733
       MROWE - MAMEI VUI 281, NUI 251, BLK.BLK)
                                                                          30225833
       NYK . CSTYP(I)
                                                                         00223900
       CALL ROWID
                                                                          0022-000
       NNN . PLUS
                                                                          00426133
       CALL MATHRTI CSPER(I) )
                                                                         00226263
 ¢
                                                                         00226300
               IF LONGFALLS ARE TO BE MODELED, INTERSECT A ROW THAT
                                                                         00220401
               LIMITS THE AMOUNT OF LONGFALL
                                                              _ C
                                                                         0022000
 150
       ORE CT CD (O.31. WZJC) 11
                                                                         00220700
       NROWZ = NAME(NU(21).NU(25).BLK.BLK)
                                                                         00226800
       NYX - CLTYP(1)
                                                                         0022-903
       CALL ROWID
                                                                         00227000
       NNN - PLUS
                                                                         0322713
       CALL MATURTE CLPER(I)
                                                                         302272us
 C
               IF SHORTFALLS ARE TO BE MODELED, CONSTRUCT A CCLUMN VECTOR33227433
               REPRESENTING SHORTFALLS OF THIS UNIT FROM ITS RMS VALUE. 332275C3 THE COLUMN INTERSECTS OBJECTIVE FUNCTION /TDEV/, THE 32227633
                                                                        . 00227700
               COMBAT UNIT ROW WITH A +1.0. AND THE LIMITING ROW WITH
               A -1.3.
 C
                                                                         00227800
                                                                         00227903
      .IF (CSSW .LE.O) GO TO 120
 180
                                                                         30224004
       NVAR2 = NAME( NU( 28) . BLK . BLK . BLK)
                                                                         00226100
       CALL COLID
                                                                         00228205
       CALL BASIS(STR, NVARI, NVARZ)
                                                                         06228334
       NROHL = OBNAME(7,1)
                                                                         33224400
       NROW2 = ORNAME(7.2)
                                                                         00226500
       NNN - PLUS
                                                                         Ju 22360-
       VAL = EFF(1,CSSW-3)
                                                                         00228700
       IF (CSSH .EQ.1) VAL = STRNTH(1) + 0.001
                                                                         00273803
                        VAL - COST(1)
       IF (CSSW .EQ.2)
                                                                         00224900
       IF (CSSW .EQ.3)
                         V4L - 1.0
                                                                         30227000
       CALL MATHRT (VAL)
                                                                         00229100
       NROW1 = NAME(NU(12), [1, [2, [3]
                                                                         00224400
```

RAC

```
MEMBER NAME CONGEN
     MROWZ . BLK
                                                                     06224103
     NNN . PLUS
                                                                     205547
     CALL MATHRTILLOI
                                                                     90554270
     HRITHE . NAME ( NUL 28) . NUL 25) . BLK . BLK !
                                                                     ひしょくりゅうい
     NNN . YEG
                                                                     2225177
     CALL MATHRETIL. 01
                                                                     30224653
C
                                                                     00223400
C
             IF LONGFALLS ARE TO BE MODELED, CONSTRUCT A COLUMN VECTORDUZADADA
CCC
             REPRESENTING LONGFALLS OF THIS UNIT FROM ITS RHS VALUE. JUZIJIJJ
             COMBAT UNIT NOW WITH A -1.C. AND THE LIMITING ROW WITH
                                                                     9351359
             A -1.0.
                                                                     30233333
                                                                     3323333
     1F (CLSw .LE.3) 53 TO 19
120
                                                                     33230500
     NVARZ - NAMEINUIZII, ALK, BLK, BLKI
                                                                     دنو د د د د د د د د
     CALL COLID
                                                                     00234733
     CALL BASISISTR.NVAR1.NVAR2)
                                                                     00230833
     NACHI . DONAME (7.1)
                                                                     20537477
     NRUNZ . DANAME (7.2)
                                                                     00231000
     NYN - PLUS
                                                                     03231160
     VAL . EFFILICUSA-31
                                                                     02571590
      IF (CLSW .EQ.1) VAL - STRNTH(1) . 0.001
                      VAL - COSTILI
     IF (CLSW .EQ.2)
                                                                     00211400
     IF (CLS4 .EQ.3)
                      VAL - 1.0
                                                                     00211535
     CALL MATHRTIVALI
                                                                     03411033
     NAOH1 - NAME(NULLZ). [1, [2, [3]
                                                                     30231733
     MROHZ - BLK
     NYN . NEG
                                                                     30231933
     CALL MATWRTILLOI
                                                                     00515000
     NRONZ. - NAMELMULZIJ. NULZSJ. BLK. BLK.
                                                                     00232133
     CALL MATHRT(1.0)
                                                                     0752537
02434030
                                                                     00232133
        NEXT COMBAT MODULE TYPE
                                                                     00232800
                                                                     06232530
10
     CONTINUE
                                                                     00233600
                                                                     30233200
00233400
C
                                                                     0363333
     RETURN
                                                                     30233000
C
                                                                     00233700
                                                                     restez no
                                                                     0023+000
C
             CONGEN
                                6 JUNE 72
                                                                     0123-100
C
                                                                    0023+244
        FORTRAN IV SUBROUTINE TO DETERMINE IN WHAT USER SPECIFIED UNIT 0023433
C
       MIX/RATIO CONSTRAINTIS) , IF ANY , COMBAT UR SUPPORT UNIT
       TYPE KJ APPEARS
                                                                     3023+300
                                                                     00234630
                                                                    00234700
     COMMON /DESCRP/STRNTH(760),OTM(760),COST(760)
                                                                    00234800
                                                                    00234900
     COMMON /MIX/UMIXSW.NMIXFS.MIXES(100.3).IMIXES(100)
     COMMON ITHPMEX/MXIND. ILMMEXILOD
                                                                    00233000
```

and the second stages

```
MEMBER NAME CONGEY
                                                                           30435103
      REAL MITES
                                                                           30235200
      INTEGER DIN
                                                                           10572777
00:00
         DETERMINE EXTERNAL (DIM) IDENTIFICATION NUMBER OF THIS UNITIRALIZAÇÃO
                                                                           00223900
         SPARCH ANRAYS IMINES TO SEE IN WHAT MIX SPECIFICATIONS
                                                                           30230000
        IF ANY THIS UNIT APPEARS. STORE ANY APPEARANCES IN INTERMEDIATE JOE 2010
        ARRAY LIMMICCIDI.
                                         STORE THE NUMBER OF MIKES IN
        WHICH THIS UNIT APPEARS IN VARIABLE MEIND.
                                                                           00236300
                                                                           00236400
      MK IND . 0
                                                                           ......
      INDEX - 0
                                                                           00230000
      00 10 1 . I.NMIKES
                                                                           6023a70u
20
      INDEF . INDEX . 1
                                                                           00230800
      IF CIMIXESCINDEXI.E3.0; GO TO 10
                                                                           3023653
      OS OT OD INTOL.SHIPS OF TO 20
                                                                           00231000
      MEEND = MEIND + 1
      I I MAIK (MXIND) . I
                                                                           33457253
      63 TO 20
                                                                           00237300
10
      CONTINUE
                                                                           06217403
                                                                           00237500
C
      RETURN
                                                                           00237633
C
                                                                           20237763
                                                                           30237000
      SUBROUTTHE SUPORT
                                                                           30237934
                                   6 JUNE 72
C
              CONGEN
                                                                           00238000
         THIS IS A SUDROUTINE SUBPROGRAM WHICH IS CALLED CACE FROM
Ċ
                                                                           30238133
        THE MAIN ROUTINE FUNGEN TO GENERATE THE LOGICAL SUB-MATRIX
C
                                                                           03234200
2
        OF COLUMN VECTORS THAT REPRESENT THE SUPPORT UNITS OF A FORCE
                                                                           00238300
        HODEL .
                                                                           03438433
      COMMON /AGG/AGGRSW. WAGGR. AGGRGT(750). INDAGG. INNAGG(20.2). AGLAN(25) JO23650J
      COMMON /ALPHA/NUI 351
                                                                           00234600
      COMMON /RET/STR.LGL
                                                                           30234703
      COMMON /DESCRP/STRNTHE7601.DTM17601.COSTE7601
                                                                           00238401
      COMMON /DEVIAT/CSS4, CLSW, SRSSW, SRLSW, SFSSW, SFLSW
                                                                           20210407
      COMMON /GROUP/GRPSW.GRD'IP(760).1GHOUP(760.2)
      CCMMON /MIX/UMIXSW, NMIXES, MI KESI 100, 3), IMIXES(100)
                                                                           02534170
      COMMON /NAMES/WVARI, NVARZ, NROWI, NROWZ, NNK, NNN
      COMMON INCONINCINTESCONTAL
                                                                           102393JJ
      COMMON JOBUS/OBNAMET 7.21.NORJ
                                                                           33234433
      COMMON /REGFAC/CUEFI 8COOL.KJCOFF (8CCOL,NANZ,NBNZ
                                                                           00239500
      COMMUN /REGTOL/TOLASM. TOLS(2350, 31. NTULS, ALRTYP
      COMMON /RESOLU/NCUMST. NSUPRT. NPRAM, NPRAMU
                                                                           30237733
      CUMMON /SIGN/NEG.PLUS.ZFRU.ALK.FREE
                                                                           00219400
      COMMON /SSL/SDVTYP17001.SRSPER17001.SRLPER17001.SFSPER17001.
                                                                           CCAAFZOF
                  SFLPER(730)
                                                                           00243055
      COMMON /TMPHIX/MXEND. IIMMIX(10)
                                                                           002-0103
۲
      INTEGER AGGRSW, AGGRGT
                                                                           22401371
      INTEGER GRPSW
                                                                           002-0400
      INTEGER NEG.PLUS, ZERO, BLK. FREE
                                                                           30243500
      INTEGER STR.LGL
                                                                           00246033
      INTEGER DBNAME
                                                                           00240700
      INTEGER TULRSW
                                                                           60240855
```

```
MEMBER NAME CONGEN
       INTEGER SLATYPIRESCON
                                                                                06246401
       INTEGER DIA
                                                                                33241 -33
       INTEGER CSSW.CLSW.SRSSW.SRLSW.SFSSW.SFLSW
                                                                                002-110-
       INTEGER SOUTEP
                                                                                00241430
       REAL MIXES
                                                                                99547397
       INTEGER UNIXSW
                                                                                00241400
0::0
                                                                                 30201000
          IF THERE ARE N.I SUPPORT UNITS IN THIS MODEL, RETURN CONTROL
                                                                                00241700
                                                                                00241 411
C
                                                                                30241477
       IF INSUPKT.EJ.OI
                            RETURN
                                                                                0024200
       IPDINT . YANE . I
                                                                                00242135
          ONE COLUMN VECTOR IS GENERATED FOR EACH OF MSUPRI SUPPORT UNIT 30242330
         TYPES
C
                                                                                63442301
       03 10 1 - 1. NSUPRT
                                                                                JU24263u
       IJINO . 0
                                                                                06242133
C
                                                                                 10645011
               PREPARE THE DIGITS OF THE DIM NUMBER OF THIS
Č
               SUPPORT UNIT TYPE
                                                                                0024333
              FOR USE IN RUW AND COLUMN NAMES.
C
                                                                                0243201
       IN - I + NCOMBT
                                                                                00243300
       CALL BRK3DGIDIMIIX1.11.12.131
                                                                                02243400
C
                                                                                03243532
C
               GENERATE THE NAME OF THIS COLUMN VECTOR BY 2 CALLS TO
              FUNCTION NAME TO CONCATENATE & CHARACTERS WHICH ARE PASSED JULEDIJU
              AS CALLING PARAMETERS.
C
                                                                                402-1404
       NVARE - NAME(NU(20), 11, 12, 13)
                                                                                30244000
                                                                                0324413.
C
                                                                                00244200
               ENTER THIS COLUMN INTO THE LIST OF MODEL COLUMNS BY A CALLODZ-45300
C
               TO SUBRUJTINE COLID.
                                                                                032+4400
C
                                                                                33244700
      CALL COLID
C
C
               ENTER THIS COLUMN INTO THE ADVANCED START BASIS BY A CALL 30294000
              TO SUBROUTINE BASIS.
                                                                                10244911
C
       CALL BASISISTR, NVARI, NVARZI
                                                                                JU24510J
C
              ENTER THE STRENGTH OF THIS SUPPORT UNIT INTO ALTERNATIVE 3024->300 OBJECTIVE FUNCTION /TFSTRN/ BY A CALL TO FUNCTION NAME TO 3024->400
C :: C
              FORM THE OBJECTIVE FUNCTION NAME, AND A CALL TC SUBROUTINE OD2.>>>
CC
              MAINNE TO WRITE THE MATRIX COEFFICIENT.
               THIS OBJECTIVE FUNCTION IS THE SUM OF THE STRENGTHS OF ALLJULADION
              CUMMAT MODULES AND SUPPORT UNITS IN A FURCE. THE COEFFICIENT IS SCALED IN 1000S.
C
                                                                                002+1031
C
                                                                                ひいともつけい
      NROWL . DENAMETIALD
                                                                                44246144
       NROWS - GONAME(1,2)
                                                                                30446233
       NNN . PLUS
                                                                                20646333
       CALL MATHATISTENTHIIX
                                    1/1000.1
C
                                                                                364.6500
               ENTER THE STRENGTH OF THIS SUPPORT UNIT INTO ALTERNATIVE DOZINOLOGI
```

```
MEMBER NAME CONGEN
              OBJECTIVE FUNCTION /TSSTRN/ BY CALLS TO NAME AND MATHRE.
                                                                             302-0733
E
               THIS UNJECTIVE FUNCTION IS THE SUM OF THE STRENGTHS OF ALLOGRAPHIC
              SUPPORT UNITS IN A FORCE.
C
              THE COEFFICIENT IS SCALED IN 10005.
                                                                              30241333
                                                                             332-710-
      NROWL - OBVAME(3.1)
                                                                             03277203
      NRD#2 . 08444E(3,2)
                                                                             225-1277
      CALL MATERTISTRATHIIX
                                   1/1000.1
                                                                             004-7403
                                                                             20201527
               ENTER THE COST OF THIS SUPPORT INIT INTO ALTPANATIVE
CCC
              DBJECTIVE FUNCTION /TFCOST/ BY CALLS TO NAME AND MATHRE.
                                                                             602-77-
               THIS OBJECTIVE FUNCTION SUMS THE CUST OF ALL COMBAT
                                                                             30247430
CC
              MODULES AND SUPPORT UNITS IN A FORCE.
                                                                              332-1933
                                                                             00244000
      NROWL . OBNAME(4,1)
                                                                             00246100
      NAONS - DMANETA.ST
                                                                              ンシューロミン・
      CALL MATURTICOSTITE
                                                                             00248300
                                                                             3324840-
               FRITER THE COST OF THIS SUPPORT UNIT INTO ALTERNATIVE
CCC
                                                                             332-6332
              DBJECTIVE FUNCTION /TSCOST/ BY CALLS TO NAME AND MATHRE.
                                                                             222-4-62
               THIS DUJECTIVE FUNCTION SUMS THE COST OF ALL SUPPORT
                                                                             J32467JJ
              UNITS S IN A FORCE.
                                                                             202-4822
Č
                                                                             COS+4+00
      MROUL - DOMANE(6,1)
                                                                             30244000
      NRONZ - DOYAME(6,2)
                                                                             775-6177
      CALL MATURTICOSTIIX
                                                                             0024:200
                                                                             20544377
              WHICH THIS SUPPORT UNIT HAS A POSITIVE REQUIREMENT.
                                                                             33249433
              (INCLUDING THIS SUPPORT UNIT TYPE-I) FOR
                                                                             30204333
               INTERSECT A MODEL ROW FOR EACH SUPPORT UNIT TYPE
                                                                             70544407
              THE DIGITS OF THE NUMBER (JONCCHOT) OF EACH SUPPPORT UNIT ARDIZAGTA
              PREPARED FOR USE IN THE ROW NAME. NAME. ROWID AND MATURT
                                                                             JU 249 833
              ARE CALLED.
                                                                             0024990)
               THE TYPES OF ALL THESE ROWS IS THE SAME AND IS VARIABLE.
                                                                             7777777
               IT IS USUALLY /LESS THAN OR EQUAL/ OR EQUAL/ .I.E..
                                                                             77527100
               /AT LEAST AS MANY/ OR /EMACTLY AS MANY/ SUPPCAT UNITS
                                                                             225>7507
               AS SPECIFIED BY ALLOCATION RULES. WHEVER, NC MATTER WHAT JUISSIBLE
               THE TYPE SPECIFIED BY VARIABLE ALRTYP. IT IS /EQUAL/ IF OOZ>U+OVANY DEVIATIONS ARE TO BE MODELED. THE MATRIX CREFFICIENTS 332>3563
                                                                             00420404
          ARE POSITIVE REQUIREMENTS FUCEPT FOR THE COEFFICIENT IN THE
                                                                             いいくろうひひょ
              ADM VECTOR CORRESPONDING TO THIS SUPPORT UNIT-I-IN WHICH
                                                                             4043L 700
              CASE IT IS -1.0 . POSITIVE REQUIREMENTINERS THE REQUIREMENTALES JOOJ
              IS ASSUMED TO BE LESS THAN 1.01.
                                                                             33250933
                                                                             90521000
15
      CALL KJUNPK(1, IPNINT, IPTX, JK)
                                                                             3025116,
      IF (IPTX.NE.DTM(IX).AND.IJIND.EQ.1)
                                               60 10 23
                                                                             03231403
      IF (IPTX. NE. DIMITELL) GO TO 25
                                                                             63251365
C
                                                                             30251400
       J - KJGETIJKI
                                                                             3752727
      IF CIX
                   .fQ.J1
                                                                             35232000
      GO TO 35
                                                                             20251705
25
      J - IX
                                                                             00251800
      JE . DIMIIKI
                                                                             2752147
      CALL BRK JOG(JK.J1.J2.J3)
                                                                             ひりとうとしひょ
                                                                             2252570
      MRONI - MAMELYULSOI, JI. JZ. JZI
                                                                             37-2557
      MEDUS . OFE
                                                                             00171 JUJ
      NYE . ALRIVP
                                                                             00252400
```

DAG

```
MEMBER NAME CONSEN
       IF ISRSSW.GE.1.OR.SRLSW.GE.1.OR.SFSSW.GE.1.OR.SFLSW.GE.11 MIK-ALK JU2525UJ
       CALL AUGID
                                                                               35252644
       16 (12
                    .tu.11 60 TO 39
                                                                               00232700
C
                                                                               20625000
       NNN . PLUS
                                                                               20222922
      VAL . COEFF IPOINT
                                                                               935×1000
      63 10 40
                                                                               30253130
                                                                               00233233
10
      NYN . NEG
                                                                               302513...
       IF (1J1N0.FQ.1)
                          67 10 45
                                                                               しし くり しゅしゅ
      V41 - 1.0
                                                                                30233500
      63 10 40
                                                                               3025365-
       IF (COFFEEPOINT).GE.1.0)
                                    60 10 999
                                                                               002>173-
      ITPICALITIOS - C.I . LAV
                                                                               00423600
                                                                               UU2334Ju
      CALL MATURTIVALI
                                                                               442340 LL
       1F 11E
                   .EV. J. 4ND. I JIND. EQ. 01
                                              60 10 20
                                                                               30250100
C
                                                                               00427233
               IF TOLERANCE IS ALLOWED IN GENERAL ON REQUIREMENTS FOR
                                                                               004201Ju
              SUPPORT UNITS BY CURBAT MODULES AND BY SUPPORT UNITS
          ION INDIVIDUAL ALLOCATION RULE COEFFICIENTS!
                                                                               recepte
              ITULASH . 11 . AND IF IN PRATICULAR LUNER PAD/CR UPPER
                                                                               30224000
              DEVIATION IS ALLINGED FROM THIS REQUIREMENT
                                                                               03234733
               COUPLE THIS SUPPORT UNIT
                                                                               20220444
              CRUTY VECTOR TO 1 OR 2 COLUMNS REPRESENTING PARIMUM
                                                                               UC4+430
              DEVIATIONISI. IF I - J AND I ACQUIRES NO J.NO TOLERANCE MAY BE GENERATED FOR THIS DIAGONAL COEFFICIENT. THIS
                                                                               33253000
                                                                               からっしい
             CONNECTION IS BY A -1.0 COEFFICIENT
                                                                               662>>203
              IN A SPECIAL MODEL ROW. THE WAMP OF THIS ROW IDENTIFIES
                                                                               JU23300
              THE CREFFICIENT ON MAICH TOLERANCE IS ALLOWED BY USING THE I AND J NUMBERS. THE 6-CHARACTER LIMIT ON THE SIZE OF THE HOW NAME PROHIBITS THE USE OF DIM NUMBERS HERE.
                                                                               ししょうちょう
                                                                               3345553-
                                                                               33233000
              THE COEFFICIENT IS GENERATED BY CALLS TO ROUTINES NAME.
                                                                               Lifection
              ROUID AND MATERI.
                                                                               002,560
                                                                               00235477
      IPUINT . IPOINT . 1
                                                                               10220000
      IF (TOLASM.NE.1)
                           60 10 15
                                                                               3025610
      DO 200 INDEE . I. NTOLS
                                                                               06220200
      CALL KJUNPELZ, INDE E, IRE, JEFF
      IF (IPTE.WE.14E.04.JE.VF.JVE) GO TO 260
IF (ITOLS11WOEE.2).LE.O. J. AND. TOLS11WOEE.3).LE.O.O)
                                                                               33420000
                                                                60 10 15
                                                                               36256530
C
                                                                               1042001
      MARGE - MAMEETT. 12.13.44(291)
                                                                               20130130
      NEGOS . MATE (11,12,13, TUE 33) 1
                                                                               00230800
      NYE . PLUS
                                                                               ·(6-<200
      CALL ROWID
                                                                               3025/00-
      NNY . MEG
                                                                               JU2>7165
      CALL MATGREELL.SI
                                                                               JUZZTZJJ
                                                                               00457 Auu
2 00
      CONT INUE
                                                                               30257-00
      GO 10 15
                                                                               30257532
                                                                               JU23163.
002514.
                                                                               ......
               IF UNIT HIE SPECIFICATIONS ARE ALLOWED IN THIS PORFL AT
                                                                              JUE 26 100
              ALLIAND IS THIS SIMPORT UNIT APPEARS IN ONE CR MORE MIXES. JULIAGUA
```

```
HEMBER NAME CONGEN
                                                                             _ 30234300
              COUPLE THIS SUPPORT UNIT COLUMN VECTOR TO THAT (THOSE)
              COLUMN VECTORISI REPRESENTING THE MIXIESI BY A -1.0
                                                                                03234403
              COEFFICIENT IN ONE OR MORE COUPLING MODEL ROWS.
                                                                                36256300
                                                                                30224607
                           IF NO UNIT MISES ARE ALLOWED AT ALLISKIP THIS
                                                                                J0250700
                          SECTION.
                                                                                002>4630
                                                                                70324477
                          GR TO 40
20
       IF (UMIXSW.NE.1)
                                                                                002>1303
                                                                                04254104
                          OFTER TIME IN HOW MANY UNIT MIKES THIS SUPPORT
                                                                                30259200
                          UNIT! APPEARS EVARIABLE MEINDIGEND IF THIS IS
                                                                                36254303
                          GREATER THAN O, THE SEQUENCE NUMBER(S) OF THAT
                                                                                00259400
                          (THOSE) MIKES (STORED IN ARRAY SIPHIK).
                                                                                00254300
                                                                                30234601
       CALL INMIXSCIXI
                                                                                30259700
                                                                                30254803
                           IF THIS SUPPORT UNIT DOES NOT APPEAR IN ANY
                                                                                33259930
                         MIX SPECIFICATIONS, SKIP THIS SECTION.
                                                                                30203000
                                                                                06205135
       IF (MXINO.EQ.O)
                         60 TO 60
                                                                                30507537
                                                                                00200300
                         CENERATE A -1.0 COEFFICIENT IN A COMPLING ROW FOR EACH OF THE MXIND UNIT MIXES IN WHICH
Č
                                                                                30200433
                                                                                30263503
                          THIS SUPPORT UNIT APPEARS. THE COUPLING ROWS
                                                                                63265665
                         ARE TYPE - AND ARE IDENTIFIED BY THE SEQUENCE
                         NUMBER OF THE MIX AND THE INTERNAL ID NUMBER (KJ NO. - I+NCOMBT) OF THIS SUPPORT UNIT.
                                                                                JJiaJAJ.
                                                                                05 400 400
C
                                                                                00201000
       D3 50 J - 1.MYIND
                                                                                00261103
                                                                                30201203
  ... CALL BRK3DG([[MMIX(J),JL,JZ,J3)
                                                                                002-1300
                                                                                03261400
       NROWS - NAME(NU(22), JL, J2, J3)
                                                                                30201533
      NROW2 - NAME(4U(33), 11, [2, [3]
                                                                                002-1030
       NYX - BLK
                                                                                35261733
      CALL ROWID
                                                                                00401831
      NYN - NEG
                                                                                00261403
       CALL MATWRT(1.0)
                                                                                00262303
                                                                                22505107
50
      CONTINUE
                                                                                00262203
                                                                                03202300
                                                                                30402400
INTERSECT MODEL ADM /TFSTRL/.WHICH PL/CES AN UPPER LEMIT 30262700
              CONSTRAINT OF THE TOTAL STRENGTH OF COMBAT MOCULES AND SUPPORT UNITS IN A FORCE. THE MATRIX COEFFICIENT IS THE
                                                                                30505030
                                                                                00202500
              STRENGTH OF THIS SUPPORT UNIT AND IS POSITIVE THE TYPE OF DOZEDJUJ ROW /TESTRL/ IS ". ROUTINES NAME, ROWID AND NATURE ARE CALLEDJUZEDJUJ
              THE COEFFICIENT IS SCALED IN 1000S.
                                                                                002-3200
                                                                                00263300
60
      NROW1 - NAME(MU(29), NU(15), NU(28), NU(27))
                                                                                33403-33
      MICHE - NAME ( NUT 27) . NUT 211 . BLK . BLK)
                                                                                004.1501
      CALL BASISILGL . HROWI . NR7421
                                                                                30203000
      NNX - RESCON[1]
                                                                                33403730
      CALL ROYID
                                                                                032-1600
      NYN . PLUS
                                                                               002-1903
       CALL MATURTISTANTHIIE
                                    1/1000.1
                                                                                30204333
```

238

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MEMBER NAME CONGEN
0...........
                                                                                                                                               30264100
                            INTERSECT MODEL ROW /TSSTRL/, WHICH PLACES AN UPPER LIMIT
                                                                                                                                              30204630
                          CONSTRAINT ON THE TOLAL STRENGT OF SUPPORT UNITS IN A
                                                                                                                                               11404311
                          FORCE. THE MATRIX COFFFICIENT IS THE STRENGTH OF THIS SUPPORTUGATION OF THE STRENGTH OF THIS SUPPORTUGATION OF THE STRENGTH OF THE STRENGTH OF THE SUPPORTUGATION OF THE STRENGTH OF THE STRENGTH OF THE SUPPORTUGATION OF THE STRENGTH OF THE SUPPORTUGATION OF THE STRENGTH OF THE SUPPORTUGATION OF THE STRENGTH OF THE SUPPORTUGATION OF THE STRENGTH OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE SUPPORTUGATION OF THE
                          ROUTINES HAME, ROWID AND MAINRT ARE CALLED.
                                                                                                                                               30204630
                          THE COEFFICIENT IS SCALED IN 10005.
                                                                                                                                               1150-111
                                                                                                                                               00204000
            MRONE - NAMECHUIZ91, NUCZ91, NUCZ81, NUCZ911
                                                                                                                                               30204930
            HROWS . MAMEL MULE 71. MULE 11. BLK. BLK.
                                                                                                                                               39502997
            CALL BASISELGE . WEDWI . NEOW 21
                                                                                                                                               00202100
            NYK . RESCONEST
                                                                                                                                               20265233
            CALL RUNTO
                                                                                                                                               20202321
                                                                 1/1000.1
            CALL MATHATESTRUTHIER
                                                                                                                                              63235400
0000000
                                                                                                                                              00265530
                            INTERSECT MODEL ROW /TFCSTL/. WHICH PLACES AN UPPER LIMIT
                                                                                                                                              33202000
                          CONSTRAINT ON THE TOTAL COST OF COMBAT MODULES AND SUPPORT 00255705
                          UNITS IN A FORCE. THE MATRIX COEFFICIENT IS THE COST OF THISOGRAPHIC SUPPORT UNIT AND IS POSITIVE. THE TYPE OF ROW /IFCSTL/ IS "44245934
                          ROUTINES NAME ROAID AND MATURE ARE CALLED.
                                                                                                                                              00266000
                                                                                                                                              03266133
            MROWL . MAMELYULZALAWILTSIAMULTZIAMULZBII
                                                                                                                                               Dizcozii
            MRONZ - MAMEENUEZOI, NUEZII, ALK, BLKI
                                                                                                                                              00266300
            CALL BASISILGL, WROWI, NROWED
                                                                                                                                               30260433
            WWX - RESCONIAL
                                                                                                                                               10200501
            CALL ROWID
                                                                                                                                              0020000
            CALL MATWRT(COST(IX
                                                                                                                                               10200711
¢
                                                                                                                                              00200834
C
                            INTERSECT MODEL ROW /TSCSTL/, WHICH PLACES AN UPPER LIMIT
                                                                                                                                              20200911
C
                          CONSTRAINT ON THE TOTAL COST OF SUPPORT UNITS IN A FORCE. DG237003
                          THE MATRIX COEFFICIENT IS THE COST OF THIS SUPPURT UNIT
                          AND IS POSITIVE. ROUTINES NAME, ROWLD AND MATERT ARE CALLED. 0326/433
                                                                                                                                              00207300
            MROWL - NAME(YJ(29), NU(28), NU(12), NU(28))
                                                                                                                                              00201400
            NROWZ - NAME(MUCZ9), MUCZII, BLK, BLKI
                                                                                                                                              33267533
            CALL BASISTEGL , NADWI , NROWED
                                                                                                                                              00201600
            NYK . RESCONIGI
                                                                                                                                              20207700
            CALL ROAID
                                                                                                                                              00267633
            CALL MATURTICOSTILIE
                                                                                                                                              00267403
C
                                                                                                                                              30200000
                                                                                                                                              30200135
JJ2083JJ
Ċ
                  IF THIS SUPPORT UNIT IS INCLUDED IN ANY AGGREGATES INHICH
                                                                                                                                              Júzambu.
                  FUR EXAMPLE MAY CORRESPINO TO FUNCTIONAL ARES OF SUPPORTS
                                                                                                                                              UAZOGOÚU
                  ENTER ITS UNIT STRENGTH AND COST INTO AGGREGATE STRENGTH AND
                                                                                                                                              47504177
                  COST ROWS. THE NAME AND TYPE OF THE ROWS IS VARIABLE BY
                                                                                                                                              204821
                  AGGREGATE.
                                                                                                                                              30204100
                                                                                                                                              30264033
                                                                                                                                              99504199
            IF (AGGRSW.NE.:) GO TO 200
                                                                                                                                              00209200
           CALL INAGGE DIMETER 1
                                                                                                                                              052643-1
            IF ( INDAGG. EQ. 0) GO TO 200
                                                                                                                                              30264433
           00 210 J . 1. INDAGS
                                                                                                                                              33269333
            JI - MASKE IMMASSEJ. II. I
                                                                                                                                              30209000
            J2 . MASKE INNASCEJ. 11.2 1
                                                                                                                                              03269733
           GIPSIUM, IBSIUM, SL, ILLIBPAM - INOPM
                                                                                                                                              30205031
```

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MEMBER VAME CONGEN ... VRONZ = NAME(NU(27), BLK, RLK, BLK)
                                                                   ____00269900
      CALL BASISILGL , NRUW1 , NROW21
                                                                       00270060
                                                                       00270100
      NYX = MASK(INNAGG(J, 2), 1)
      CALL ROWID
                                                                       00270200
      NNN - PLUS
                                                                       00273300
      CALL MATERIC STRUTHLIX1/1000.0 )
                                                                       30270400
      NROW1 = NAME(J1.J2.NU(12).NU(28))
                                                                       33273533
     NROWZ - NAME( NUL 29) . ALK . BLK . BLK)
                                                                       0027060u
      CALL BASISILGL , VROW1 , NROW2)
                                                                       30270700
      NNX = MASKIINNAGGIJ.21.21
                                                                       00270713
     CALL ROWID
                                                                       00270800
      CALL MATURTI COSTIIN) 1
                                                                       00276900
      CONTINUE
210
                                                                       00271000
                                                                       00271100
                                                                       UU271200
00271400
                                                                       00271500
              ENTER SPECIFIED ATTRIBUTE OF THIS UNIT TYPE INTO UNIT ...
                                                                     . 00271000
             GROUP CONSTRAINT IF THIS CONSTRAINT IS ALLOWED AT ALL
                                                                       03271733
            (GRPSW = 1 OR 2) AND THIS UNIT TYPE IS INCLUDED IN ONE OF THE TWO GROUPS OF UNITS CONSTRAINED
                                                                       00271800
C
                                                                       00271900
                                                                       30272330
200
     IF (GRPSW.EQ.2)
                       GO TO 80
                                                                       00272100
                                                                 00272200
                       GO TO 110
     IF (GRPSW-NE.1)
                                                                       00272300
         TOTAL COMBAT UNITS VERSUS TOTAL SUPPORT UNITS
                                                                      00272400
                                                                       20272503
     INDEX = 2
                                                                       30272600
     GD TO 100
                                                                    .... 00272800
C
         USER DEFINABLE GROUPS
C
                                                                      00272905
                                                                     30273303
C
.
     INDEX . 1
                                                                      00273100
      IF (IGROUP(INDEX, 1).EQ. 0)
                                                                    20273200
85
                                 GO TO 110
      IXX - DIMIIXI
                                                                      00273300
      IF (IXX.EQ. IGROUP(INDEX,1)) GO TO 100
      INDEX - INDEX + 1
                                                                      00273500
     GO TO 85
                                                                      30273600
                                                                      00273730
     IGX - IGROUP(INDEX,2)
100
                                                                      00273863
      IF ( IGX . GE . 4) GO TO 110
                                                                   00274000
     VAL - STRNTH(IX)
     IF (IGX.EQ.2) VAL = COST(IX)
IF (IGX.EQ.3) VAL = 1.0
                                                                      00274163
                                                                      00274203
     VAL - GROUP(INDEX) . VAL
                                                                      00274300
     NNN - NEG
                                                                      JU274400
     IF (VAL.GE.O.O) NNN - PLUS
                                                                       30274503
     VAL - ABSIVALI
                                                                      00274000
C
                                                                      30274755
     NROWL = NAME(MU(16), NU(27), NU(24), NU(30))
                                                                      00274833
     NROWE . NAME ( VUE 251 . BLK . BLK . BLK)
                                                                      00274900
     CALL BASISILGL , NROWI , NROW2)
                                                                      30275035
     NNX - NEG
                                                                      00275133
     CALL ROWID
                                                                      00275203
     CALL MATHRTIVALI
                                                                      JU27>30J
C
                                                                      00275403
                                                                      00275533
C
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PAR

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MEMBER NAME CONGEN
00275700
                                                                         UU2758JJ
         GENERATE STRUCTURE FOR SUPPORT UNIT DEVIATIONS FROM REQUIREMENTJ0273900
        AS DEFINED BY ALLOCATION RULES, AND FROM TARGETS AS DEFINED BY UU276000 RHS VALUES. THIS LATTER TYPE OF DEVIATION IS CALLED FORCE J027610J
        DEVIATION.
                                                                         30270255
C
                                                                        30276300
Ċ
              LIMIT ROW FOR REQUIREMENTS SHORTFALLS
                                                                        00276400
                                                                        30276533
     NROW1 = NVAR1
110
                                                                        J027600J
     IF (SRSSW.LE.O) GO TO 150
                                                                        03276700
     NROW2 = NAME(NU(27), NU(28), NU(25), BLK)
                                                                        35276300
     NYX = MASK( SDVIYP(1),1 )
                                                                        20276900
     CALL ROAID
                                                                        JÚ27763J
                                                                        03277100
     NNN = PLUS
     CALL MATHRT( SRSPER(I) )
                                                                        3327720J
C
                                                                        JU277300
              LIMIT ROW FOR REQUIREMENTS LONGFALLS
C
                                                                        032774UJ
                                                                        00217500
150
     IF (SRLSW.LE.D) GO TO 160
                                                                        J02776Ju
     NROW2 = NAME( NU( 27) , NU( 21) , NU( 25) , BLK)
     NNX = MASK( SDVTYP(1),2 )
                                                                        00277833
     CALL ROWID
                                                                        00277900
     NNN = PLUS
                                                                        JU27800J
     CALL MATWRT( SRLPER(1) )
                                                                        00278100
C
                                                                        00273200
Č
              ROW , THE RHS VALUE OF WHICH IS THE TARGET
                                                                        00278300
                                                                        00278400
160
     IF (SESSW.LE.O.AND.SELSW.LE.O) GO TO 165
                                                                        002/8500
     NROW2 = NAME(NU(15), BLK, BLK, BLK)
                                                                        00278600
     NNX = BLK
                                                                        JU2787JJ
     CALL ROWID
                                                                        00278800
     NNN = PLUS
                                                                        20278335
     CALL MATWRT(1.0)
                                                                        00279000
C
Ċ
             LIMIT ROW FOR FORCE SHORTFALLS
                                                                        JU279203
                                                                        00279333
165
     IF (SFSSW.LE.O)
                      GO TO 170
                                                                        00279400
     NROW2 = NAME(NU(15), NU(28), NU(25), BLK)
                                                                        JJ2795JU
     CALL BASIS(LGL, NROW1, NROW2)
     NNX = MASK( SDVTYP(I), 3 )
                                                                        00279700
     CALL ROWID
                                                                        30279835
     NNN = PLUS
                                                                        00274400
     CALL MATERIC SESPER(I)
                                                                        05280005
C
č
             LIMIT ROW FOR FORCE LONGFALLS
                                                                        30283233
                                                                        UU28U3UU
170
     IF (SFLSW.LE.O) GO TO 180
                                                                        00280400
     NROW2 = NAME( NU( 15) , NU( 21) , NU( 25) , 9LK)
                                                                        30280500
     IF (SFSSW.LE.D) CALL BASIS(LGL, NROW1, NROW2)
                                                                        30283633
     NNX = MASKE SOVTYPEED.4 1
                                                                        00280700
     CALL ROWID
                                                                        JUZOOBJJ
     NNN = PLUS
                                                                        00283900
     CALL MATWRTE SFLPEREID )
                                                                        00281000
                                                                        30201103
              REQUIREMENTS SHORTFALL COLUMN VECTOR
                                                                        JO281500
                                                                        00441300
```

MEMBE	R NAME CONGEN		4-
180	15 15055W.15.0.00.5055W.66.41 GO TO	120	06281400
	NVAR2 = NAME(VU(27) - NU(28) - BLK - BLK)		33281533
	CALL COLID	•	03281600
	CALL BASISESTR NVAR1 NVAR21		00261700
	NACHI = CANAME(7.1)		00281800
	MANUE = ORNAME(7.2)	The state of the s	1628193
	NVAR2 = NAME(NU(27), NU(28), BLK, BLK) CALL COLIO CALL BASIS(STR, NVAR1, NVAR2) NROW1 = OBNAME(7,1) NROW2 = OBNAME(7,2) NNN = PLUS		0028400
****	WAL - CTONTHILLY O OOL	and the second s	35282000
	TE SERCEM EN 21 MAS - COCTASAS		30202130
	NNN = PLUS VAL = STRNTH(X + 0.001 IF (SRSSW.EQ.2) VAL = CUST(X) IF (SRSSW.EQ.3) VAL = 1.0		00282200
	IL (2K22M=EA-3) AMF = 1-0		00282300
	CALL MAINKITVALI		00282400
	CALL MATHRT(VAL) NROW1 = NAME(NU(28),(1,(2,(3)) NROW2 = BLK		00282500
	NNN = NEG		0028270
*	CALL MATWRT(1.0) NROW2 = NAME(NU(27),NU(28),NU(25),BLK)	B B B B	03282800
	NROW2 = NAME(NU(27), NU(28), NU(25), BLK)		00282900
	CALL MATHRT(1.0)		00283300
	TE FAGGRSW.NF. 1) GO TO 120		
	IF (INDAGG.EQ.0) GO TO 120	e en en en en en en en en en en en en en	30283200
	DO 220 J = 1, INDAGG		00283300
	J1 = MASK(INNAGG(J,1),1)		30283430
	J2 = MASK(INNAGG(J,1),2)	,	ひひとなるつひし
	DO 220 J = 1, INDAGG J1 = MASK(INNAGG(J,1),1) J2 = MASK(INNAGG(J,1),2) NROW1 = NAME(J1,J2,NU(28),NU(29)) NROW2 = NAME(NU(27),NU(27),NU(13),BLK) CALL BASIS(LGL,NROW1,NROW2)		00283000
******	NROW2 = NAME(NU(27), NU(27), NU(13), BLK)		00263700
	CALL BASIS(LGL.NRUW1.NROW2)		00243300
	NNX = FREE		33283933
	CALL ROWID	on a cross start .	30284030
	CALL MATURT(STRNTH([X]/1000.0) NROW1 = NAME(J1,J2,NU(12),NU(28))		30284230
77 21	NOOW1 = NAME(11, 12, NH(12), NH(28))	• • • • • •	0028430
	NROW2 = NAME(NU(29),NU(27),NU(13),BLK)		35.28443
	CALL DACICLICE NOOME NOOMS		10 20
	CALL ROWID		30.28450
	CALL MATWRT (CUST (IX))		3026470
220	CONTINUE		00204700
220	CONTINUE	entre tre	00284800
Ç	REQUIREMENTS LONGFALL COLUMN	VECTOR	00204400
, .Ç	EROTKENERIS COMMANDE COLUMN	AEC (OK	00285000
120	IF (SRLSW.LE.O.OR.SRLSW.GE.4) GO TO NVAR2 = NAME(NU(27), NU(21), BLK, BLK)	120	00285100
120	IF (SKLSW-LE-U-UK-SKLSW-UE-4) GU IU	130	(0285200
	NVAR2 = NAME(NU(27), NU(21), BLK, BLK) CALL COLID CALL BASIS(STR, NVAR1, NVAR2)		05 285305
	CALL CULID		00285400
	CALL BASIS(STR, NVAR1, NVAR2) NRUW1 = UBNAME(7,1) NROW2 = OBNAME(7,2)		00283300
	NROWI = UBNAME(7,1)		00283000
	NROWZ = OBNAME(7, Z)		00285700
	NNN = PLUS VAL = STRNTH(IX) + 0.001		03283600
	VAL = STRNTH(IX)* 0.001		00265935
	14 (245M-64.5) A4F - CO31(14)		00285000
	IF (SRLSW.EQ.3) VAL = 1.0		30280105
	CALL MATHRT(VAL)		30280200
	NROW1 = NAME(NU(28), 11, 12, 13)		00280300
	NROW2 - BLK		00280400
	NNN - PLUS		3024555
	CALL MATHRT(1.0)		G324360U
	NROW2 = NAME(VU(27), NU(21), NU(25), BLK)		ÚC 28570J
	NYN . NEG		0023030
	CALL MATHRT(1.0)		JUZBOYJU
	IF (AGGRSW.NE.1) GO TO 130		JU24733.
	IF (INDAGG.EQ.O) GO TO 130		0520710-

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MEMBER NAME CONGEN
DO 230 J = 1, INDAGG
                                                                              30287200
      J1 = MASK( [NNAGG(J,1),1 )
                                                                               JU2873JJ
      J2 = MASK( [NN4GG(J, 1), 2 )
      NROWL = NAME(J1,J2,NU(28),NU(29))
                                                                              00287535
      NROWS = NAME(NU(27), NU(27), NU(13), BLK)
      CALL BASTS(LGL, NRUW1, NROW2)
                                                                              00287700
      NNX = FREE
      CALL ROWID
                                                                               JJ2879UJ
      NNN = PLUS
                                                                              00288000
      CALL MATWRT( STRNTH(IX)/1000.0 )
NROW1 = NAME(J1,J2,NU(12),MU(28))
                                                                              30288133
                                                                              CLZBBZUG
      NROW2 = NAME(NU(29), NU(27), NU(13), BLK)
                                                                              00244304
      CALL BASIS(LGL, NROW1, NROW2)
                                                                              00284430
      CALL ROWID
      CALL MATWRTE COSTEIX) )
                                                                              00288600
      CONTINUE
230
                                                                              30288700
C
                                                                              00248800
Č
               FORCE SHORTFALL COLUMN VECTOR
                                                                              UU2449UJ
      IF (SFSSW.LE.O.UR.SFSSW.GE.4) GO TO 140
130
                                                                              JU28 11 JJ
      NVAR2 = NAME(NU(15), NU(28), BLK, BLK)
      CALL COLID
                                                                              00289300
      CALL BASIS(STR, NVAR1, NVAR2)
                                                                              00289400
      NROW1 = OBNAME(7,1)
                                                                              30287533
      NROW2 = OBNAME(7,2)
                                                                              00287600
      NNN = PLUS
      VAL = STRNTH(IX) + 0.001
                                                                              3028 /833
      IF (SFSSW.EQ.2) VAL = COST(IX)
IF (SFSSW.EQ.3) VAL = 1.0
                                                                              60293564
      CALL MATWRT(VAL)
                                                                              00293103
      NROW1 = NAME(NU(28), 11, 12, 13)
                                                                              00293200
      NROW2 = NAME(NULLS). BLK. BLK. BLK)
                                                                              3024330
      NNN = PLUS
                                                                              00290400
      CALL MATWRT(1.0)
                                                                              5029050u
      NROW2 = NAME( MU(15) + NU(28) + NU(25) + BLK)
                                                                              00296655
      NNN = NEG
                                                                              00290700
      CALL MATWRT' 1.0)
                                                                              00247800
      IF (AGGRSW-VE-1) GD TO 140
IF (INDAGG-EQ-3) GO TO 140
                                                                              00291000
      DJ 240 J = 1, INDAGG
                                                                              JJ2911JJ
      J1 = MASK( INNAGG(J, 1), 1 )
                                                                              00291200
      J2 = MASK(INNAGG(J,1),2)
      NROW1 = NAME(J1,J2,NU(28),NU(29))
                                                                              00291400
      NROW2 = NAME(NU(27), NU(15), NU(13), ALK)
                                                                              00291503
      CALL BASIS(LGL, NROW1, NROW2)
      NYX = FREE
CALL ROWID
                                                                              00291700
                                                                              30291833
      NNN = NEG
                                                                              00291933
      CALL MATHRE STRATHEIX 1/1000.0 1
                                                                              00292000
      ((85)UN-(51)UN-(51-11)3FAN = 1WORN
                                                                              30292200
      NROWZ = NAME(NU(29), NU(15), NU(13), BLK)
                                                                              00292201
      CALL MASISILG. . NRUWI . NRUWZI
                                                                              00245 200
      CALL ROWID
                                                                              33292433
      CALL MATHREE COSTIEX) )
                                                                              33292533
      CONTINUE
240
                                                                              00245990
C
                                                                              DU29276-
C
               FORCE LONGFALL COLUMN VECTOR
                                                                              JUL928JJ
Ċ
                                                                              20245407
```

MEMB	ER NAME CONGEN	
140		00293000
	NYARZ = NAME(NU(15),NU(21),BLK,BLK)	00537107
	CALL COLID	33293200
	CALL BASIS(STR, NVAR1, NVAR2)	00293300
	NVAR2 = NAME(NU(15), NU(21), BLK, BLK) CALL COLID CALL BASIS(STR, NVAR1, NVAR2) NROW1 = OBNAME(7,1) NROW2 = OBNAME(7,2) NNN = PLUS VAL = STRNTH(IX)* 0.001	33293400
	NROWZ = OBNAME(7, 2)	00293500
	NVN = PLUS	. 00293000
	VAL = STRNTH(IX) = 0.001 IF (SFLSW.EQ.2)	00293700
	IF (SFLSW.EQ.2) VAL = COST(IX)	00233800
	IF (SFLSW.EQ.3) VAL = 1.0	002939JJ
	CALL MATWRY(VAL)	00294005
	NROW1 = NAME(NU(28), 11, 12, 13)	00294100
	NROWI = NAME(NU(28), II, I2, I3) NROWI = NAME(NU(15), BLK, BLK, BLK)	30294200
	NYN = NEG	00294300
-	CALL NATURT(1.0)	00294430
	NROWZ = NAME(NU(15), NU(21), NU(25), BLK)	30294503
	CALL MATWREEL.O)	00294603
	IF (AUGKSW-NE-1) GU TU 10	00294700
	NNN = NEG CALL MATHRT(1.0) NROW2 = NAME(NU(15),NU(21),NU(25),BLK) CALL MATHRT(1.0) IF (AGGRSW-NE-1) GO TO 10 IF (INDAGG-EQ-0) GO TO 10 D3 250	30294833
	DJ 250 J = 1, INDAGS	00294900
	JI = MASK(ENNAGG(J, I), I)	J029500J
	J2 = MASK(INNAGG(J,1),2)	00562177
	NROW1 = NAME(J1,J2,NU(28),NU(29))	00295200
	NROW2 = NAME(NU(27),NU(15),NU(13),BLK)	00295305
	D) 250 J = 1, INDAGS J1 = MASK(INNAGG(J,1),1) J2 = MASK(INNAGG(J,1),2) NROW1 = NAME(J1,J2,NU(28),NU(29)) NROW2 = NAME(NU(27),NU(15),NU(13),BLK) CALL BASIS(LGL,NROW1,NROW2) NYX = FREE	_0029540J
	NYX = FREE CALL ROWID NYN = PLUS CALL MATWRT(STRNTH(IX)/1000.0) NROWI = NAME(JI.JZ.,NU(12),NU(28)) NROWZ = NAME(NU(29),NU(15),NU(13),BLK) CALL MASSS(IGL.NB(MAS),NEOM22	00295500
	CALL ROWID	J U2956UJ
	NYN = PLUS	30295703
	CALL MATWRT(STRNTH(IX)/1000.0)	00295800
	NROWI = NAME(JI.JZ.NU(12).NU(28)) NROWZ = NAME(NU(29).NU(15).NU(13).BLK)	00295930
	NROWZ = NAME(NU(29),NU(15),NU(13),BLK)	_30250333
	NROWZ = NAME(NU(29),NU(15),NU(13),BLK) CALL BASIS(LGL,NRUW1,NROWZ) CALL HOWID CALL MATWRT(COST(IX)) CONTINUE	00296100
	CALL ROWID	00296233
	CALL MATWRT(COST(IX))	JU2963JJ
	CALL MATURE (COST(1x)) CONTINUE	60246460
C		00296500
C	cecceccecceccecceccecceccecceccecceccec	00295600
CCCC	000000000000000000000000000000000000000	C0029670J
C	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00246800
C		00296900
. C	NEXT SUPPORT UNIT TYPE	33297333
•	CONTINUE	60297100
10	CONTINUE	30297203
C		30297333
C		00297460
CCCC	000000000000000000000000000000000000000	C3029750J
C		33297603
C		66297700
_	RETURN	00247860
C		JU2979UU
777	WRITE (6,1)	00254000
1	FORMATILHO, 13HSUPPORT UNIT . 14,41H REQUIRES MORE THAN 100 PERCENT	00244100
	OF ITSELF)	00294233
	STOP 0001	JU29830J
_C	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	00298400
	EVD	36298500
	SUBROUTINE (NATESTRI)	00244000
C		00248700

```
MEMBER NAME CONGEN
                                   6 JUNE 72
                                                                            00293800
              CONGEN
                                                                            00238300
         FORTRAN IV SUBROUTINE TO DETERMINE IN WHAT USER SPECIFIED UNIT 00299300
0000
        MIX/RATIO CUNSTRAINT(S) , IF ANY , COMBAT OR SUPPORT UNIT
                                                                            06294251
        TYPE KJ APPEARS
         NOTE - THIS IS THE SAME INMIX AS THE ONE THAT ACCEMPANYS
                                                                            UJ2993UJ
                                                                            00299405
        SURROUTINE COMBAT
                                                                            30239500
C
                                                                            00239600
      COMMON /DESCRP/STRNTH(760).DTM(760).COST(760)
                                                                            30299700
      COSTRAINT, (E,COI) SEXIMA SEXIMALES (1001) INDEED (1001)
                                                                            00244000
      COMMON /THPMEX/MXIND, [[MMEX(10]
¢
                                                                            ひし きいろうりい
      REAL MIXES
                                                                            33333133
      INTEGER DTM
                                                                            00300300
         DETERMINE EXTERNAL (DTM) IDENTIFICATION NUMBER OF THIS UNIT(KJ1003)000
      IDIM = DIM(KJ)
C
                                                                           ÚÚ 3UÚ 8ÚU
         SEARCH ARRAYS IMIXES, MIXES TO SEE IN WHAT MIX SPECIFICATIONS
                                                                            00300900
000
        IF ANY THIS UNIT APPEARS. STORE ANY APPEARANCES IN INTERMEDIATELICATION
        ARRAY ILMMIX (10).
                                          STORE THE NUMBER OF MIXES IN
                                                                            30331100
        WHICH THIS UNIT APPEARS IN VARIABLE MXIND.
                                                                           00301200
Č
                                                                           00301300
                                                                            30331433
      O = CMIXM
      INDEX = 0
DO 10 I = 1.NMIXES
                                                                           00401200
                                                                           00301600
20
      INDEX = INDEX + 1
                                                                            JJ 3J17JJ
      IF (IMIXES(INDEX).EQ.0)
                                GO TO 10
      IF (IMIXES(INDEX).NE.IDTM)
                                   GO TO 20
                                                                           00431930
      1 + CNIXM = GNIXM
                                                                           00302001
      IIMMIX(MXIND) = I
                                                                           30332100
                                                                           30332233
      G3 T0 20
10
      CONTINUE
                                                                           00302300
C
                                                                           UJ 30250U
      RETURN
C
                                                                           10302730
                                                                           00302800
      SUBROUTINE INAGGI LOTAL
C
                                                                           00303100
                                   6 JUNE 72
              CONGEN
         THIS SUBROUTINE DETERMINES IN WHAT SUPPORT UNIT ACGREGATE(S)
                                                                           .....
         THE INPUT (IDTH) SUPPORT UNIT IS TO BE INCLUDED.
                                                                           COMMON /AGG/AGGESW. MAGGE . AGGRETT 7501 . INDAGG. INNAGGT 20 . 21 . AGLAST 2510333 /00
      INTEGER AGGRSW, ASGRGT
                                                                           333340-
C
                                                                           00304000
      INDAGG = 3
      INDEX . 0
                                                                           3334100
      IAGGR = 0
                                                                           1220457
                                                                           30334330
10
      INDEX - INDEX + 1
                                                                           3334432
      IF (AGGRGT(INDEX).GT.999.DR.AGGRGT(INDEX).LE.O)
                                                          GO TO 20
                                                                           Prepre
```

C	IF (AGGRGT(INDEX).NE.IDTM) GO TO 10 INDAGG = INDAGG + 1	003046
	IF (AGGRGT(INDEX).NE.IDTM) GO TO 10	003047
	INDAGG = INDAGG + 1	003048
C		
20	IAGGR = IAGGR + 1 IF (IAGGR.GT.NAGGR) RETURN INNAGG(INDAGG+1,1) = AGGRGT(INDEX)	003050
	IF (IAGGR-GT-NAGGR) RETURN	023051
	INNAGG(INDAGG+1.1) = AGGRGT(INDEX)	103052
		003053
		U03U54
	GO TO 10	UU3U35
C		333056
6	EVD	003057
	SUBROUTINE TOLKYS	947770
C	TOLKYC IS A FORTRAN IV SUBROUTINE SUBPROGRAM THAT . WITH THE	203036
	ASSISTANCE OF SEVERAL UTILITY ROUTINES, GENERATES MATRIX COLUMN	303054
Ç	VECTORS WHICH REPRESENT PERMISSIBLE UPPER AND LOWER PERCENTAGE	
Č		
-	DEVIATIONS FROM REQUIREMENTS FOR SUPPORT UNITS BY COMBAT MODULE	
6	AND SUPPORT UNITS (FROM INDIVIDUAL ALLOCATION RULE COEFFICIENTS	
	REQUIREMENTS FOR SUPPORT UNITS BY COMBAT MODULES ARE STORED IN	
<u> </u>	THE FIRST NAME WORDS OF FOMGEN COMMON ARRAY COEF (6500). MAXIMUM	
	ALLOWABLE DEVIATIONS BELOW THESE	303066
C	REQUIREMENTS IN TERMS OF DECIMAL FRACTIONS OF THOSE REQUIREMENT	S Jû 306 7
	AND MAXIMUM DEVIATIONS ABOVE	003068
C	EACH REQUIREMENT ARE STORED IN ARRAY TOLS(2350.3)	003069
5	REQUIREMENTS FOR SUPPORT UNITS BY SUPPORT UNITS ARE STORED IN	JU 3U 70
	THE WORDS NANZ+1 THROUGH NANZ+NBNZ OF	003071
5	COMMON ARRAY COEF(6500) . MAXIMUM DEVIATIONS PERMITTED BELOW	003072
	THESE REQUIREMENTS AND	JU3J73
Ċ.	MAXINUM DEVIATIONS PERMITTED ABOVE EACH REQUIREMENT ARE STORED	
	IN COMMON ARRAY TOLS(2350.3)	003075
	COMMON INTEGER VARIABLE TOLRSW IS A SWITCH THAT CENTROLS	003076
	WHETHER OR NOT REQUIREMENT TOLERANCE IS TO BE PERMITTED AT ALL	
	IN A MODEL. IF TOLRSHED SUBROUTINE TOLRNO IS NOT CALLED FROM	003078
	THE MAIN PROGRAM ROUTINE FOMGEN. IF TOLKSW-1 TOLKNO IS CALLED	003079
	ONCE FROM ROUTINE FOMGEN.	003019
-	WHEN TOLRNC IS CALLED, ONE MUDEL COLUMN VECTOR IS GENERATED	003081
Ç	FOR EACH PERMITTED DEVIATION (LOWER AND/OR UPPER) FROM EACH	
9	POSITIVE SUPPORT UNIT REQUIREMENT. IF FOR A POSITIVE RE-	003083
:	QUIREMENT A PERMITTED DEVIATION IS 0.0 , NO COLUMN VECTOR	003084
	IS GENERATED.	003085
	THE STRUCTURE OF THE COLUMN VECTOR REPRESENTING EACH	003086
•	PERMITTED REQUIREMENTS DEVIATION IS SPECIFIED BY THE COMMENTED	
=	INSTRUCTIONS OF THIS SUBROUTINE.	
	COMMON /ALPHA/NU(35)	073094
	COMMON /BET/STR.LGL	003690
	COMMON /ALPHA/NU(35) COMMON /BET/STR.LGL COMMON /DESCRP/STRNTH(760).DTM(760).COST(760) COMMON /NAMES/NVAR1,NVAR2.NROW1,NROW2.NNX.NNN CUMMON /REGFAC/COEF(80C0).KJCOEF(80C0).NANZ.NBNZ	003041
	COMMON /NAMES/NVAR1,NVAR2,NROW1,NROW2,NNX,NNN	203785
		003093
	COMMON /REGTOL/TOLRSW, TOLS(2350, 31, NTOLS, ALRTYP	063344
	COMMON /RESOLU/NCOMBT.NSUPRT.NPRAM.NPRAMU	0033450
	COMMON /SIGN/NEG.PLUS.ZERO.BLK.FREE	003096
:		003397
-	INTEGER TOLASM.STR.PLUS.ZERJ.BLK.DTM.ALRTYP.FRFE	303098
	REAL LUTOL	0030990
	The server of th	003100
		0031010
		~~~~~

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MEMBER NAME CONGEN
                                                                            33313433
         EXAMINE EACH OF THE NORMBT COMBAT MODULES THAT MAY PUSSIBLY
                                                                            00310503
        REQUIRE SUPPORT UNITS J BELOK.
                                                                            CUBLIBOU
                                                                            00310730
      IPOINT = 1
                                                                            33313830
      DD 10 1 = 1. NCOMBT
                                                                            00310900
      IX = DTM(I)
                                                                            33311333
      CALL BRK3DG(1X, 11, 12, 13)
                                                                            303...133
         EXAMINE EACH OF THE NSUPRT SUPPORT UNITS POSSIBLY REQUIRED BY
                                                                           00311300
        COMBAT HODULE I ABUVE.
                                                                            00311500
20
      CALL KJUNPK(1, IPDINT, IPTX, J)
                                                                            LLOLIEUU
      IF (IPTX.NE.DTM(I)) 30 TO 10
                                                                            00311700
                                                                            30311830
         IF SUPPORT UNIT J IS NOT REQUIRED BY COMBAT MODULE 1.00 NOT
                                                                            00311905
        ATTEMPT TO GENERATE ANY TOLERANCE HERE, LOOK AT THE NEXT SUPPORT DOGLECOOL
C
        UNIT TYPE.
                                                                            00312100
C
                                                                            00312200
      D3 80 L = 1, VIOLS
                                                                            01312300
      CALL KJUNPK(Z,L,IXX,JXX)
                                                                           00312400
      IF (IPTX.NE.IXX.DR.J.YE.JXX)
                                      GO TO 80
                                                                            00312503
         ATTEMPT TO GENERATE FIRST ANY PERMISSION OF DEVIATION BELOW
                                                                            30312135
        THE REQUIREMENT -- COFFIIPOINT -- AND THEN ANY PERMISSIBLE UPPER
C
                                                                            00315800
        DEVIATION.
                                                                            03312407
C
                                                                            30313300
      DD 30 K = 1.2
                                                                           00313100
C
                                                                           UU3132UJ
         IF NO DEVIATION IS PERMITTED, DO NOT GENERATE A MATRIX COLUMN.
                                                                           JUSTSJO
Ċ
                                                                           DO 31 3400
                                           CO TO 30
      IF (K.EQ.1.AND.TULS(L,2).LE.O.O)
                                                                           OUCETFOO
      IF (K.EQ.2.AND.TDLS(L,3).LE.O.O)
                                           GO TO 30
                                                                           U031160J
C
                                                                           03313700
         A PERMISSIBLE DEVIATION HAS BEEN DETECTED, GENERATE A CCLUMN
                                                                           00313600
C
        VECTOR REPRESENTING IT.
                                                                           00313901
              PREPARE THE NUMBERS OF THIS COMBAT MODULE AND SUPPORT
                                                                           00314100
             UNIT TYPE (I AND J) FOR USE IN THE NAME OF THE COLUMN.
C
                                                                           33314253
C
                                                                            30314333
                                                                           00314400
      CALL BRK3DG(J, J1, J2, J3)
                                                                           03314503
              GENERATE COLUMN VECTOR NAME BY A CALL TO FUNCTION NAME
                                                                           30314634
                                                                           Ju31470J
      KX = NU(21)
                                                                           00314800
      IF (4.EQ.2)
                    KX = VU(30)
                                                                           30314900
      NVAR1 = NAME( [1, [2, [3, MU(29) ]
                                                                           22319222
      NVAR2 = NAME(J1,J2,J3,KX)
                                                                           UUSLOLUU
                                                                           00315200
C
              ENTER THIS CULUMN INTO THE LIST OF MODEL COLUMNS BY A
                                                                           الكذفاذنا
             CALL TO SUBROUTINE COLID.
                                                                           00315403
C
                                                                           ひょうしょうしょう
      CALL COLID
                                                                           LLUCIELL
C
                                                                           00315700
              IF THIS CULUMN REPRESENTS PERMISSIBLE LOWER CEVIATION.
                                                                           JU3154JJ
             ENTER THIS VECTOR INTO THE ADVANCED START BASIS BY A
                                                                           وروداذتن
             CALL TO SURROUTINE MASIS.
                                                                           UU31600J
                                                                           Costaldi
```

```
MEMBER NAME CONGEN
              IF (K.EQ. 1) CALL BASIS(STR. NVARI, NVARZ)
                                                                                                                                                                 36316203
                                                                                                                                                                 7727227
                             CONNECT THIS COLUMN VECTOR TO THE ONE REPRESENTING COMBAT JU316403 MODULE I--THE OVE REPRESENTING ALL REQUIREMENTS FOR SUPPORTUJ316503 UNITS BY COMBAT UNIT 1. THIS COUPLING IS BY A POSITIVE OCCUPANT OF THE COMBAT COMBAT CONTRACTOR OF THE COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT COMBAT CO
                           MATRIX COEFFICIENT IN A SPECIAL MODEL ROW. THE COLUMN
                           OF REQUIREMENTS TO WHICH THIS COLUMN IS COUPLED HAS A -1.0 COFFFICIENT IN THIS RCW. THE ROW TYPE IS . THE
                                                                                                                                                                 JUSISBUJ
                                                                                                                                                                 00316900
                            MATRIX COEFFICIENT HERE IS THE RECIPROCAL OF THE MAXIMUM
                                                                                                                                                                 3317333
                           DEVIATION ALLUWED-TOLS(L,2) OR TOLS(L,3). GENERATION
                                                                                                                                                                 33347133
                           OF THE COEFFICIENT IS BY CALLS TO ROUTINES NAME, ROWED
                                                                                                                                                                 00317233
                           AND MATHRE.
                                                                                                                                                                 3031/330
                                                                                                                                                               _ 33317400
             NROW1 = NAME([1, [2, [3, NU(29)]
                                                                                                                                                                 00317503
             NROW2 = NAME(J1,J2,J3,NU(33))
              NNX - PLUS
                                                                                                                                                                 JJ 31 7 7UJ
              CALL ROWID
                                                                                                                                                                 3331740u
              NNN = PLUS
                                                                                                                                                                 00317933
              VAL = 1.0 / TOLS(L,K+1)
                                                                                                                                                                 نده که اختر
              CALL MATWRT(VAL)
                                                                                                                                                                 03318233
                             GENERATE A COEFFICIENT IN THE MODEL ROW FOR SUPPORT UNIT J. UDJ. B. DUJ
                           THIS COEFFICIENT WILL REDUCE THE REQUIREMENT FOR SUPPORT UNIONAL 400 J BY COMBAT MODULE I IF THIS COLUMN VECTOR REPRESENTS JUBBLE 300 318 500
                           PERMITTED LOHER DEVIATION FROM THE REQUIREMENT -- IN THIS
                                                                                                                                                                 33318033
                           CASE THE COEFFICIENT = -COEF(IPDINT).IF THIS CCLUMN REPRESENTS UPPER DEVIATION, THE COEFFICIENT-- = COEF(IPDINT) --
                                                                                                                                                                33316700
                                                                                                                                                                 33314833
Č
                            IS BY CALLS TO ROUTINES NAME - ROWID AND MATERT .
                                                                                                                                                                00314900
                                                                                                                                                                 30319300
             NROW1 = NAME(NU(28), J1, J2, J3)
             NROW2 - BLK
                                                                                                                                                                 01119201
             NYX = PLUS
                                                                                                                                                                00419300
             CALL ROWID
                                                                                                                                                                 J0319400
          ! NYN = PLUS
             IF (K.EQ.1)
                                        NNN = NEG
                                                                                                                                                                03319603
             CALL MATURT(COEF(IPDINT))
                                                                                                                                                                03319700
CC
                                                                                                                                                                00314900
30
             CONTINUE
80
             CONT INUE
                                                                                                                                                                JJ32u10J
              IPOINT = IPOINT + 1
                                                                                                                                                                 30320200
             GO TO 20
                                                                                                                                                                00320300
10
             CONTINUE
Ċ
                     EXAMINE EACH OF THE NSUPRT SUPPORT UNITS THAT HAY PCSSIBLY
                  REQUIRE SUPPORT UNITS J BELOW.
                                                                                                                                                                33323903
C
             IPOINT = NANZ + 1
                                                                                                                                                                30321130
             DO 50 I = 1, NSUPRT
                                                                                                                                                                 11121201
             IX - DIMI I + NCOMBT )
                                                                                                                                                                U0321300
                                                                                                                                                                30321403
             CALL BRK30G(1X-11-12-13)
                                                                                                                                                                30321333
CCC
                    EXAMINE EACH OF THE NSUPRT SUPPORT UNITS POSSIBLY REQUIRED BY
                                                                                                                                                                33341434
                  SUPPORT UNIT I ABOVE.
                                                                                                                                                                J3321703
Ċ
                                                                                                                                                                30321600
60
             CALL KJUNPKII, IPUINT, IPTX. JI
                                                                                                                                                                00341930
```

```
MEMBER NAME CONGEN
       IF (IPTC.ME.STM(I+NCOMBTH)
                                    GO TO 50
                                                                              22255201
                                                                              00322103
          IF SUPPORT UNIT J IS NOT REQUIRED BY SUPPORT UNIT 1.00 NOT
5
         ATTEMPT TO GENERATE ANY TOLERANCE HERE, LOOK AT THE NEXT SUPPURT
                                                                              LLESSEN
        UNIT TYPE.
                                                                              33322433
C
                                                                              30362530
      DO 90 L . 1. NTOLS
                                                                              322000
      CALL KJUNPKIZ, L, IKK, JXX)
                                                                              22365127
      IF (IPIX.NE.IX4.JR.J.NE.JKX)
                                        60 10 90
CCCCC
                                                                              ひいうととりひょ
          ATTEMPT TO GENERATE FIRST ANY PERMISSION OF DEVIATION BELOW
                                                                              しじょうしい
        THE REQUIREYENT -- COEFITPOINT)-AND THEN ANY PERMISSIBLE UPPER
                                                                              CUTSTON
        DEVIATION.
                                                                              00341203
                                                                              UJ323300
      00 70 K . 1.2
                                                                              33323400
C
          IF NO DEVIATION IS PERMITTED, DO NOT GENERATE A MATRIX COLUMN.
                                                                              بدو د د د د د
Č
                                                                              33357103
      IF (K.EQ.1.AND.TULS(L.2).LF.O.O)
                                            GO TO 70
         (K.EQ.2.AND.TOLS(L.3).LE.0.0)
                                            GO TO 70
                                                                              77757
C
                                                                              7775 -077
          A PERMISSIBLE DEVIATION HAS BEEN DETECTED GENERATE A COLUMN
                                                                              3032-100
0000
                                                                              00324300
               PREPARE THE NUMBERS OF THESE SUPPORT UNIT TYPES (I AND J) 00324400
              FOR USE IN THE NAME OF THE COLUMN.
¢
                                                                              33324633
      CALL BRK3DG(J, J1, J2, J3)
                                                                              U332+70-
C
                                                                              3032483
CC
               GENERATE COLUMN VECTOR NAME BY A CALL TO FUNCTION NAME
                                                                              15324950
                                                                              60325064
      KX . NO[51]
                                                                              0032>100
      1F (K.EQ.21
                     KX - NU(30)
                                                                              ひいろろうとひょ
      NVAR1 - NAME (11,12,13, NU(29))
                                                                              20252322
      NVAR2 - NAME(J1,J2,J3,KK)
                                                                              00 42540u
C
                                                                              00325563
               ENTER THIS COLUMN INTO THE LIST OF MODEL COLUMNS BY A
2111
                                                                              00323000
              CALL TO SUBROUTINE COLID.
                                                                             06 12 2 700
                                                                              00325403
      CALL COLID
                                                                              70752477
C
                                                                              0032000
               IF THIS COLUMN REPRESENTS PERMISSIBLE LOWER DEVIATION.
                                                                              33340130
              ENTER THIS VESTOR INTO THE ADVANCED START BASIS BY A
                                                                              77 7 * * 5 77
              CALL TO SUBROUTINE BASIS.
                                                                              03 12 0 103
C
                                                                              ひひるとももひひ
      IF (K.EQ.1) CALL BASIS(STR. HVAR), NVAR2)
                                                                              33320331
C
C
               CONNECT THIS COLUMN VECTOR TO THE ONE REPRESENTING SUPPORTOUS 2010
                    1-- THE OVE REPRESENTING ALL REQUIREMENTS FOR SUPPORTUJIZADAJA
              JINL
              UNITS BY SUPPORT UNIT EATHIS COUPLING IS BY A POSITIVE
C :: :
                                                                             17750277
             MATRIX CUEFFICIENT IN A SPECIAL MODEL ROW. THE COLUMN
                                                                             JU 12 100 J
            OF REQUIREMENTS TO WHICH THIS COLUMN IS COUPLED HAS A -1.0 COEFFICIENT IN THIS ROW. THE ROW TYPE IS . THE
                                                                              30327130
                                                                             22251277
             MATRIX COEFFECIENT HERE IS THE RECIPHOCAL OF THE MAKINUM
                                                                             UJ 327 30J
             DEVIATION ALL THEO-TOLSIL. 21 OR TOLSIL. 31. GENERATION
                                                                              35361431
            OF THE COEFFECIENT IS BY CALLS TO ROUTINES NAME , ROWLD
                                                                              10121717
            AND MATHRE.
                                                                             35327633
                                                                             00 12 1701
```

```
MEMBER NAME CONGEN
                                                                               00327800
       NADWL - NAME(11.12.13. NU(29))
       NROW2 - MAME(J1.J2.J3. NU(33))
                                                                               03321933
                                                                               3036033
       MIE - PLUS
       CALL ROUID
                                                                               30 346 100
       MIN - PLUS
                                                                               30 32 4233
       VAL - 1.0 / TOLSIL.K+11
                                                                               10154171
       CALL MATURTIVALI
C
                                                                               00424533
              GENERATE A CHEFFICIENT IN THE MODEL ROW FOR SUPPORT UNIT J. JJJJJOB
             THIS COEFFICIENT WILL REDUCE THE REQUIREMENT FOR SUPPORT UNID 3444 TO J BY CUNSAT MODULE I IF THIS COLUMN VECTOR REPRESENTS 00 32400 J
             PERMITTED LOJER DEVIATION FROM THE REQUIREMENT -- IN THIS
                                                                               3434443
             CASE THE CUEFFICIENT - - COEFFICIENT - IN THIS COLUMN REPRE- 33324303 SENTS UPPER DEVIATION, THE COEFFICIENT -- COEFFICIENT -- 33324333 INCREASES THE REQUIREMENT FOR SUPPORT UNIT J. CENERATION 30324333
             IS BY CALLS TO ADUTINES NAME, ROWID AND MATURE.
                                                                               0012430-
                                                                               UU32940J
                                                                               0232451
      MROWL - NAME (NUIZB), JL, '2, J3)
                                                                               4677 4007
      MEONS . BFK
                                                                               06 12 + 700
      NYE . PLUS
      CALL ROWID
                                                                               72754677
      NNN . PLUS
                                                                               06333003
       IF (K.60.1)
                       - NEG
                                                                               30 22 1133
      CALL MATURFICOEFIT DINTII
                                                                               3033333
C
                                                                               UC 33U 30J
2
                                                                               10116435
70
      CONT INUE
                                                                               いしょうしょうし
90
      CONTINUE
                                                                               2211227
C
                                                                               2020220
      IPOINT . IPOINT . 1
      60 10 60
                                                                               06.13-43.1
50
      CONTINUE
                                                                              06 331003
                                                                              33331133
UGAAL BUU
C
                                                                               30331430
         RETURN CONTROL TO THE MAIN ROUTINE FORGEN
                                                                               بدد . د د ده
č
                                                                              2224402
      RETURN
                                                                               30331703
C
                                                                              20111000
                                                                              44331433
                                                                               JJ 336 JUJ
                                                                               30331133
0000000000
               CONGEN
                                     & JUNE 72
                                                                              COSSEECO
                                                                              2222532
         UNIMIE IS A FOATRAN IV SUBROUTINE SHEPAGGRAM THAT MAY
                                                                               1011401
        GENERATE COLUMN VECTORS REPRESENTING OFSIRED OR NICESSARY
        UNIT MIRES HITHIN & FORCE. IF ANY UNIT MIRES MAY BE REPRESENTED DOSAGOOD
        FROM THE MAIN ADUTINE FORGEN.
                                                                              TO 225 477
                                                                              06 412 Wil
                                                                              3033300
      COMMON /ALPHA/NJI 351
                                                                              33333130
      COMMON /MET/STRILGL
                                                                              5333230
      COMMUN /MIT/UTITSH, NMIRE S. MITE SC100.31.1MITE SC1001
                                                                              Luctory
      COMMON /HAMES/HVARI.NVARZ.NROWL.NGOWZ.NNF.NNN
                                                                              30333436
      COTTON /SIGN/YEG, PLUS, 2 FAO. BLK. FREE
                                                                              -641116
```

```
MEMBER WINE CONGEN
 C
                                                                             3033343
       INTEGRA NEG. PLUS. ZERO. BLA. FREE
                                                                             JO 1 1 1 16 J
       INTEGER UNIESE
                                                                              30333600
       INTEGER STR
                                                                              333395.
       REAL MIKES
                                                                             00334000
 C
                                                                             30004200
                                                                             2222457
C
                                                                             ינו בנננם
       IF INTIKES. CO. OL
                           SETURN.
                                                                             رنه و د د ن د
C
          UNE CILUMN VICTOR IS GENERATED TO EXPRESENT EACH OF THE
                                                                             3:3300-1
         MAIRES USER SPECIFIED UNIT MITES.
                                                                             30334750
 C
       INDEE . O
                                                                             シンショ アレン
       00 10 1 . 1.NAIEFS
                                                                             ......
C
                                                                             reserve
       CALL BAK SOGII. IL. IZ. ISI
                                                                             30335200
                                                                             ......
                GENERATE COLUNN NAME BY CALL TO FUNCTION NAME.
                                                                             10112400
C
       WART . MAMEL WULZZI. NUCLOS, NUCLOSS. 115
                                                                             LOSECLUO
       NVAR2 . NAMELIZ, 13.84. . ...
                                                                             00335700
C
                                                                             13335632
               ENTER THIS COLUMN INTO THE LIST OF MODEL COLUMN NAMES
                                                                             JU 1 1 2 900
CC
              BY A CALL TO SUSPOUTINE COLID.
                                                                             20330030
                                                                             relection
       CALL COLID
                                                                             J013023J
. C
                                                                             ---
               FATER THIS COLUMN INTO THE LIST OF CANDIDATE PASIS
200
                                                                             2011000
              VECTORS BY A CALL TO SUMMOUTING MASIS.
                                                                             ......
                                                                             0633-005
       CALL MASISISTR. WYARI. AVARZI
C
                                                                             J033000-
                          SAVE ADDRESS OF THE FIRST ENTRY OF THIS HIE.
C
                                                                             06110933
       INDER - INDER + 1
                                                                             36331300
20
       INDIA . INDEE . I
                                                                             3333710.
       15 (IMITESTINDECT. (3.0)
                                  GO TO 40
                                                                             0011120-
       JA . IMTRESCINGETT
                                                                             30331300
       CALL BRE DOGIJE.JI.J2.J31
                                                                             333343.
C
                                                                             W11750-
       MACH: - MAMEE VUEZZI. 11. 12. 131
                                                                             3033760.
       MEG. 2 - MEREL RULDS 1. 31. 32. 331
                                                                             20237122
       NYE . DLA
                                                                             30 111000
       CALL 40HID
                                                                             3-11743-
       NVN . PLUS
                                                                             34336-31
       CALL MATWATINIES (INDEE, 11)
                                                                             3033663.
C
               LOUR AT FUSSIBLE IMPER AND LINER TOLERANCE CA THIS ENTRY
                                                                             ---
              OF THIS UNIT MIE SPECIFICATION.
                                                                             .....
                                                                             W011450.
       IF INTESTINATE, 21.LE.O. D. AND. METERSTINDEE. 31.LE.O. OF GC TO 20
                                                                             ---
       NAME + NAME ( YUE 271.11.12.131
                                                                             U333676.
       MARKET . MAMELMARTHINES
                                                                             3011000-
       WYE . PLUS
                                                                             30336900
       CALL MUITO
                                                                             . دن و دو د د
       NAM . NEG
                                                                             3011410-
       CALL MATERIALION
                                                                             00337400
                                                                             .66 46660
```

```
MEMBER NAME CONGEN
      G3 TO 23
                                                                         60339400
C
                                                                         2222952
              CALL SUBROUTINE MIXTOL TO GENERATE ANY USER SPECIFIED
                                                                         0044400
Č
             TOLERANCES ON THE ENTRIES OF THIS UNIT.
                                                                         22 2 3 9 2 2 2 2
C
                                                                         30119830
40
      CALL MIXTOL(11,12,13,1NOEX1,1NOEX)
                                                                         60134400
C
                                                                         36 143004
10
      CONTINUE
                                                                         93343100
C
                                                                         00 1-6201
C
                                                                         66340300
      RETURN
                                                                         Chenes CC
C
                                                                         773-727
                                                                         UUU C P & UUU
      SUBROUTINE MIXTOLIII. 12. 13. INDEXI. INDEXI
                                                                         بدا دود ده
C
              CONGEN
                                  6 JUNE 72
                                                                         101-14Ju
                                                                         004-1900
         MINTOL IS A FORTRAM IV SUBMOUTINE THAT IS CALLED BY SUMMOUTINE 30341633
        UNIMIR ONCE AFTER GENERATION OF EACH USER SPECIFIED UNIT MIX
                                                                         22341121
        COLUMY VECTOR TO GENERATE USER SPECIFIED LOWER AND HPPER
                                                                         36341203
        TOLERANCES ON EACH FHTRY OF EACH MIX. MIXTOL GENERATES 1 OR 2 UU 3-13-00 ILOWER AND/OR UPPER TOLERANCES COLUMN VECTORS FOR EACH ENTRY OF 50-3-1-00
        A SPECIFIED MIX IF THE USER INPUT TOLERANCEIS) IS (ARE) GREATER 66341500
        THAN O.O . AS FOR PERMISSIBLE UPPEP AND LOWER DEVIATIONS FROM
                                                                         03 2-1003
        ALLOCATION RULE CREFFICIENTS LAS GENERATED BY SUBRCUTINE TOLRNCIDURATOU USER TOLERANCE SPECIFICATION IS IN TERMS OF DECIMAL FRACTIONS - OCIO-1000
        OF THE MATRIX COEFFICIENT (HERE UNIT MIX ENTRY) ALLOWED AS
                                                                         1091-601
        MAXIMUM DEVIATIONS FROM THE COEFFICIENT.
                                                                         33342333
CCCCC
                                                                         00342100
              11.12.13...THE THREE-DIGIT SEQUENCE NUMBER OF THE UNIT
                                                                         00245500
                         MIX SPECIFICATION OF REFERENCE.
                                                                         00342300
                      THAT CONTAINS SPECIFICATION OF THE FIRST
                         ENTRY AND ITS PERMISSIBLE TOLERANCE IN THIS
                                                                         LLASOENL
                         UNIT MIK.
                                                                         00342703
                      ... THE CURRENT POSITION IN ARRAYS IPINES(100) AND JUJ42800
              INDEX
                         MIRES(100,3) IN SUBROUTINE UNIMIX--THE WORD
                                                                        07345473
                         CONTAINING THE ALL-ZERO TERMINATOR OF THIS
11101101
      COMMON /ALPHA/NU(35)
                                                                        60343403
      COMMON /BET/STR.LGL
                                                                        00 14 1500
      COMMON /MIT/UNITSHING SAINF SHIRE STIDDING IN MERCED IN
                                                                        33343635
      COMMON /NAMES/NYARI.NYARZ.NROWI.NROWZ.NNK.NNA
                                                                        003-3733
      COMMON /SIGN/NEG.PLUS.ZERO.BLK.FREE
                                                                        00343400
C
                                                                        ししきゃうりょう
      INTEGER NEG. PLUS, ZERO, BLK, FREE
                                                                         33344331
      IN TEGER STR
                                                                        00 444 104
      INTEGER UNIXSW
                                                                         30344333
      REAL MIXES
C
                                                                        DU 1- - 40U
303-4830
Cit
         LOOK AT EACH FATRY OF THIS UNIT HIX SPECIFICATION.
                                                                         56344403
                                                                        00345000
      INDEX2 = INDEX - 1
                                                                        JU3451JJ
```

```
HEMBER NAME CONGEY
     DO 10 1 . INDEXI.INDEX2
                                                                        03242233
C
                                                                        30 300 300
C
         LOOK AT POSSIBLE UPPER AND LOWER TOLERANCES ON THIS MIT ENTRY.
                                                                        1456 66 11
                                                                        LLCCOLUD
      00 20 1 . 2.1
                                                                        36342033
C
                                                                        ......
         IF A POSITIVE TOLERANCE IS SPECIFIED.GENERATE A CCLUMN VECTOR
                                                                        30342000
                                                                        30342700
Č
                                                                        00342600
      IF [MIRES[1,J].LE.J.O) 60 10 20
                                                                        11100611
C
                                                                        221-62-1
     KE . IMINESCLI
                                                                        LU 1 - - 10 -
     CALL BRE SOCIARIRI, KZ.KSI
                                                                        ********
C
                                                                        いろろっつちょう
      JE . NU( 30)
                                                                        00 140-00
      1F (J.60.31
                    JE . NUT 211
                                                                        66340733
C
                                                                        ددهدودرد
     NVARL - NAMFEMULZZJ. 11.12.13)
                                                                        30 1-043-
     MVARZ . MAMELJE,KI,KZ,KTI
                                                                        06341003
      CALL CULID
                                                                        00347133
                   CALL BASISISTR, NVARI, NVARZI
      IF (J.EQ. 2)
                                                                        00371200
                                                                        00347330
C
              INTERSECT MIX SPECIFICATION ROW FOR THIS ENTRY WITH A
                                                                        00397433
             POSITIVE MIK ENTAY IF THIS COLUMN REPRISENTS UPPER
                                                                        10c1+106
CC
             TOLERANCE OR A MFGAILVE MIN ENIRY IF IT REPRESENTS LOWER
                                                                        60347633
             TOLERANCE.
                                                                        -61106
                                                                        3334 7000
     MROWL . MAMEINULZZI. 11.12.13)
                                                                        20347900
      NROW2 - NAME(NUISSI,K1,K2,K3)
                                                                        30346330
      WYK . BLA
                                                                        COLPERUO
      CALL ROWID
                                                                        36348233
      NYY . PLUS
                                                                        00144301
                    NYY . NEG
      IF (1.63.3)
                                                                        30346403
     CALL MATWRTIMITES (1.13)
                                                                        33346533
                                                                        343+4044
                                                                       U0340733
              INTERSECT A MODEL ROW THAT COUPLES THIS TOLFRANCE COLUMN
CCCC
             VESTUR TO THE MIR SPECIFICATION COLUMN VECTOR. THE NAME
                                                                       J344832
             OF THIS ROW IS THE SAME AS THAT OF THIS COLUMN. THE
                                                                        30346700
             COEFFICIENT IS THE RECIPROCAL OF THE USER SPECIFIED DECIMALDUSAYDUS
CC
             FRACTION.
                                                                       003.413.
                                                                        30241250
     NROW1 - NAME(NU(221.11.12.13)
                                                                       00144301
                                                                       06349403
      MRON2 - NAMEINULZ93.K1.K2.K33
                                                                       303+9533
     NNX - PLUS
                                                                        30349635
      CALL RONID
                                                                       GU 14 1700
      NNN - PLUS
      CALL MATARTIL. O/MIXESTI. JII
                                                                        303.9800
                                                                        10349411
23
      CONTINUE
                                                                        3635 3000
     CONTINUE
                                                                       36353103
10
                                                                        ひろうろをシン
ひひょうょうりょ
C
                                                                       ひじろうひらい
      RETURN
                                                                       30323730
C
                                                                       LLBLCLUU
      END
                                                                       ひじょうひりひひ
```



```
MEMBER NAME CONGEN
       SUBMOUTINE SUBSTI
                                                                             30351006
                                                                             30351203
                                     6 JUNE 72
               CONGEN
                                                                             00351230
 200
                                                                             13221233
          SUBSTI IS A FURTRAN IN SUMPHUTINE SUBPROGRAM THAT IS CALLED
                                                                             00331400
         ONCE FROM THE SELL ROSTINE FORGEN IF ANY SUPPORT UNIT SUBSTITU- 30324500
 C
         TRONS ARE ALLOWED AT ALL CROSS . 11 TO GENERATE THE SUB-MATRIX JUSTICIA
 0000
         OF COLUMN VECTORS REPRESENTING PERMISSIBLE SUPPORT UNIT SUBSTI- JUDGITOU
         TUTIONS IN SATISFACTION OF REQUIREMENTS FOR SUPPORT BY OTHER
                                                                             LCFicerr
         UNITS.
                                                                             UUJ3200U
                                                                             33352133
       COMMON /ALPHA/NULJSI
                                                                             ひいろつととろい
       COMMON INAMESINVAKI, YVARZ, NROKI, NROWZ, NNK, NNN
                                                                             00 45 2 400
       COMMON /SIGN/NEG.PLUS. ZERO. HLK.FRFF
                                                                             79725607
       COMMON /SPTSUB/SUASW.SUB(100), KJSUB(100,21,NSUBS
                                                                             JO 1725JU
 C
                                                                             3612630
       INTEGER SUBSA. PLUS. JERO. BLK. FREE
                                                                             JU 2227JJ
 C
 Č
                                                                             00 122 9UU
         ONF COLUMN VECTOR IS GENERATED FOR FACH OF NSUBS-PERMISSIBLE SUBSTITUTIONS. (MSUBS * 100)
CCC
                                                                             30123100
                                                                             2277500
                          RE TURY
       IF INSUBS.LE.O.
       D3 10 1 - 1. 45035
                                                                             LESECTO
                                                                             13123501
.00
               GENERATE THE COLUMN VECTOR NAME.
                                                                             0033730
                                                                             3033300
       IX - KJSUNII.11
       CALL BAK 30G(1X,11,12,13)
                                                                             G045490J
       JK . KJSUALI.21
                                                                             36354001
       CALL BRK3DG(JX,J1,J2,J3)
                                                                             00354100
       NVAR1 - NAHELLL.12.13.NU(281)
                                                                            00334200
       IEL, SL, IL, III)UY JAMAN . SAAVN
       CALL COLID
                                                                             01354403
                                                                             UC3>450J
0000000
               THE NUMBER OF SUPPORT UNITS OF TYPE KISUBILLI THAT PAY
                                                                          BEJU3546JJ
              DIVERTED FROM SATISFACTION OF REQUIREMENTS FOR IT TO
                                                                             03354703
              SATISFACTIONOF REQUIREMENTS FOR SUPPORT UNIT MUSUBILIZE
                                                                            00 33 4 8 OJ
              IS DEBITED FROM ITS AVAILABILITY BY A +1.0 COEFFICIENT
                                                                            UJ33493J
              IN ITS MODEL ROW.
                                                                             しじさっさいしょ
č
                                                                             00355100
       NROW1 - NAME(NU(28), [1, [2, [3]
                                                                             30355200
       NROW2 . BLK
                                                                             ひいろっろろう
       NNK - PLUS
                                                                             003>>400
       CALL ROALD
                                                                             03355503
                                                                             LUBECEE
       NNN . PLUS
       CALL MATHRT (1.0)
                                                                             03335733
Conc
               THE NUMBER OF SUPPORT UNITS DIVERTED SATISFY SOME FRACTIONS 0355403
              SUBLIT OF THE RESIDERCHENTS FOR UNIT KUSUBLI-2) BY A
              -SUB(1) ENTRY IN THE MODEL NOW FOR UNIT KUSUB(1,2).
                                                                             00356100
                                                                            00000200
       NROW1 . NAME(NU(28), J1, J2, J3)
                                                                            ひりょういきじょ
                                                                            UJ33343J
       NROWZ . BLK
                                                                             りょうこうじょ
       NYX = PLUS
       CALL ROWID
                                                                            COSSOCU
                                                                             14320744
       NNN = NEG
```

RAC

```
MEMBER NAME CUNGEN
      CALL MATHATES JOE 111
                                                                           1015-611
C
                                                                            Libertol
                                                                           0015/030
10
      CONTINUE
                                                                           3335713-
                                                                           00127441
C
                                                                           0033/300
      RETURN
                                                                           UC 47 < 100
C
                                                                           30227500
      END
                                                                           3033/660
      SUARCUILKE ADAILUI
                                                                           UU 12/1/22
C
                                                                           ---
C
              COLGEN
                                   6 JUNE 72
                                                                           30331933
000000000
                                                                           6612436J
         SUBMOUTINE SUMPRIGARE TO WRITE THE ARRAYS OF UNIQUE ACM VECTOR DOSSALOS
        MANES AND TYPES AS THE HOW EVENTIFICATION FILE CTAPETI. THIS
                                                                           Jussech
        FILF IS CONCATINATED FFTER FUNGEN FUNTRAN EXECUTION WITH THE
                                                                           DO SO S SC J
        MAINIC ELEMENT FILE CTAPFAL AND THE RIGHT HAND SIDE VALUE FILE
        TO FORM THE COMPLETE MATRIX FILE READY FOR EMPUT TO MPS/360 OR
                                                                           LLCACLUL
        DETINA FOR SOLUTION
                                                                           30350600
                                                                           2012012
                                                                           30334422
      COMMON /COLCAT/LSTCOL
                                                                           LCrock du
      COMMON /LPSYS/LAVGSW, PRHMAMIZI, DATSOR
                                                                           00334030
      LEUN. 15.7 19PAPPONTLEON POPPED
                                                                           003341--
      COMMON IPRICT/INDEX
                                                                           J633420 J
      CUMMUN /KOLIS/RNAMISCBOOD, 21. ATYPESCBOOD
                                                                           COTACTO
C
                                                                           とりとともいろ
      INTEGER PRANTY
                                                                           30334530
      INTEGER DATE 14
                                                                           UUSYEUU
      INTEGER R'. 1 'ES . RTYPES
                                                                           20129732
      INTEGER HOVAME
                                                                           3337433
                                                                           U047400
C
                                                                           ひしろいうひろう
      REMIND 7
                                                                           LLICOCOU
C
                                                                           00 160211
      CUMPUTE HOW TYPE INDICATORS FOR MPS LANGUAGE OF REFERENCE
                                                                           U2 160 133
      NEND . INDEK - 1
                                                                           LICESTUL
      00 15 1x . 1. NEND
                                                                           363633
15
      RTYPESCIAL . NAVIP CRITPESCIALI
                                                                           CETUOLEO
                                                                           CUBUCEUU
              WRITE THE ROW. IN ON DISK FILE /TAPET/
                                                                           LLEGUEUL
                 IN THE FORMAT OF THE CHOSEN MPS
                                                                           cristle
C
                                                                           COSOLION
      IF (LANGSH. (2.2)
                        GO TO 50
                                                                           00301203
                         4PS/360 FORMAT
C
                                                                           3030.301
      WRITE (7.155) PRONTMITT. PRONAMIZE
                                                                           لائبه اعديد
      WRITE (7,150)
                                                                           .......
      D1 40 1-1. NIHJ
                                                                           77701077
40
      WRITE 17.1631 08VAMP(1.11.08NAME(1.2)
                                                                           W101100
      03 45 1X + 1. YEVD
                                                                           LEGIOLOL
      HATTE (7,155) ATYPESCICH, RNAMESCIX, 11, RNAMESCIX, 21
45
                                                                           .....
      RETURN
                                                                           いじ シレイ シンン
                        UPTIMA FORMAT
                                                                           33302133
50
      WRITE (7.190) PROMATELLY OF TERM
                                                                           01305531
      DJ 55 1-1. 109J
                                                                          06 362 300
      17 . MANKE OF NAME (1.21 . 3 )
                                                                           2220500
      18 - MASKE HAYAYELL.21 . 4 1
```

44364334

```
MEMBER NAME CONGEN
      WTITE (7.170) OMMANS(1,1).00NAME(1,2).17,10
55
                                                                             3-) 3ade3a
      03 65 1x . 1. NEVO
                                                                             LU 302700
      17 . HASKE AVAMESELT.21 . 3 1
                                                                             33 342 663
      10 . MASKE ANAMESTIC.21 . 4 1
                                                                             06 302 9 33
..
      WRITE (7,175) AVAMESCIE, 11, ANAMESCIE, 21,17,10, ATYPESCIE)
      RETURN
                                                                             Listertic
C
                                                                             00 Ju 1200
                                                                             ىند دەد بار
      FORMAT ( SHROWS , 76 T)
150
                                                                             LLPCOCLU
155
      FTHMAT (28,41,14,244,644)
                                                                             00303500
      FORMAT (28,144,14,284,66E)
100
                                                                             2010100-
165
      FORMAT (AMMENE . 1) E.A4. 42.60E)
                                                                             20001733
170
      F 3844T ( 18, 314 GL . 64, 44, 42, 14. , 241, 34( F) . 50 E)
                                                                             443010--
      FJAMATCIE, SMLGL.61.64.47.1H., 241.1H1.41.1H1.5011
175
                                                                             11101401
100
      FORMAT (1E, 4) # ILE. SE, &4, 42, 641)
                                                                             Livertic
      EVO
                                                                             10100100
      FUNCTION WESTPINSES
ċ
                                                                             3-10-13-
              CONGEN
                                    6 JUNE 72
                                                                             しいとうもしい
C
                                                                             03304303
C
                                                                             1030-00-
               PUYCTION SUSPROGRAM TO COMPUTE THE MPS SPECIFIC ROW TYPE
                                                                             33300133
Č
                  INDICATORINAY-ORJECTLYF ROWS ONLY)
                                                                             U08++400
                                                                             10104963
      COMMON /ALPHA/NUL 351
                                                                             LLCCOLUL
      COMMON /LPSYS/LANGS-.P48MAMIZI.DATSOR
                                                                             COTCOFOR
      COMMON /SIGN/NEG.PLUS.ZERO.OLE.FREE
                                                                             ししょうさいしょ
C
                                                                             DO Jas Sus
      INTEGER NES.PLUS. JERO. BLK
                                                                             60305400
      INTEGER FREE
                                                                             Lucestul
      INTEGER PRANAS
                                                                             Leotote
      INTEGER DATSOR
                                                                             00 100 700
C
                                                                             30305030
C
                                                                             ししょうちゃしょ
      IF (LANGSW.EQ. 2) GO TO 35
                                                                             3030000
C
                                                                             00000135
              TAPPOR COCKERN
                                                                             36300233
č
                                                                             0-10030-
      IF INNE. PLUSI GO TO 25
                                                                             30366403
      MRHTP-NULZ11
                                                                             30300500
      RETURN
                                                                             ددهدهديد
      IF INNE.NE.BLK 1 GO TO 30
25
                                                                             UU 300 7UU
      NEWTP-NULLAL
                                                                             3-30680-
      RETURN
                                                                             ---
      IF INNX.NE.FREE! GO TO 55
                                                                             00307000
10
      WRUTP - NUL 231
                                                                             303671--
      RETURN
                                                                             30367230
      NEWTP . NULLED
                                                                             JU 36 7 30 -
55
                                                                             UU30145.
      RETURN
                                                                             Jusathu
C
              OPTIMA FORMAT
                                                                             66307630
C
                                                                             U33077UJ
35
      IF INNE.NE.PLUST GO TO 40
                                                                             00301430
      NRWTP=NU(25)
                                                                            LCVIOLUU
      RETURN
                                                                             ......
      IF INNX.NE.BLK | GO TO 45
                                                                             00336103
40
      MRHTP=NUL351
                                                                             30108200
      RETURN
                                                                             11106311
```

# Appendix D

## DESCRIPTION OF CONFIL

FIGURES	
---------	--

Dl.	CONFIL Source Program Listing	261
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## Appendix D

#### DESCRIPTION OF CONFIL

CONFIL is a CONFORM procedure, written in the FORTRAN language and using the IBM MPS/360 READCOMM subroutine, that reads the output of MPS/360's report procedure SOLUTION and produces a file of row and column information that is input to the CONFORM LP reporter, CONREP. It may be thought of as a preprocessor for CONREP.

Figure D1 is a listing of the CONFIL source program. Figure 43 in Chapter 4 shows an example of MPS/360 controls used to execute CONFIL.

One execution of CONFIL processes one NPS/360 solution. The output from SOLUTION is always input to CONFIL on FORTRAN logical unit seven (7). CONFIL's output is ultimately input to CONREP on unit two (2) or 12. For CONFIL execution, the output unit is specified by a single calling argument.

The order of CONFIL execution is:

- (a) The value of the calling argument is retrieved by CONFIL by a call to READCOMM routine GETARG.
- (b) A call to the READCOMM routine POSITN positions the communications file to the beginning of the second array.
- (c) A call to READCOMM routine ARRAY positions the file to the beginning of the next array—the row information section—and performs initialization for reading that data.
- (d) A series of calls to READCOMM routine VECTOR retrieves information about the rows. There is one call per row. Eight values are returned for each call. CONFIL prints only the row name (value 1), its activity (value 3), its slack (value 4) and the pi-value (value 7).

```
C
                                    CONFIL
C
                                   5 JULY 72
C
C
          FCGTRAN/GTAGCOMM PACGRAM TO PRODUCT THE MPS/361 CUTPUT FILL
C
          WHICH IS INPUT TO THE CONFORM LP REPORTER (CONREP) AS
C
          FT.2FJ. 1 OF FT12F. 11.
C
C
         CHIFIL HAS UNF (1) APGUMENT, ACCESSED BY A GALL TO READCOMM
C
          R' TIME GETARG , WHICH IS THE FORTRAN LOGICAL UNIT ON WHICH
C
          CONFIL WILL PRODUCE ITS CUTPUT. CONFIL ALMAYS READS UNIT 7.
C
C
      REAL . NAME , VALUE ( 8)
C
      IFILE . 7
      SALL GETARG (IUUT)
C
      SALL FOSITNITETLE, INDIC, 2)
      IF (INDICALL) AT
                         FTURN
C
C
          RUMS SECTION -- NAME, ACTIVITY, SLACK, PI
C
      CALL ARPAY (IFILT, IND, NAME)
      HRITE (IOUT.101)
      FORMAT(1X.4HROWS)
1.1
      IF (IND.LE.1)
                      PFTURN
C
2.:
      CALL VECTUR (IFILE, IND, VALUE)
      IF (INC.LF.1)
                       GO TO 44:
      WRITE (TOUT, 7 () VALUE(1), VALUE(3), VALUE(4), VALUE(7)
3..
      FORMAT(1x, 40, 9x, F13.5, 2x, F13.5, 1x, F13.5)
      50 TC 2.:
C
C
         COLUMNS SECTION -- NAME, ACTIVITY
      CALL ARPAY (IFILE, IND, NAME)
4.1
      WRITE (IOUT, 5.1)
5. :
      FORMAT(1x.7HCOLUMNS)
                      RETURN
      IF (IND.LE.1)
C
      CALL VECTUP(IFILE, IND, VALUE)
      IF (IND.LE.1)
                       RETURN
      WRITE ([OUT, 7.1) VALUE(1), VALUE(3)
      FORMAT(1X, 48, F13.5)
7.:
      50 TO 6:1
C
      END
```

Fig. D1—CONFIL Source Program Listing

- (e) A call to ARRAY positions the file to the beginning of the column information section and prepares for reading.
- (f) A series of calls to VECTOR now retrieves information about the columns. CONFIL prints only the column name (value 1) and its activity (value 3).

Figure D2 is an example of the rows section of CONFIL output. Figure D3 is an example of the columns section of CONFIL output.

enus			
TECTON	1328.83594	-132A.83594	1.00000
TOSTAN	477.38696	-407.38696	0.0
TESTEN	921.44897	-921.44997	0.0
TELUCT	13657.47656	-13659.47656	0.0
TECOST	4497.11717	-4499.11719	0.0
TSCOST	9143.35938	-9160.35938	0.0
TATTED	-2746.59912	2746.59912	0.0
TADTED	-6158.699?2	6158.69922	0.0
TIED	-9135.29688	71 05.29689	0.0
TMORSH	-477.79956	A23.79956	0.0
ALVIAL	-972.A9966	902.89966	0.0
TCCC	-678.49976	678.49976	0.0
COOL	1 74 - 00000	0.0	-3.01183
5002	7.0	0.9	20.31903
Snn4	0.0	0.0	24.31111
5004	0.0	0.0	14.07269
5012	0.0	0.0	3.42834
5014	0.0	0.0	1.54804
5015	<b>0.</b> 0	0.0	1.99570
5032	0.0	0.0	0.21481
eùe1	3.7	0.0	0.29872
\$107	0.0	0.0	0.07119
\$110	0.0	0.0	0.30373
\$113	3.0	0.0	0.27604
\$128	n.n	0.0	0.46790
\$137	2.0	0.0	0.07181
\$145	0.0	0.0	0.01379
\$165	0.0	0.0	0.00287
\$168	0.0	0.0	0.03144
\$176	0.0	0.0	1.34639
CITA	ଚ୍∙ତ୍	0.0	1.13793
\$185	0.0	0.0	0.93268
\$190	0.0	0.0	0.33911
\$192	င့်∙ ဝွ	0.0	0.40099
\$194	3.3	0.0	0.46326
\$270	0.0	0.0	1.42321
\$271	0.0	0.0	0.39085
\$276	0.0	0.0	0.37194
S278	0.0	0.0	0.19483
\$290 \$304	0.0	0.0	1.45741
5294	0.0	0.0	0.38957
5299	J. J	0.0	0.99313

Fig. D2—Example of Rows Section of Output from CONFIL

CUTTIONS	
C921	103.99990
C902	97.99998
5003	15.00000
(904	7.00000
C905	A7.9994P
6664	16.00998
C907	2.00000
Cuor	2.00000
(909	16.00000
רחון	3.00000
C413 C415	4.00000
C914	25.99998
C915	2.00000
(916	10.00000
C917	4.00000
C919	77.99558
(92)	6.00000
C921	9.00000
C933	16.00000
COSS	1.00000
C924	9.00000
C925	2.00000
C926	3.00000
C927	22.99968
C928	25.9995R
C929	42.99998
C930	12.00000
C931 C932	4.20020 6.00000
C933	3.00000
(935	1.00000
C939	12.00000
C939	3.00000
5202	0.99972
\$103	3.99999
5004	0.99998
5705	0.0
5006	5.00003
5007	1.00000
5008	8.00001
S009	0.99993
5010	23.99997
5011	0.99999

Fig. D3—Example of Columns Section of Output from CONFIL

# Appendix E

## DESCRIPTION OF CONREP AND ITS ROUTINES

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#### Appendix E

### DESCRIPTION OF CONREP AND ITS ROUTINES

#### OVERVIEW

This appendix, together with the listing of the COMREP source program in Appendix F, documents the COMREP program as it is operational at USAMSSA.

CONREP is written entirely in the FORTRAN IV language for operation on USAMSSA's IBM 360/65 computer system. It is also operational on RAC's CDC 6400 computer system. There are several differences between the programs at the two installations. These differences are not documented here.

The program is overlayed, and some data is packed.

Figure El is the general logic flow of CONREP execution. It is keyed to subroutine names (in ' '). Calls to the subroutines that produce the various reports are shown; but none of the internal workings of those subroutines is shown here. These details are presented in the discussions of those routines below.

Table El defines the CONREP input and output units. Note that the cost factors file, unit 11, is only required if the Peacetime Cost Summary is to be produced. Output units 3 and 9 are normally printed; unit 9 may also be punched as a deck of cards. One set of data input on units 4 and 10 is used to interpret all LP solutions reported on in one CONREP run.

Table E2 lists the subroutine that produces each report. Figure E2 shows the general relationship of all CONREP routines. It also defines the program overlays. Table E3 lists the entry points for each routine. Table E4 is an incidence table of possible calls by each CONREP routine.

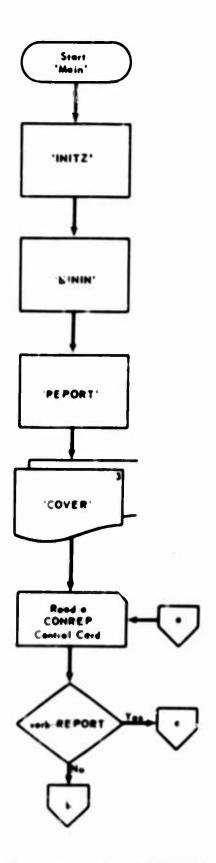


Fig. E1 - General Lagic Flow of CONREP Execution

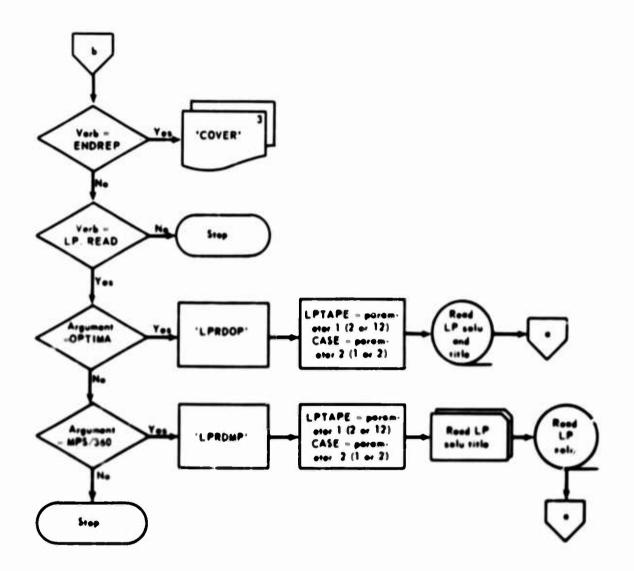


Fig. E1 - (Continued)

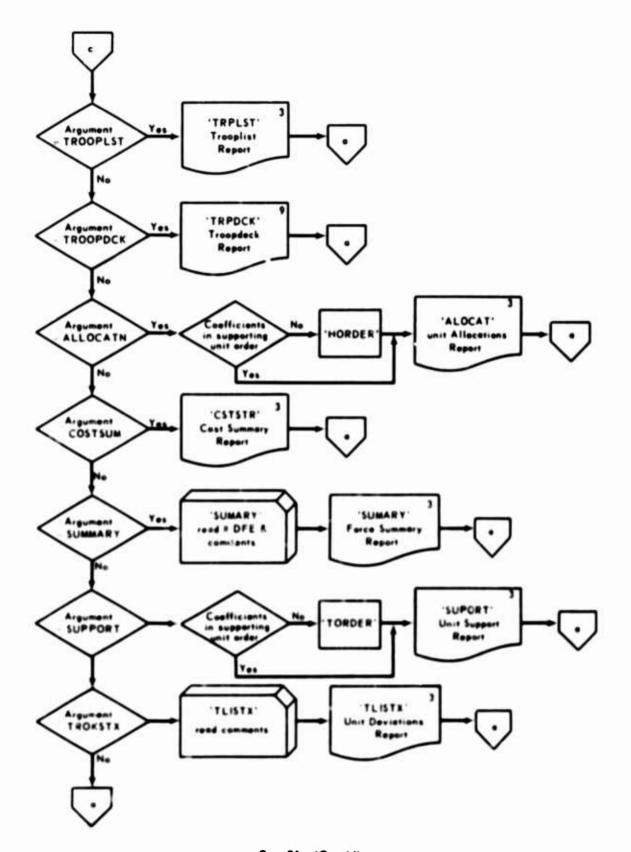


Fig. E1 - (Cont'd)

Table El DEFINITION OF CONNER I/O UNITS

File	or Output	or Binary	Definition
-	Input	Formatted	All card-image CONREP data; control verbs and parameters usually = system input.
-	Input	Forms thed	IP solution data produced by CONFORM procedure CONFIL from output of MPS/360's SOLUTION, or as produced directly by OPTIMA's RECORD.
4	Output	Formatted	Output of all reports but the Troop Deck Report.
7	Imput	Binary	Dump of certain CONGEN arrays produced as FT11F001.
7	Output	Forms thed	System output; diagnostic messages.
.,2,	Output	Forms thed	Output (card-image) of the Troop Deck Report; each execution of the report is a new file on unit 9.
-	Input	Form thed	List of unit DTM numbers, titles, SRC numbers and TPSNs produced by CONGEN as FT02F001.
-	Input	Binary	Battalion Slice model FT85F001; cost factors; only required if the Peacetime Cost Surmary Report is to be produced.
-	Input	Formatted	Same as for unit 2.
		1 Input 1 Output 1 Imput 1 Output 1,2, Output 1 Input 1 Input 1 Input	

Table E2

CORRESPONDENCES BETWEEN CONFORM REPORTS
AND CONREP ROUTINES

Report	Routine
Force Summary	SUMARY
Peacetime Cost Summary	CSTSTR
Troop Deck	TRPDCK
Troop List	TRPLET
Unit Allocations	ALOCAT
Unit Deviations	TLISTX
Unit Support	SUPORT

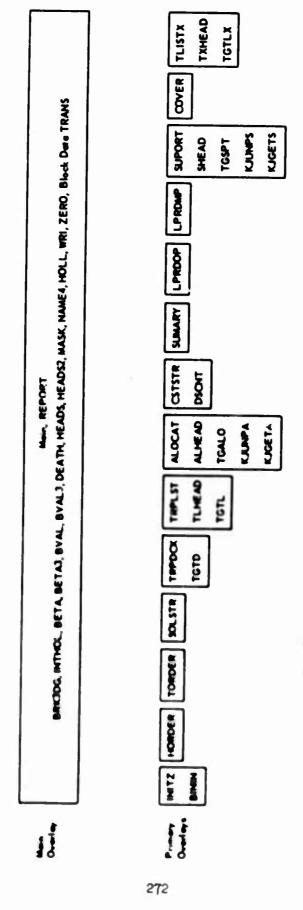


Fig. E2—General Reletionship of COMREP Revines, and Definitions of Overlays

Table E3

ENTRY POINTS OF CONREP ROUTINES

Routine	Entry points
Main	Main
REPORT	REPORT
BRK3DG	BRK3DG
INTHOL	INTHOL
BETA	BETA
BETA 3	BETA3
BVAL	BVAL, PIVAL, RLGL
BVAL3	BVAL3, PIVAL3, RLGL3
DEATH	DEATH
IDADS	HEADS
IEADS2	HEADS2
HOLL	HOLL
MASK	MASK
KANE4	NAMEL
TR1	WR1
ZERO	ZERO
INITZ	INITZ
BININ	BININ
HORDER	HORDER
PORDER	TORDER
SOLSTR	SOLSTR
TRPDCK	THPDCK
TOTO	TOTO
rrist	TRPLST
TLIBAD	TLIGAD
POTL	TOTL
LOCAT	ALOCAT
LLIGAD	ALIGAD
CALO	TGALO

Table E3 (Cont'd)

Routine	Entry points
KJL X	KJUNPA
KUCETA	KJGETA
CSTSTT	CSTSTR
LEGIT	DSCNT
SUK ? RY	SUMARY
LPRDOP	LPRDOP
LPRDMP	LPRIMP
SUPORT	SUPORT
SHEAD	SHEAD
TOSPT	TGSPT
KJUMPS	KJUNPS
KJCETS	KJ GIPTS
COVER	COVER
TLISTX	TLISTX
TXHEAD	TXXEAD
TOTLX	TOTLX

A MAN TO THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE

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a south	4140	MOUN	905 448	The state of	(APM	TVAL	MANY LIAM	DAVT(MUT)	PAYT)	BANT)(PLANT	TOTAL ( PEOF )	MINN	MAM	ENTYDI	770H	2014	1941	THA	ONTE	22.141	BIRIT	HISTOR	TOWER	WL5705	TIPLICK	dior	Talvit	GAMAIT	1101	ALOCAT ALACAT	TOALO	KJUNDA	KITADUN	STSTR	DECNT	<b>YAAMUR</b>	TPRDOP	LPRIMP	TROTUS	CASHE	TGSPT	KJUNPS	KIGELZ	COAEB	XTSIJT	TXIEAD	XITOT
707																														l		1			1	1			l			l	l	l	1	1	
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Table E5 defines the possible normal CONREP terminations. CONREP cannot, of course, check for all bad or inconsistent data; it is possible for it to terminate abnormally.

All common variables are in labeled common blocks. Table E6 is an incidence table of labeled common blocks in each routine. Table E7 defines each block by listing the variables and arrays in it. Table E8 is an incidence table of variables and arrays in common blocks. This allows easy determination of the block containing a particular variable. Table E9 defines each common variable and array.

The next sections discuss each routine in turn, in the order in which they were listed in the preceding tables.

#### DESCRIPTION OF ROUTINES

#### Main

The main routine of CONREP calls subroutine INITZ to initialize variables and arrays, and to call subroutine BININ to read a binary file of data (unit 4) passed from CONGEN. Main then calls subroutine REPORT which reads CONREP control verbs and calls subroutines to produce specified reports. Upon return from REPORT, Main stops CONREP execution.

### REPORT

Subroutine REPORT is called from the main routine once to read CONREP control cards and to call the subroutines that read LP solutions and produce specified reports. If the EMDREP verb is encountered, control is returned to the main routine which stops CONREP execution. If certain conditions are encountered, REPORT will print an appropriate diagnostic and terminate execution or proceed. A test against a 4th verb, RET, is programmed but is not really used. If SET is encountered, control is returned to the main routine. The order of REPORT execution is:

- (a) Call subroutine COVER twice to print two CONFORM cover pages on unit 3.
  - (b) Read a verb card.

Table E5

POSSIBLE "NORML" CORREP TERMINATIONS

	Tera:	metion	Termination Routine	Message/Condition
	STOP		Na in	Normal "successful" reporting.
	STOP		NO.	"Premature EOF encountered". Endfile encountered on FORTRAN logical unit one (1) before control verb ENDREP.
	STOP		HEPORT	"Unrecognizable LP system, xxxxxxxx job killed". Other than "OPTIM" or "MPS/360" input as argument of control verb LP.RSAD.
			REPORT	"Twpe xxx not silcowed for LP solution. Only 2 and 12 are OK. Job killed". Other than "2" or "12" specified on LP.READ card as FORTRAN logical unit from which to read LP solution.
200	STOP	870P 0003	INTHOL	"*************************************
	STOP		DEATH	"Attempt to produce subreport before LP solution read. Case xxx. Job killed".
	STOP 0004	70000	KJŒETA	Function KJGETA was called with ID = xxxxx which is not an array DTM. Other than the DTM number of a modeled unit was input to function KJGETA for the calculation of the sequence number of the unit.
	STOP		LPRDOP	The OPTIMA NECORD for case xxx job killed". Premature EOF encountered on unit 2 or 12 when reading LP solution produced by OPTIMA's RECORD.
	STOP		LPROP	Deta storage overflow job killed. Case xxx". Attempt while reading a case 1 or case 2 OPTDMA LP solution to store information for more columns than for which CONNER is dimensioned. Current dimensioning is for 2500 total case 1 and case 2 columns. Only nonzero information is stored.

Table Es (continued)

Termination	Routine	Wessage/Condition
STOP	JOURNAL THE STREET	"Nows storage overflow job killed. Case xxx". Attempt while reading a case 1 or case 2 OPTIMA LP solution to store information for more rows than for which CONNET is dimensioned. Current dimensionin, is for 4000 total case 1 and case 2 rows. Only nonzero information is stored.
STOP	7047	"Bad MPS/360 solution for case xxx job killed". Premature EOF en- ecuntered on unit 2 or 12 when reading LP solution information produced from MPS/360's SOLUTION by the CONFIL procedure.
STOP	700471	"Bows storage overflow job killed. Case xxx". Attempt while reading a MPS/360 LP solution to store information for more rows than for which configE is dimensioned currently 4000 total case I and case 2.
STOP	LPERSO	"Beta storage overflow job killed. Case xxx." Attempt while reading a MPS/360 solution to store information for more columns than for which convals is dimensioned 2500 total case 1 and case 2.
STOP OOOL	KIGETS	"

Table E6

INCIDENCE OF LABELED COMMON BLOCKS IN CONREP ROUTINES

								'			-										
Routine	ĐĐ <b>A</b>	SNA	CHECKX	COMENT	COMMO	DESCEE	चभन	FORSOL	HEDD	IDM	IFOCIO E	TIME	TNIATN	ОКЪЕК	DATGER	BEZOTO	RNS	TATS	SAMBOL	TILIL	
Main	×	×				×	×	×	×						×	×	×	×	×		
REPORT			×		×									×					×		
BRK3DG																					
INTHOL																			×		
BETA		×								×								×	×		
BETA3		×								×								×	×		
BVAL										×									×		
BVAL3			•							×							×	×	×		
DEATH																					
HEADS									×												
HEADS2									×												
HOLL						٠							×								
MASK																					
NAME4																					
WRI							٠		×												
ZERO																					

Table E6 (continued)

			П						SOS	Common Block	100}	u						į		
Routine	₽ĐĄ	S <b>NA</b>	СИЕСКХ	COMENT	COMMO	DESCRE	<u> </u>	TORSOT	HEDD	IDM	ITOCIO	NBBINT FINE	ОКОЕК	DATOER C	RESOLU	ENS	TATS	SYMBOL	Altit	
Block Data																		×		1
INITZ		×							×				×			×	×	×		
BININ	×					×	×							×	×					
HORDER						×							×	×	×					
TORDER						×							×	×	×					
SOLSTR					×	×		×							×					
TRPDCK						×	×	×							×				×	
TGID																			×	
TRPLST			×			×	×	×			~	×			×			×	×	
TLHEAD			×									×								
TGIL																			×	
ALOCAT			×			×	×	×		×	×	u		×	×			×	×	
ALHEAD											×	ŭ								
TGALO										×									×	
KJUNPA														×						
KJGETA						×									×					
CSTSTR						×		×							×			×		
DSCNT		•													٠					

Table E6 (continued)

					Ì															
									Comm	l dot	Common Block	u					l			
Routine	₽Đ₩	2NA	СНЕСКХ	COMENT	СОММО	DESCRP	नगर	TORSOL	HEDD	IDM	IPOCIO	rine -	NPRINT	оврев	о∧тоая	RESOLU	RNS	TATE	SAMBOL	TILL
SUMARY	×					×	×	×								×			×	
LPRDOP		×			×				×								×	×		
LPRDMP		×			×				×								×	×		
SUPORT			×			×	×	×			×	×			×	×			×	×
SHEAD												×								
TGSPT											×									×
KJUNPS															×					
KJGETS						×										×				
COVER																				
TLISTX			×	×		×		×				×	×			×			×	×
TXHEAD			×	×								×								
TCTLX																				×

Table E7

DEFINITION OF CONREP LABLLED COMMON BLOCKS

Block	Definition
AGG	NAGGR,AGGLAB(25)
ANS	IB(7500)
CHECKX	ITEST(25)
COMENT	COMENT (5,20)
COMMO	IOTA(16)
DESCRP	STRNTH(760), DIM(760)COST(760)
EFF	NEFF, EFFLAB(6,3)EFF(60,6)
FORSOL	FORSOL(760,2), IFRSOL(760,2)
HEDD	ITITLE(33,3), IPAGE
IDN	NAME(2)
ILOClo	ILOCIO
LINE	LINE, ISBPAG
NPRINT	LINE(130)
ORDER	IORD
REQFAC	COEF(8000), KJCOEF(8000), NANZ, NENZ
RESOLU	NCOMBT, NSUPRT, NPRAM, NPRAMU
RNS	IR(20000)
STAT	NCOL(3),NROW(3),CREAD(3)
SYMBOL	NSYMB(37)
TITLE	<pre>ITITLE(8), ISRC(3), ITPSN(2)</pre>

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Table E8

INCIDENCE OF CONREP VARIABLES IN LABELED COMMON BLOCKS

		SAMBOL																	
		TATS					×												
١		SNA																×	
l		BESOFA																	
l		о марая		×											×				
		оврев																	
		иъвгит																	
	ck	LINE																	×
	Common block	ггосго												×					
	mmon	IDM																	
	ည	HEDD															×		
		TORSOL									×		×						
		चपत							×	×									
		DESCRE				×		×											
		COMMO														×			
		COMENT			×														
		СНЕСКХ																	
		SNA										×							
		₽ĐĄ	×																
		<b>Variable</b>	AGGLAB(25)	COEF(8000)	COMENT(5,20)	COST(760)	CREAD(3)	DIM(760)	EFF(60,6)	EFFIAB(6,3)	FORSOL(760,2)	IB(7500)	IFRSOL(760,2)	ILOC10	IORD	IOTA(16)	IPACE	IR(20000)	ISBPAG
							2	85											

Table E8 (Cont'd)

										i										
									CO	Common block	)lock	LJ.			l y					
Variable	DDA	<b>SNA</b>	СНЕСКХ	COMENT	COMIMO	DESCRE	चनञ	FORSOL	HEDD	IDM	IFOCTO	LINE	NPRINT	яасио	DAT@IR	RESOLU	FINS	TATZ	SAMBOL	TILLE
ISRC(3)																				×
ITEST(25)			×																	
ITITEE (8)																				×
ITITUE (33,3)									×											
ITPSN(2)																				×
KJCOKF (8000)											•				×					
LINE												×								
J.INE(130)													×							
MAGGR	×																			
NAME(2)										×										
NANZ															×					
NBWZ															×					
NCOL(3)																		×		
NCOMBT																×				
NEFF							×													
NPRAM																×				
NPRAMU																×				
MROW(3)																		×		

Table E8 (Cont'd)

							i	ວ	momix	ommon block	ck							
Variable	DDA SNA	CHECKX	COMENT	COMMO	DESCRE	क्तम	TORSOT	HEDD	IDM	IFOCTO	LINE	NPRINT	ORDER	REQFAC	ene Besorn	TATE	SAMBOL	TITLE
NSUPRT															×			
NSTAB(37)																	×	
STRNTH(760)					×													

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Table E9

# DEFINITION OF CONNEP COMMON VARIABLES

Name	Dimension	Type	Input or internal	Definition
AGGLAB	(25)	Alpha	Input	A 2-character label for each of the support unit aggre-gates.
COEF	(8000)	Real	Input	A- and B-matrix allocation rule coefficients.
COMENT	(5,20)	Alpba	Input	Five 80-character lines of comments used in Unit Deviations Report.
COST	(160)	Real	Input	Unit cost of each combat and support unit type modeled.
CREAD	(3)	Logical	Internal	Indicator as to whether an LP solution has been read.
DIM	(160)	Integer	Input	DIM number of each combat and support unit modeled.
अअञ	(9°09)	Real	Input	A coefficient for each combat unit modeled, for each effectiveness index modeled.
EFFIAB	(6,3)	Alpba	Input	The name and type of each combat unit effectiveness index modeled.
FORSOL	(760,2)	Real	Internal	The fractional solution value of each unit in each of up to 2 LP solutions.
e	(4200)	Real	Internal	Array storing nonzero column solution values for all LP solutions read. Some routines use different names and dimensioning for this array.
IFRSOL	(760,2)	Integer	Internal	The integer solution value of each unit in each of up to 2 LP solutions.
ILOC10		Integer	Internal	The record last read on unit 10.
IORD		Integer	Internal	Indicator of ordering of allocation rule coefficients.

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Table E9 (Cont'd)

Маше	Dimension	Туре	Input or Internal	Definition
IOTA	(16)	Integer	Internal	Array used to pass the values of some parameters of CONREP control verbs.
IPAGE		Integer	Internal	The page number for all output on unit 3 for a CONREP run.
IR	(20000)	Real	Internal	Array storing nonzero run solution values for all LP solutions read. Some routines use different names and dimensioning for this array.
ISBPAG		Integer	Internal	The subpage number of individual report output on unit 3.
ISRC	(3)	Alpha	Internal	The SRC number of a combat or support unit.
ITEST	(25)	Integer	Internal	Array used to pass the values of some parameters of CONREP control verbs.
TITLE	(8)	Alpha	Internal	The filie or label of a combat or support unit.
TTTTE	(33,3)	Alpha	Input	One line of information for each LP solution read, used as a heading to key reports to specific solutions.
ITPSN	(2)	Alpha	Internal	The TPSN of a combat or support unit.
KJCOEF	(8000)	Integer	Input	Packed DIM numbers of the supported and supporting units of each allocation rule coefficient.
LINE		Integer	Internal	Line number on a page of a report.
LINE	(130)	Alpha	Internal	Hollerith characters (1 per word) returned by subroutine HOLL.
NAGGR		Integer	Input	Number of support unit aggregates modeled.
NAME	(2)	Alpha	Internal	Two-part name of a model row or column.
NANZ		Integer	Input	Number of A-matrix allocation rule coefficients.

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Table E9 (Cont'd)

Маше	Dimension	Type	Input or Internal	Definition
NBNZ		Integer	Inpuė	Number of B-matrix allocation rule coefficients.
NCOL	(3)	Integer	Internal	Number of model columns for which information is stored, for each LP solution read.
NCOMBE		Integer	Input	Number of combat unit types modeled.
NEFF		Integer	Input	Number of combat unit effectiveness indices modeled.
NPRAM		Integer	Input	Number of Battalion Slice parameterized units.
NPRAMU		Integer	Input	Number of unique Battalion Slice parameterized units.
NROW	(3)	Integer	Internal	Number of model rows for which information is stored, for each LP solution read.
NSUPRT		Integer	Input	Number of support unit types modeled.
NSYMB	(31)	Alpha	Internal	Alphameric characters used in model row and column names.
STRNTH	(160)	Real	Indut	Unit strength of each combat and support unit type modeled.

- (1) If LP.READ, call subroutine LPRDMP or LPRDOP to read a MPS/360 or OPTIMA LP solution, then call subroutine SOLSTR to retrieve frequently used solution values, and then go to b.
- (2) If REPORT, determine which of seven reports is wanted and call the appropriate one. If unit Allocations Report or Unit Support Report is specified, first check to see if allocation rule coefficients are in correct order, and if not call subroutine HORDER or TORDER to reorder them. Upon return from the report subroutine, go to b.
- (3) If ENDREP, call subroutine COVER twice to print two CONFORM cover pages on unit 3, and return to the main routine.

# BRK3DG

BRK3DG is a subroutine that is called to convert a 3-digit integer to 3 Hollerith characters. The characters are used in specifying model row and column names in calls to entry points BETA, BETA3, BVAL, PIVAL, RLGL, BVAL3, PIVAL3 and RLGL3 to retrieve solution values. There are four calling arguments:

- (a) I, the input number. This is usually the DTM number of a unit.
- (b) Il, the leftmost digit returned as a Hollerith character.
- (c) I2, the second digit returned as a Hollerith character.
- (d) I3, the rightmost digit returned as a Hollerith character.

BRK3DG strips apart the digits and then calls function INTHOL three times to convert them to Hollerith.

## INTHOL

Function INTHOL is called by subroutine BRK3DG to convert a 1-digit integer to the corresponding Hollerith character.

## BETA

Function BETA is one of the "solution value search" routines. It returns a column solution value from the Case 1 LP solution. The 8-character name of the column is specified by the eight calling arguments. The two-part name is formed by two calls to function NAME4. The name is then checked against all those stored. If a match is found, the nonzero solution value is returned; otherwise, a value of "0.0" is returned.

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# BETA3

Function BETA3 is one of the "solution value search" routines.

BETA3 is a LP case-dependent version of BETA. There are nine arguments.

The first specifies the case—1 or 2—and the last eight specify the column name.

# BVAL, PIVAL, RLCL

Function BVAL is one of the "solution value search" routines. It returns row solution values from the Case 1 LP solution. There are three entry points. A call to BVAL returns the RHS value of a row. A call to PIVAL returns the pi-value of a row. A call to RLGL returns the logical or slack value of a row. The 8-character row name is specified by the eight calling arguments. Two calls to function NAMEL form a two-part row name which is checked against all row names stored. If a match is found, the desired nonzero value is returned; if the name is not found, a value of "0.0" is returned.

# BVAL3, PIVAL3, RLGL3

Function BVAL3 is one of the "solution value search" routines. BVAL3 and its other two entry points are LP case-dependent versions of BVAL, PIVAL and RLGL. There are nine calling arguments. The first specifies the case—1 or 2—and the last eight specify the row name.

#### DEATH

Subroutine DEATH may be called to print a diagnostic message and stop execution if a subreport was called before an LP solution was read.

#### **HEADS**

Subroutine HEADS may be called from 1-case report-producing subroutines to print the standard CONREP heading and page number on unit 3. HEADS prints one line of LP solution information for case one and then calls subroutine WR1 to print a line with a constant CONREP heading and the page number.

## HEADS2

Subroutine HEADS2 may be called from subroutines that compare two LP solution cases to print a page heading and page numbers. HEADS2

prints two heading lines of information from case 1 and case 2, and then calls subroutine WR1 to print a constant CONREP heading and the page number.

## HOLL

Subroutine HOLL converts a word in real format to a specifiable number of words with a single Hollerith character per word. If the real word is nonzero, the characters produced are the digits of the word. If the real word is zero, the characters may be all blank or may include a decimal point in the proper position. The characters are returned in common array LIME(130). The real number, the real format, whether to print all blanks or the decimal point, and the positions in array LIME to fill are all specified through calling arguments. HOLL is mainly used to aid in performing zero-suppression in some report-producing routines.

## MASK

Function MASK masks off a specified character of an input word, and returns it as the left-justified and zero-filled function value. There are two arguments. The first specifies the input word and the second the character.

## NAME4

Function NVME4 concatenates four left-justified and zero-filled characters to form one-half of model row and column names. The four characters are passed as calling arguments.

## WRI

Subroutine WRl is called by subroutines HEADS and HEADS2 to print a line with a constant CONREP heading and the page number.

## ZERO

Subroutine zero is called by some routines to zero out an array. Two arguments specify the array and the number of words to zero out.

## Block Data

Array NSYMB is initialized here. It is the basic character set for row and column names. The characters are specified as left-justified



with blank fill. Subroutine INITZ converts them to zero fill by calls to function MASK.

# INITZ

Subroutine INITZ is called once from the main routine to initialize some variables and arrays. It calls subroutine BININ to read the binary file (unit 4) of data passed from CONGEN.

## BININ

Subroutine BININ is called once from subroutine INITZ to read the binary file of data passed from CONGEN. BININ reads from unit 4. The file was written by CONGEN on unit 11. The following date is read:

- (a) STRWTH(760), DIM(760), COST(760)
- (b) COEF(8000)
- (c) KJCOEF(8000)
- (d) NANZ, NBNZ, WCOMBT, NSUPRT
- (e) NEFF, EFFLAB(6,3), EFF(60,6)
- (f) NAGGR, AGGLAB(25).

These variables and arrays have the same names as in CONGEN.

## HORDER

Subroutine HORDER may be called from subroutine REPORT to put the allocation rule coefficients—arrays COEF and KJCOEF—into supporting unit order before REPORT calls subroutine ALOCAT to produce the Unit Allocations report. HORDER is called if common variable IORD is not equal to 1.

# TORDER

Subroutine TORDER may be called from subroutine REPORT to put the allocation rule coefficients—arrays COEF and KJCOEF—into supported unit order before REPORT calls subroutine SUPORT to produce the Unit Support Report. TORDER is called if common variable IOPD is not equal to 0.

## SOLSTR

DAG

Subroutine SOLSTR is called from subroutine REPORT immediately after each LP.READ to retrieve and store the number of each combat and support

unit type in the force. The LP case number is passed by common variable IOTA(2). The fractional solution values are retrieved by calls to subroutine 'BRK3DG' and function BETA3. They are stored in array FORSOL(760,2). Integer values are computed from these according to Battalion Slice model rules, and are stored in array IFRSOL(760,2).

# TRPDCK

Subroutine TRPDCK produces the Troop Deck report. TRPDCK is called from subroutine REPORT whenever the control card is "REPORT TROOPDCK". This report is card-images and is produced on unit 9. An EOF is written before returning control to REPORT. Subroutine TGTD is called to retrieve the title, SRC number, and TPSN of each unit from unit 10. TRPDCK rewinds unit 10 before the first call to TGTD.

## TGTD

Subroutine TGTD is called from subroutine TRPDCK once for each unit type to retrieve the title, SRC number, and TPSN of the unit from FORTRAN logical unit 10. Unit 10 is a formatted file and has one logical record per unit type, in the order modeled.

# TRPLST

Subroutine TRPLST produces the Troop List report. TRPLST is called from subroutine REPORT whenever the control card is "REPORT TROOPLST i". This report is produced on unit 3. The value of the parameter i on the control card indicates how to interpret the marginal values of the LP solution:

- i = 1 ... interpret as strength
  - 2 ... interpret as cost
  - 3 ... interpret as numbers of units
  - 4 ... interpret as combat unit effectiveness
  - 5 ... all other.

The value of the parameter, which is passed to TRPLST in common variable ITEST(1), indicates what column headings to print and how to calculate certain values.

TRPLST loops on combat unit types and then on support unit types. Information is reported for each unit type. Subtotals are taken at the

end of the combat and support units, and grand totals are also reported. The title, SRC number and TPSN of each unit are retrieved from logical unit 10 by a call to subroutine TGTL. The fractional and integer number of units in the force is retrieved from arrays FORSOL and IFRSOL. The "Fractional, Per Unit, Slice" value is the LP marginal value of the row corresponding to each unit. It is computed by a call to function PIVAL. The "Fractional, Per Unit" value is the strength of the unit, or the cost of the unit, etc., as specified by the parameter on the report control card. The "Fractional, Per Unit, Support" value is the difference between these last two values. The "Fractional, Total" values are simply the "Fractional, Per Unit" values times the number of units in the force.

Although this report is usually only produced for base case runs, it may be produced for other runs. To allow for use with some of these other runs, the LP marginal values are adjusted according to some rules discovered for uniform support unit requirements deviations runs. For a base case there is effectively no adjustment. For other runs, a fraction is computed as the number of units in the force divided by the number required. The number required is calculated based on solution values of deviation variables by calls to function BETA. The LP marginal value is then divided by this fraction.

## TLHEAD

Subrouting TLHEAD is called from subroutine TRPIST to eject to the top of a new page and print the standard CONREP heading and a heading for this report. The report heading is variable. Common variable ITEST(1) passes the value of the parameter on the control card for this report, which indicates what heading to use. TLHEAD calls subroutine HEADS.

# TGTL

Subroutine TGTL is called from subroutine TRPIST once for each unit type to retrieve the title, SRC number, and TPSN of the unit from FORTRAN logical unit 10. TGTL is identical to subroutine TGTD except for name. The logic is duplicated to facilitate program overlaying.

## ALOCAT

Subroutine ALOCAT produces the Unit Allocations report. It is called from subroutine REPORT whenever the control card is "REPORT ALLOCATN i". ALOCAT loops on all support unit types, interpreting them as "supporting units." As it does this, it also steps through the A- and B-matrix allocation rule coefficients stored in arrays COEF(8000) and KJCOEF(8000). These coefficients are already in supporting unit order. Each coefficient that requires the supporting unit currently looped on is used to compute information, and a line is printed in the report. The DTM number, title and solution value of each supporting and supported unit is reported. The unit titles are retrieved from logical unit 10 by calls to subroutine TGALO. If the control card parameter equals "1", this retrieval is suppressed to speed-up the report. The "Supporting Unit Marginal Value" is computed from the LP marginal value by calls to function PIVAL, using the same adjustment logic as in subroutine TRPLST. The "Supporting Unit Subtotal" is the solution value of each supported unit times the coefficient. The "Subtotal Strength" is the "Supporting Unit Subtotal" times the strength of the supporting unit. The "10 Percent Coefficient Marginal Value" is computed from the unadjusted LP marginal value and the solution value of the corresponding supported unit by the formula presented in Chapter 5 of this volume.

## ALHEAD

Subroutine ALHEAD is called by subroutine ALOCAT to eject to the top of a new page and print a heading. ALHEAD calls HEADS to print the standard CONREP heading.

#### TGALO

Subroutine TGALO is called by subroutine ALOCAT to retrieve the title, SRC number, and TPSN of a combat or support unit from FORTRAN logical unit 10. The single calling argument specifies the sequence number of the unit in the model. This is the same as the number of the logical record on unit 10 that is to be read. Common variable ILOC10 stores the number of the logical record last read. If the record wanted is the one last read, TGALO backspaces unit 10 and then reads the record. If the record wanted is greater than the one last read,

TGALO performs dummy reads to skip to the record, and then reads it. If the record wanted is less than the one last read, TGALO rewinds unit 10, performs dummy reads to skip to the record, and then reads the record. The information read is passed to ALOCAT through common variables ITITIE(8), ISRC(3), and ITPSN(2).

## **KJUNPA**

Subroutine KJUNPA is called by subroutine ALOCAT to unpack the DTM numbers of the supported and supporting units of an allocation rule coefficient. There are three calling arguments:

- (a) LOC, the word of array KJCOEF to be unpacked.
- (b) ID1, the DTM number of the supported unit.
- (c) ID2, the DTM number of the supporting unit.

## KJŒTA

Function KJGETA is called by subroutine ALOCAT to determine the sequence number of a unit in the model. The single calling argument specifies the DTM number of the unit. Array DTM(760) is searched until a match is found, and then that location is returned as the function value.

# CSTSTR

Subroutine CSTSTR produces the Peacetime Cost Summary report. This report ignores the single cost function included in the LP model whose wolution is being reported. It instead uses the number of each unit type as derived by the model and the cost factors included in the special Battalion Slice extraction from the FCIS.

Variables initialized within CSTSTR match the routine with this data file. NCST is the number of budget categories included in the file. NCST currently equals 32. CSTLAB(8,32) stores labels for each of these categories. Cost factors for some categories may vary by peacetime stations. NPTSTA is the number of peacetime stations included in the data file. NPTSTA currently equals 6. PTSLAB(2,6) stores labels for each of these peacetime stations. IPTSTA(i,1) specifies whether or not cost factors for category i may vary by peactime station. A value of "l" indicates that they do. IPTSTA(i,2) specifies whether each

budget category is an initial or recurring cost. A value of "l" incicates that the category is an initial cost. If the number and/or type of data in this file is changed, this internal CONREP data must be changed. The data is read from unit 11; unit 11 is rewound at the beginning of CSTSTR execution.

All numbers reported on the first page and the three strength totals are computed and stored in array TOTALS(41,3). The strength totals are retrieved from the slack values of the corresponding alternative objective functions; function RLGL is called. Each record of the cost data file is read, and if it corresponds to a unit that is in the model, those cost factors are multiplied times the number of that unit in the force (stored in array FORSOL). The appropriate subtotals are incremented.

All costs are then scaled in millions of dollars, and the first page of the report is printed on unit 3.

The second page of the report is then produced. First, total initial investment plus ten years operating cost for representative discounting rates is computed and printed. Function DSCNT is called to compute the discount rates. Then the strength totals are printed, and finally the user-specified distribution of units at peacetime stations is noted.

## DSCNT

Function DSCNT is called by subroutine CSTSTR to calculate discount rates used in the Peacetime Cost Summary. Calling arguments specify the nominal interest rate and the number of years. The rate calculated is multiplied times one year's cost in CSTSTR. The rate is calculated by

DSCNT = 
$$\frac{1}{\ln(1+R)}$$
 *  $\left\{1 - \left(\frac{1}{(1+R)^{NPD}}\right)\right\}$ ,

where R is the nominal interest rate and NPD is the planning period in number of years.

## SUMARY

Subroutine SUMARY produces the one-page Force Summary report. It is called from subroutine REPORT whenever the control card is "REPORT SUMMARY". The five lines of comments below the report heading are read from five data cards prepared by the user.

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The number of combat unit types is passed from CONGEN. The number of combat units is computed from the solution values of the combat units. The number of DFE is input by the user.

The combat strength is retrieved from the slack value of the alternative objective function TCSTRN by a call to function RIGL. The support strength is retrived from the slack value of TSSTRN, and the total strength is retrived from the slack value of TFSTRN. The percent combat, combat-to-support ratios, and strength per DFE are computed from these values and the number of DFE.

The combat cost is retrieved from the slack value of alternative objective function TCCOST. Support and total cost are retrieved from the slack values of TSCOST and TFCOST.

The values of the six combat indicators are retrieved from the slack and RHS values of the up to six combat effectiveness indices included in the model. Functions BVAL and RLGL are called. This report always reports six values, and the labels are not variable.

SUMARY then loops on the number of support unit aggregates in the model. For each one, the strength and cost of the alternative are computed from the slack and RHS values of rows "abSTR" and "abCST". The strength and cost force short- or longfall is computed by either comparing the values for this alternative with those in a case 2 LP solution, or from the slack and RHS values of rows "abSTRFD" and "abCSTFD". An input parameter selects which way. The strength and cost requirements short- or longfalls are computed from the slack and RHS values of rows "abSTRRD" and "abCSTRD".

## LPRDOP

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Subroutine LPRDOP is called from subroutine REPORT if a control card is "LP.READ OPTIMA". This routine reads the output of OPTIMA's RECORD procedure. Information is read for use in the heading on each page of each report that uses this LP case. The case number is passed to LPRDOP in common variable IOTA(2). The unit from which the solution will be read is passed in variable IOTA(1).

First column and the row information is read and stored. The name and solution value of all columns with non-zero solution values is stored in common block ANS. The name, RHS value, pi-value, and logical

or slack value of all rows with any one of the three values nonzero is stored in common block RNS.

Information for a case 1 is always stored starting in the first words of the common blocks.

## LPRDMP

Subroutine LPRDMP reads an LP soluti n produced by MPS/360. LPRDMP is called from subroutine REPORT if a control card is "LP.READ MPS/360". This routine reads the output of the CONFORM procedure CONFIL. CONFIL is called from within MPS/360, and translates the output of MPS/360's SOLUTION procedure into a form that is readable by CONREP. LPRDMP first reads information to be used in page headings from two cards following the LP.READ card. It then reads row and column information from a unit specified by common variable IOTA(1). The LP case number is specified by variable IOTA(2). The name, RHS value, pi-value, and logical or slack value of all rows with any one of the three values nonzero is stored in common block RNS. The name and solution value of all columns with nonzero solution values is stored in common block ANS. Information for case 1 is always stored starting in the first words of the common blocks.

# SUPORT

Subroutine SUPORT produces the Unit Support report. It is called from subroutine REPORT whenever a control card is "REPORT SUPPORT i". SUPORT loops on each combat and support unit type in the model, interpreting them as supported units. At the same time, it steps through the allocation rule coefficients, stored in arrays COEF(8000) and KJCOEF (8000). These coefficients are already in supported unit order. One line is printed for each supported unit, and one additional line for each unit required by it on the basis of allocation rule coefficients.

Unit titles are retrieved from logical unit 10 by calls to subroutine TGSPT. This retrieval may be suppressed to speed-up the report.
A control card parameter value of "l" specifies suppression. Solution
values are retrieved from array FORSOL. The requirements deviation
is computed from the solution values of columns "SijkRS" and
"SijkRL". The unit strength and cost are retrieved from arrays STRNTH

and COST. The LP marginal value is retrieved from the marginal value of row "Cijk" or "Sijk". The "direct unit allocation, assuming no requirements deviation" is simply the solution value of the supported unit times the corresponding coefficient. The strength value is simply this number times the strength of the supporting unit. The "direct unit allocation, assuming uniform requirements deviation" is the allocation assuming no deviation times (1 - overall fraction requirements deviation). The 10 percent coefficient marginal value is computed exactly as in subroutine ALOCAT.

## SHEAD

Subroutine SHEAD is called from subroutine SUPORT to eject to the top of a new page and print the heading information for the Unit Support Report. SHEAD calls subroutine HEADS to print the standard CONREP heading lines.

## TGSPT

Subroutine TGSPT is called by subroutine SUPORT to retrieve the title, SRC number, and TPSN of a combat or support unit from FORTRAN logical unit 10. Except for the name, TGSPT is identical to subroutine TGALO. The logic is duplicated to facilitate program overlaying.

## **KJUNPS**

Subroutine KJUNPS is called by subroutine SUPORT to unpack the DTM numbers of the supported and supporting units of an allocation rule coefficient. Except for the name, KJUNPS is identical to KJUNPA. The logic is duplicated to facilitate program overlaying.

## **KJGETS**

Function KJGETS is called by subroutine SUPORT to determine the sequence number of a unit in the model. Except for the name, KJGETS is identical to KJGETA. The logic is duplicated to facilitate program overlaying.

## COVER

RAC

Subroutine COVER is called from subroutine REPORT to print cover pages at the beginning and end of output on unit 3. COVER prints

"CONFORM" in 12 x 10 characters made of "\$s" approximately centered on the page. A "C", "O", "N", "F", "R" and "M" are defined with DATA statements.

# TLISTX

Subroutine TLISTX produces the Unit Deviations report. It is called from subroutine REPORT whenever a control card is "REPORT TRPLSTX i".

TLISTX loops on all combat and then all support unit types. For each one, its title and SRC number are retrieved from unit 10 by a call to subroutine TGTLX. The unit strength and cost are retrieved from arrays STRNTH and COST. The LP marginal value is the marginal value of row "Cijk" or "Sijk". It is retrieved by a call to function PIVAL.

The fractional and integer number of units of each type are retrieved from arrays FORSOL and IFRSOL. They are multiplied by the strength of the unit to get the fractional and integer number of men in the force. Force deviations are computed from the solution values of columns in this alternative or by comparison with the number of units in a case 2 LP solution. The parameter on the control card selects the method. For combat units, function RETA retrieves the solution values of columns "CijkS" and "CijkL" if deviations are to be computed from structure within the model. For support units the column names are "SijkFS" and "SijkFL". Support unit requirements deviations are computed from the solution values of columns "SijkRS" and "SijkRL".

Subroutine HOLL is called to blank-out zero values.

#### TXHEAD

Subroutine TXHEAD is called from subroutine TLISTX to eject to the top of a new page and print a heading for the Unit Deviations report.

TLISTX calls HEADS or HEADS2, depending on whether one or two LP cases are used in producing the report, to print the standard CONREP heading.

## TGTLX

Subroutine TGTLX is called from subroutine TLISTX to retrieve the title, SRC number, and TPSN of a unit from FORTRAN logical unit 10. Except for the name, TGTLX is identical to TGTD. The logic is duplicated to facilitate program overlaying.

RAC

the No. 2 to war a

# Appendix F

# CONREP SOURCE PROGRAM LISTING

The CONREP Source Program (IEM 360 FORTRAN IV) is listed here. The order of routines and the page numbers on which they begin is:

CONREP	307
REPORT	307
BRK3DG	310
INTHOL	311
BETA	311
BETA3	312
BVAL	313
BVAL3	314
DEATH	315
HEADS	315
HEADS2	315
HOLL	315
MASK	317
NAME4	317
WRL	318
ZERO	318
Block Data TRANS	318
INITZ .	318
BININ	319
HORDER	320
TORDER	320
SOLSTR	321
TRPDCK	322
TGTD	323
	REPORT  BRK3DG  INTHOL  BETA  BETA3  BVAL  BVAL3  DEATH  HEADS  HEADS2  HOLL  MASK  NAME4  WR1  ZERO  Block Data TRANS  INITZ  BININ  HORDER  TORDER  SOLSTR  TRPDCK

Preceding page blank

305



TRPLST	323
TLHEAD	326
TGTL	326
ALOCAT	327
ALHEAD	329
TGALO	329
KJUNPA	330
KJGETA	330
CSTSTR	330
DSCNT	334
SUMARY	335
LPRDOP	339
LPRDMP	342
SUPORT	344
SHEAD	346
TGSPT	346
KJUNPS	347
KJGETS	347
COVER	348
TLISTX	349
TXHEAD	351
TGTLX	352

```
MEMBER NAME CONREP
      .. OVERLAY ( MASTER . 2. 0)
                                                                                                                                                  60 202 100
            PROGRAM CORREPCTIPUT =1 93, OUTPUT=100, TAPEL=IMPUT, TAPEZ, TAPES,
                                                                                                                                                 03333.30
           مرسرين ( ۱۲۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ - ۱۵۵ -
                                                                                                                                                  06 036 400
 Č
                                                                                                                                                  03633500
            COMMON /AGG/VACGR. AGGL431251
                                                                                                                                                  DGLJJLJJ
                                                                                                                                             .... 06 300703
            COMMON/ANS/19175001
            COMMON /DESCRP/STRATH( 740) . DTM(760) . COST( 760)
                                                                                                                                                  COMMON /EFF/NEFF.EFFLAT(6.3),EFF(60.6)
                                                                                                                                                  464-4434
            COMMON /FURSOL/FORSOL(760.2). IFRSUL(760.2)
                                                                                                                                                  00001000
            SDAGI, IE, EE 133, 31, IPAGE
                                                                                                                                                  30331100
            SMEN, SMAP, (OOCE ) 790 DLA, (CCOR ) 79C2 SAC NOMPOD
                                                                                                                                                  03011200
            COMMON /RESOLU/YCU49T. YSUPRT, NPRAM, NPRAMU
                                                                                                                                                 00001300
            (COCOS IRI \ZNR\NOMPO)
                                                                                                                                                  00001400
            COMMON/STAT/YOUL (3), NROY (3), CREAD(3)
                                                                                                                                                 UL JUISJ
            CUMMUN/SYMPOL/NSYMA(37)
                                                                                                                                                  00031-33
            INTEGER DTY
   .... INTEGER AGGLAS
                                                                                                                                                 00002300
                                                                                                                                                 36302130
                                                                                                                                                 00 002200
            CALL SUBROUTIVE INITE TO INITIALIZE VARIABLES AND ARRAYS AND
                                                                                                                                                  20075200
   TO CALL SUBROUTINE BININ TO READ A BINARY FILE OF DATA PREPARED BY CONGEN.
                                                                                                                                                  ひいいとっろい
                                                                                                                                                 36037533
                                                                                                                                                 JC 302033
           CALL MARKET 10HINET
                                                                                                                                                 JU 302733
            CALL OVERLAYISHSTART, 1, 2, 31
                                                                                                                                                 30 77593º
            CALL INITE
                                                                                                                                                 00002533
                           CALL THE ROUTINE / REFORT / THAT CONTROLS ORCER AND
                                                                                                                                                 00303.30
                           CONTENT OF SIVEN CONFORM REPORT.
                                                                                                                                                 0000 1430
                                                                                                                                                 3033333
           CALL REPORT
           STOP
                                                                                                                                                 CUCE 60.00
            EYD
                                                                                                                                                  الدنية والمؤونون
            SUBROUTINE REPORT
                           30 2 1433
C
                                                                                                                                                 ひし シレーンシン
                            SUBROUTINES ARE CALLED FAON /PEPORT/. MESSAGES ARE
                            ISSUED FOR & VANIETY OF AMORMAL CONDITIONS.
                                                                                                                                                 34 -- 4 ---
           COMMON/CHECKE/ITEST(25)
           COMMON/SYNSOL/NSYNSESTA
                                                                                                                                                 0600--00
           COMMON/COMMO/10TALL61
           COMMON /DRDEN/1740
           DIMENSION IXIZZI, WERTIZI, NARGILAI, MPST VP (4)
           EQUIVALENCE (ITESTELL, INDL). (11ESTELL, INDL). (ITESTELL, INDL)
                                                                                                                                                 1000000
           EQUIVAL ENCELLTESTIAL, LTILLI
                                                                                                                                                 درد ولاد ود
                           MARG CUNTAINS THE SUBREPORT PHRASE ARGUMENTS USABLE
           ANSURY, CHERY, ANSUPP, CHOCK , CHERY, CHISTE /
MPSTYP CONTAINS PHRASES PERMITTED AS ARGIMFATS OF
                                                                                                                                                しししいっとう
                                                                                                                                                0000000
           PATA PETTP/HAPTI. APPA, . CACHA. / CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACHA. . CACH
                                                                                                                                                06 36 3533
                                                                                                                                                Letuus
                           MARYER CONTAINS THE MUMBER OF ALLOWABLE CONTRUL VEROS.
                                                                                                                                                LLTCUL DO
                           MYER CONTAINS THE PHRASES ALLOWED AS CONTROL YERRS--
                                                                                                                                                د ده د د د د د
```

```
MEMBER NAME CONREP
                         REPORT, SET, ENOREP, LP.READ.
                                                                                     ひしゅうちょ
           DATA MARYER/A/, TYER/AMAEPO, SHRT, SHSET, IN , AMENOR, SHEP.
                                                                                     2011243-
            MATAGE CONTAINS THE NUMBER OF ALLOWABLE ARGUPENTS OF
                                                                                     wholm
                                                                                     43336664
                    THE VEAS REPURT.
                                                                                     00000 AO
           DATA MAKA43/ T/
                                                                                     يدويد للقالب
           CALL OVERLAYISHCOVER.29.0.11
____ C
                                                                                     ددومندفد
           CALL OVERLAYISHCOVER.20.0.11
                                                                                     لالمود للل باللا
           CALL COVER
                                                                                     3336663
           CALL COVER
                    AFGIN EXECUTION --
                                                                                     06369430
                    INITIALIZE THE YERS IN COUNTER.
                                                                                     30 36 7633
        99 1 . 0
    "S" READ WHAT SHOULD BE A VERB CARD IN USER DECK."
C 100 READ(1.1) LCON1.LCOV2.IRG1,18G2.INO.IMD1.14D2.IMD3.
                                                                                     330-7263
         AEAD (1,1.6N)-2011 LCOY1, LCOY2, LARS1, LARS2, LND, LND1, LND2, LND3,
          · +1x1,1,J-1,221,FV44
                                                                                     0321300
         1 FORMATCIX, +4+, 11, 313, 2212, F9.41
                                                                                      درهاسا
                    ******
                              THIS IS THE COC ENOTILE CHECK .....
                                                                                     03347743
           IFIEDF. 11 201. 101
                                                                                     433-13-3
                    ADVANCE THE YERR IN COUNTER.
                                                                                     04007904
      101 1 . 1 . 1
                                                                                     3033633
                    TEST IF YERS IN COUNTER EXCEPS ALLOWABLE NUMBER -- 1.F. WHETHER CARD DOTS NOT CONTAIN LEGAL YERB.
                                                                                     OL 036 233
           IFII.GT.MATVEN | GO TO 200
                                                                                     دود وننوع
                    TEST GIVEN VERA AGAINST ACFERENCE TABLE /NVER/. TWO STEPS. JUJJOHUJ
           IFILCONI. VE. VVEAL 2-1-111 GO TO 101
                                                                                     03000500
           IFILCONZ.NE.NVERIZ-III GO TO 101
                    HERE ONLY IF GIVEN VERR MATCHED -- GO TO MEST STEP
                                                                                     00000700
                    IMPLIED BY VERS IO.
                                                                                     03310003
           GO TO (300, 301, 302, 303, 104, 305, 304), 1
                                                                                     دنه ويدوه
                   MERE BECAUSE VERB IS /REPURT/ -- MUST DETERMINE WHICH SUBMEPORT IS WANTED.
                                                                                     بحدونجيد
                                                                                     03634137
                    INITIAL COUNTER FOR REPORT ARGUMENT ID.
                                                                                     かかんちょう
      300 1 - 0
    C
                    ADVANCE REPORT ARGUMENT TO COUNTER.
                                                                                     0004 5 600
                                                                                     00137537
                    TEST WHETHER REPORT ARGUMENT COUNTER EXCEPOS MIPARA
                                                                                     للمؤيديل
                   OF ALLOWABLE ARGUMENTS - I.E. ARGUMENT IS NOT LEGAL.
    C
                                                                                     fall by the Pool
           SCS OF GD (SPAPAM.TO. 172
                                                                                     00639452
                    TEST GIVEN REPORT ARGUMENT AGAINST REFERENCE TABLE /NARG/
                                                                                     ひょうりょ
                    TWO STEPS.
           IFITARGL.NE. NAMGIZ-1-111 GO TO 310
                                                                                     44313133
           IFI LARGE . NE . YEAG! 2-111 50 TO 310
                                                                                     22217577
                   HERE ONLY IF REPORT ANGUMENT MATCHED.
NOW GIT TO APPROPRIATE SUBREPORT CALLING SEQUENCE.
                                                                                     دند د ۱ د ده
                                                                                     09017-77
           63 10 (401.432.493.404.465.406.4071.1
                                                                                     درد درن درد
                   HERE IF /TRUMP LIST/ SUBREPORT IS MANTED.
    C 401 CALL DYFRLAYIGHTAPLST. 2.0.01
           CALL TAPLST
                                                                                     6301-630
    401
           63 10 99
                                                                                     600.040
                   HERE IF /TANOP DECK/ SUBMEPRAT IS WANTED.
                                                                                     00011133
    402 CALL OVERLAY ( SHTRPDC 4. 3.0.0)
                                                                                    434.1144
          CALL TPPOCK
                                                                                     20011433
    405
           63 TO 99
                                                                                     30011333
                   HERE IF JUNIT ALLOCATIONS/ SURREPORT IS WANTED.
                                                                                    JOU . 1 ...
    C 403 IF (10RD.WF.1) CALL OVERLAY(6HHORDER, 1, 0, 0)
                                                                                    20371503
           IF (1040. YE. 1)
    493
                              CALL HORDER
                                                                                     300,100,
```

```
WEMBER HAME CONSEP
       CALL OVERLAVIONAL OCAT. 4.0.01 .
                                                                                   30 ... 733
       CALL ALDCAT
                                                                                   03011835
       63 10 99
                                                                                   00011500
                HERE IF /PEACETIME COST AND STRENGTH SURMARY/ SUBREPORT
                                                                                   333.23.3
                                                                                   33-11133
                IS WANTED.
C 404 CALL OVERLAVIONESTSTR.S.O.O.
                                                                                   DUGLECAJ
                                                                                   3334 < 343
                                                                                   03012044
       64 10 99
C 405 CALL OVERLEYIONSUMARY.6.0.01
               HERE IF /FORCE SUMMERY REPORT! IS MANTED.
                                                                                   60011300
                                                                                   3031 5033
495
       CALL SUMMAY
                                                                                   06012730
       60 10 11
 HERE IF /WIT SUPPORT REPORT/ IS MANTED....

400 IF (104).NE.)) CALL DYTELAY(MIDADER.1.0.3)

60 IF (104D.NE.0) CALL TOADER

CALL DYTELAY(MISUPORT.7.0.0)
                                                                                   ---
                                                                                   2101 2-17
404
                                                                                   0061 1100
                                                                                   30313232
       CALL SUPURT
                                                                                   06-31 3 333
       60 13 99
                                                                                   COUL 140
                HERE IF JERPAYOFO TROUBLIST REPORTS IS WANTED.
 407 CALL DVERLATIONTLISTY. 8. 7.01
                                                                                   33363630
     CALL TLISTE
                                                                                   00011733
       60 10 99
                                                                                   MERE IF YERS IS /SET/. INITIALIZE ARGUMENT CCUMTER.
                                                                                   3354 A93.
                                                                                   2001 - LUJ
                CURRENTLY UNUSED
       ac tuan
                                                                                   22214100
                                                                                  163.4:03
                HERE IF YEAD IS JENDAFPJ. PRINT END REPORTER MESSAGE AND
                ACTURN TO PFDACE FOR TERMINATION.
                                                                                  0001-100
  302 CALL SECONDIEL
                                                                                   3331 4433
       PRINT 6. E
                                                                                   みるしゅうしょ
       FURNALISHO, JOHEND OF COVACE RUN / CUN CP .. F10.3. 8H SECONDS1
                                                                                   06-14-33
                                                                                  0031-73-
       CALL OVERLAYESHOOVER. 20.0.13
       CALL DVEPLATISHEDVER. 20. 3.11
                                                                                   2031 4000
       CALL COVER
                                                                                   00014700
                                                                                  00012000
       ALT JAN
                                                                                   30015133
       HERE IF VERS IS AP.READY. INDI IS FILE ON WHICH LP SOLN
TO BE INPUT IS LUCATED -- TAPEZ OR TAPEZZ PERMITTED.
IF INDI.NE.Z.AD.I'VII.NE.ZZI GO TO 206
                                               INOL IS FILE ON WHICH LP SOLN DOULS AU
                                                                                  JO 31 5 344
                                                                                  30313403
103
                INITIALIZE WAS TYPE ARGUPENT COUNTER.
                                                                                  0001 > 200
                                                                                   1001 > > - -
                ADVANCE MPS TYPE ARGUMENT COUNTER.
                                                                                  033.573.
                TEST IF GIVEN HPS TYPE MATCHED AN ALLOWABLE CHE --
                                                                                   030: > 930
               MPS/360 OR OPTIMA.
                                                                                   دادنا ونادن
       TEST GIVEN MES TYPE ARGUMENT AGAINST REFERENCE TABLE
                                                                                   30615100
C
                                                                                   23010571
                /mestye/. Two stees.
                                                                                  2001-101
       IFITAGE . NE . NPSTYPTZ+1-111 GO TO 600
                                                                                  20310033
       IFITARGE, NT. NPSTYPEZ-III GO TO 600 HERE ONLY IF GIVEN MPS TYPE MATCHED - GO TC PROPER
C
                                                                                  333.0033
                INPUT AFADEA.
       CALL PAREZI JOHL P. READ
                                                                                  3641 000
       1041 + 11141C1
                                                                                  20210000
                                                                                  0001/600
       6) 10 (610.620).1
                                                                                  030.7133
               OPTIMA READER -- INOI - INPUT TAPE, INDE - LP CASE.
                                                                                  00017200
610
       CALL LPROOP
                                                                                  03017350
       60 10 425
                                                                                  00011433
```

(BAC)

```
MEMBER NAME CONREP
               MPS/360 READER -- PARAMETERS AS FOR OPREAD.
                                                                                 30317533
620
       CALL LPROMP
                                                                                 36617603
       CALL SOLSTR
                                                                                 00017700
       CO TO 99
                                                                                 JOJI 76.J
               UNUSED
                                                                                 2061 74.3
  304 RETURN
                                                                                 0201937
               UNUSED
                                                                                 303.8133
  305 RETURN
                                                                                 36314230
                                                                                 といしはましょう
  306 RETURN
                                                                                 00018433
               HERE IF UNRECOGNIZABLE VERB ENCOUNTERED. PRINT DIAGNOSTIC.GOOLDSJJ
  200 PAINT 2.LCOMI.LCOM2
                                                                                 00014600
    2 FORMATIZZHIUMMECOGNIZABLE VERB--- ,244,9H-SKIPPED.)
                                                                                 30014735
       60 10 11
                                                                                 06014003
               HERE IF ENDFILE ENCOUNTERED BEFORE VERB /ENDREP/.
                                                                                 06014403
  201 PRINT 3
                                                                                 00019302
    3 FORMATIZTHIPHEMATURE ENF ENCOUNTERED. I
                                                                                 363.413.
      STOP
                                                                                 26014361
                                                                                 30319303
               HERE IF GIVEN ARGUMENT OF VERS /REPORT/ IS NOT LEGAL.
  202 PRINT 4. IARGI. INRGZ
      PORMATIZINIUMRECOGNIZABLE SURREPORT--, 244, 10H--SKIPPED. 3
      60 10 11
                                                                                 COOP 10CO
               HERE IF GIVEN ARGUMENT OF VERB /SET/ IS NOT LEGAL.
                                                                                 60014700
  203 PRINT S. IARGI, IAASZ
                                                                                 300166...
      FORMATIZAMIUM ECOSNIZADLE VARIABLE -- . ZA4, 10H--SKIPPEC. ]
                                                                                 60019903
      60 C1 C3
                                                                                 3432333
               HERE IF A MEEDED CALLING PARAMETER IS ZERO.
                                                                                 00023160
  204 PRINT T
                                                                                 00040203
     7 FORMATIAGMINECESSARY PARAMETER MISSING. AGENOUM SKIPPED. I
                                                                                 4242424
      60 10 11
                                                                                000204-1
                                                                                 00020 564
               HERE IF GIVEN MPS TYPE ARGUMENT OF LP. READ IS ILLEGAL.
  205 PRINT 8, 144 G1, 144 G2
                                                                                 ىدە ئەلەلد
      FORMATI 27H UNAECUGYIZABLE LP SYSTEM--, 244,13H--JOB KILLED. J
                                                                                 60323753
      1100
                                                                                 00020801
               HERE IF LP SOLY IS GIVEN AS INPUT ON OTHER THAN THEEZ OR
                                                                                63023904
               TAPELZ.
                                                                                 300 L L L
  204 PRINT 9, 1401
                                                                                 0004110
    9 FORMATI SH TAPE, 13, 29H NOT ALLOWED FOR LP SOLUTION. .
                                                                                 30 32 1 200
        SAN ONLY 2 AND 12 ARE OG. JOB CILLED. 1
                                                                                 33341333
                                                                                 03041-01
      SUBABUTINE BAR JUSTI, 11, 12, 131
                                                                                 June 15:1
                                                                                 بده ۱ عددد
                                                                                 360217-
                                      7 061 70
C
                                                                                 30021803
         BRESDE IS A FORTRAY IN FUNCTION SUPPRIGRAM THAT ACCEPTS
         A 3-DIGIT INTEGER AS ONE CALLING PARAMER AND RETURNS THE
                                                                                 33055300
        3 BIGITS AS 3 HOLERITH CHARACTERS AS FORMAL PARAMETERS.

BRESDG CALLS FUNCTION INTHOL AND IS USED TO PREPARE UNIT
EDENTIFICATION MINBERS FOR USE IN MOREL ROW AND CCLUMN NAMES.
                                                                                 DUUZA 163
                                                                                 44422244
                                                                                03022300
                                                                                30022400
                                                                                 30022303
                ... 3-DIGIT INTEGER INPUT FOR BREAK-UP AND CCAVERSION
                                                                                 363226-3
                   FROM INTESER TO HOLERITH.
                                                                                00022703
              11 ... LEFT-MOST DIGIT AFTURNED AS A MILERITH CHARACTER
                                                                                35-22233
              12... SECTIO DIGIT RETURNED AS A HOLLENITH CHARACTER
                                                                                 10022931
              13... AIGH-MOST OIGHT ACTURAGE AS A HOLLERITH CHARACTER
                                                                                 1995 1971
                                                                                00041101
                                                                                0002 1233
```

```
MEMBER NAME CONREP
                                                                                                                                                                   ..... 30023303
                                  BREAK APART DIGITS
                                                                                                                                                                                    33323400
              11 = 1 / 100
                                                                                                                                                                                   00023500
                                                                                                                                                                                   30023000
          12 = ( 1 - (11+100 + 13) ) / 10
                                                                                                                                                                                   00323730
                                                                                                                                                                                   00023000
                                  CONVERT EACH DIGIT FROM INTEGER TO HOLLERITH BY A CALL ...
                                                                                                                                                                                   00023400
                                TO FUNCTION INTHOL.
                                                                                                                                                                                   06324303
               11 = INTHOL( 11 )
12 = INTHOL( 12 )
13 = INTHOL( 13 )
                                                                                                                                                                                   00024300
                                                                                                                                                                                   00024400
                                                                                                                                                                                   00024500
               RETURN
                                                                                                                                                                                   00024600
                                                                                                                                                                                   30324735
                                                                                                                                                                                   30024800
               FUNCTION INTHUL(1)
                                                                                                                                                                                   ひしいと ヤマンノ
                                                                                                                                                                                   30025333
                                                                                  20025105
                                                                                                                                                                                   33325230
                    A FORMAL PARA HETER ON INTEGER DIGIT (3.1....9) AND RETURNS
                                                                                                                                                                                   JU02530J
                   THE HOLLERITH CHARACTER FOR THAT DIGIT (ZERO DR NULL) FOR 1=1,916302>>00
                                                                                                                                                                                   00025000
              . . I ... INTEGER 0,1,... OR 9
                                                                                                                                                                                   0002570
                                                                                                                                                                                   00025400
                                                                                                                                                                                   36025933
              COMMON /SYMBOL/NSYMB(37)
                                                                                                                                                                                   30026633
                                                                                                                                                                                   00020100
                                                                                                                                                                                   06326233
                      IF I IS NEGATIVE OR GREATER THAN 9. PRINT AN ERROR HESSAGE
                   ON LOGICAL UNIT & AND TERMINATE FORGEN EXECUTION BY STOP 0003
                                                                                                                                                                                   00026500
               IF (1.LT.O.OR.1.GT.9) GO TO 20
                                                                                                                                                                                   30:20633
                                                                                                                                                                                  00026703
                      IF I IS 1,2,...OR 9, ITS HOLLERITH CHARACTER IS IN ARRAY NU.
                                                                                                                                                                                  00023800
                                                                                                                                                                                   16020477
              IF (1.EQ.0) GO TO 10
                                                                                                                                                                                   06327333
                                                                                                                                                                                  00027100
                                                                                                                                                                                  30327233
                      IF I IS O. ITS HOLLERITH CHARACTER IS VARIABLE ZERO.
                                                                                                                                                                                  06327433
10
               INTHOL - MSYMS(27)
                                                                                                                                                                                  33027630
              RETURY
20
              PR INT 30.1
            FORMAT(1H1////1H ,42H+++++ FUNCTION INTHOL WAS CALLED WITH I -
30
                                                                                                                                                                                100054100
                                                                                                                                                                                  36324233
                                                                                                                                                                                  00024432
                                                                                                                                                                                  00 324 534
                                                                                                                                                                                   JU JE BOU J
              FUNCTION BETALMENT, ME, ME, ME, ME, NO. NO.
                                 INTERNALLY COLLED WHENEVER THE SETA VALUE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF A VECTOR IS JUJULE OF
                                 RETIANS BETA VALUE OF VECTOR NAMED NI.NZ.NJ.NA.NJ.NA.NT.NBOJOZPOJO
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		CHRE	B NAME CONDER	
	-	EUDE	R NAME CONREP	00.1201.1.1
••		-	COMMON/SYMBOL/NSYMB(37)	00029100
			CUNTUN ZANNZALIAZTUJI	03029203
			COMMON/STAT/NCOL(3), NROW(3), CREAD(3)	
			COMHON/IDN/N4ME(2)	30127401
			DIMENSION [3(3,2500]	30329533
			EQUIVALENCE (IH,4)	JUUZYOUJ
	C		DUT FIRST FOUR CHARACTERS OF VEC NAME IN NAME(1) AND 2ND	0002970J
	C		FOUR IN NAME(2). THIS TWO WORD USE IS A CONCESSION	JU 029 300
	C		TO IBM 360.5.	06024400
••••		•	NAME(1) = NAME + (N1, N2, N3, N4)	00030000
			NAME(2) = NAME4(N5.N6.N7.N8)	00033133
• • • • •		• • • • •	MCDL = NCOL(1)	00030200
	C		BEGIN SIMPLE SEQUENTIAL SEARCH OF NAMES IN / 18 /.	30030300
	•		D3 100 I=1.MCDL	03333433
	C.		IF NO NAME MATCH. CONTINUE.	36033535
*** *	•		IF(IB(1,1).NE.NAME(1)) GO TO 190	00040600
			IF(IB(2, I).NE.NAME(2)) GO TO 1CO	00030700
• •	C			00030100
	č		VALUE IN BETA.	00030900
	C		DETA = A(3,1)	33031655
	-			00031133
	C		AND RETURN.	
			RETURN	00031200
	_	100	CONTINUE	00031333
	Ç		HERE ONLY IF NO NAMES MATCHED, HENCE ZERO BETA VALUE	03034433
	C	. <b>.</b>	IMPLIED.	00071200
			BETA = 0.0	00031600
			RETURN	00031 100
			END	00031400
			10.001.01 061-3110-31110-31110-3110-3110-3110-3110	
	C		PFDREP 1.4 27 FEBRUARY 1970	70735700
	C		INTERNALLY CALLED WHEN A CASE-SPECIFIC BETA VALUE IS	63332103
	•			
	C		WAYTED. RETURNS DETA VALUE FROM LPCASE /ICASE/ FOR THE	10002201
	Č		VECTOR NAMED NI.NZ.NZ.NZ.NG.NZ.NG. NZ.NG.	
	Č		SONTON DE SENTEN SENTEN SENTEN EN SE SENTEN SE SE SE SE SE SE SE SE SE SE SE SE SE	10002201
	Č		SONTON DE SENTEN SENTEN SENTEN EN SE SENTEN SE SE SE SE SE SE SE SE SE SE SE SE SE	10032201 00332300
-	Č	••	SONTON SONTON SONTON SONTON CONTRACTOR SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTON SONTO	30032203 00352330 00332430
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40.	Č	••	-64.74.64.64.64.64.64.64.64.64.64.64.64.64.64	30032203 00032300 00032400 00032500 00032600
	Č		VECTOR NAMED N1.N2.N3.N4.N5.N6.N7.N8.  (TENMONLYNSYMBLOT)  (D) YNSYMCHOO)  (D) YNSYMCJ.EANSYMCJ.  (COMONLONING (2)  (COMONLONING (2)  (COMONLONING (3).NROW(3).CREAD(3)	10032201 00032300 00032400 00032500 00032600 00032700 00032800
			VECTOR NAMED N1.N2.N3.N4.N5.N6.N7.N8.  CDN4DN/SVANIL/NSYB137)  CDN4DN/SVANIL/NSYB137)  CDN4DN/SDNANN(12)  CDN4DN/SDNANN(12)  CDN4DN/SDNANN(13).CREAD(3)  DIMFNSIDN [31,2500)  EQUIVALENCE (18,4)	10032201 00032300 00032400 00032500 00032600 00032700
•	•••		SOURCE CONTRACT OF CREACE OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF C	00032200 00032400 00032500 00032500 00032700 00032400 00032400
	c	••	VECTOR NAMED NIONZONSONSONSONSONSONSONSONSONSONSONSONSONSO	00032200 00032300 00032500 00032500 00032600 00032700 00032500 00033000 00033100
	c	••	VECTOR NOTON OF NOTON OF NOTON OF NOTON OF NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON OR NOTON	00032200 00032300 00032500 00032500 00032600 00032600 00033500 00033500
	CC		VECTOR NAMED NIONZONSONSONSONSONSONSONSONSONSONSONSONSONSO	00032200 00032400 00032500 00032500 00032700 00032500 000332500 00033100 00033100
	CCC		VECTOR NA MED N1.N2.N3.N4.N5.N6.N7.N8.  COMMON/SYMBIL/NSYMBI37)  COMMON/SINCHAME (3).2500)  COMMON/STAT/COL(3).NROW(3).CREAD(3)  DIMENSION [8(3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME+(11.12.43.N4)  NAME(2) = NAME+(11.12.43.N4)  SET SEARCH LIMITS FOR APPROPRIATE CASE.	00032300 00032300 00032500 00032500 00032700 00032700 0003300 00033100 00033100
	CC		VECTOR NAMED NI.N2.N3.N4.N5.N6.N7.N8.  COMMON/SYMBIL/NSYMBI37)  COMMON/SIMIL/NSYMBI37)  COMMON/SIMIL/NSYMBI37)  COMMON/SIMIL/NSYMBI37)  COMMON/SIMINAME(2)  COMMON/SIMINAME(2)  COMMON/SIMINAME(2)  EQUIVALENCE (18.4)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  MAME(1) = NAME+4(11.12.13.N4)  SET SEARCH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 WANTED.	00032200 00032300 00032500 00032500 00032700 00032400 00033100 00033100 00033400 00033400
	CC		VECTOR NA MED N1.N2.N3.N4.N5.N6.N7.N8.  CDNMN/SYMBIA71  CDN ON ANS/AI 3.2500)  CDN ON ANS/AI 3.2500)  CDN MANCAI (3.2500)  CDN MANCAI (3.2500)  EQUIVALENCE (13).NROW(3).CREAD(3)  DIMENSION (3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME 4(11.72.73.N4)  NAME(2) = NAME 4(15.76.77.N8)  SET SEARC 4 LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210	00032300 00032300 00032300 00032300 00032700 00032400 00033200 00033100 00033200 00033300 00033500
	CCC		VECTOR NA MED N1.N2.N3.N4.N5.N6.N7.N8.  COMMON/SYMBIL/NSYMBI37)  COMMON/SYMBIL/NSYMBI37)  COMMON/STATINGOLI31.NROW(3).CREAD(3)  COMMON/STATINGOLI31.NROW(3).CREAD(3)  DIMPNSION 18(3,2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CMARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME4(1).W2.W3.N4)  NAME(1) = NAME4(N5.W3.N4)  SET SEACH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1P(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THCSE OF CASE	00032200 00032300 00032500 00032500 00032700 00032400 000332400 00033100 00033200 00033300 00033500
	CC	200	VECTOR NA MED N1.N2.N3.N4.N5.N6.N7.N8.  VECTOR NA CONT.NC.NO.NO.NC.NO.NC.NO.NC.NC.NC.NC.NC.NC.NC.NC.NC.NC.NC.NC.NC.	00032200 00032400 00032500 00032500 00032500 000332500 00033100 00033500 00033500 00033500 00033500
	CC	200	VECTOR NAMED NI.NZ.N3.N4.N5.N6.N7.N8.  CONMON/SYMBIL/NSYMBI37)  CONMON/SYLINAMEIZ)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME4(1).72.43.N4)  NAME(2) = NAME4(N5.N6.N7.N8)  SET SEARCH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THESE OF CASE 1 COLUMN STOAPGE.  LCOL = 1	00032200 00032400 00032500 00032500 00032500 0003300 0003300 0003300 00033500 00033500 00033500 00033500 00033500
	CC	200	VECTOR NAMED NI.NZ.N3.N4.N5.N6.N7.N8.  CONMON/SYMRIL/NSYMB(37)  CONMON/SYMRIL/NSYMB(37)  CONMON/SYMRIL/NSYMB(37)  CONMON/SYMRIL/NSYMB(2)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME+4(11.12.13.N4)  NAME(1) = NAME+4(11.12.13.N4)  SET SEATCH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THESE OF CASE  LCOL = 1  MCOL = NCOL(1)	00032200 00032300 00032500 00032500 00032700 000332700 00033100 00033100 00033500 00033500 00033500 00033500
	CC CC CC.	200	VECTOR NA MED N1.N2.N3.N6.N7.N8.  COMMON/SYMBIL/NSYMBI37)  GD YON ANS/AI 3,2500)  COMMON/STAT/NCOLI31.NROWI3).CREAD(3)  DIMENSION 18(3,2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2NO 4  IN NAME(2).  MANE(1) = NAME(2).  NAME(1) = NAME(11.72.73.N4)  SET SEATCH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(ICASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THOSE OF CASE  1 COLUMN STOAPGE.  LCOL = 1  MCUL = NCOL(1)  GO TO 250	00032200 00032300 00032500 00032500 00032700 000332700 00033100 00033500 00033500 00033500 00033500 00033600 00033600 00033600 00033600
	CC		VECTOR NA MED N1.N2.N3.N6.N7.N8.  COMMON/SYMRIL/NSYMB(37)  GD 'ON ANS/A(3,2500)  COMMON/IDN/NAME(2)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION (8(3,2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME(11.12.43.N4)  NAME(1) = NAME(11.12.43.N4)  SET SEARCH (15.V6.V7.N8)  SET SEARCH (15.V6.V7.N8)  SET SEARCH (15.V6.V7.N8)  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210  HERE FUR CASE 1. SET LIMITS FOR SEARCH TO THESE OF CASE  1 COLUMN STOAPGE.  LCOL = 1  MCUL = NCOL(1)  GO TO 250  HERE IF NOT SASE 1. SET LIMITS FOR 1CASE.NE.1.	00032200 00032300 00032500 00032700 00032400 00033200 00033100 00033100 00033600 00033600 00033600 00033600 00033600 00033600 00033600 00033600 00033600 00034600 00034600
	CC CC CC.		VECTOR NA MED N1.N2.N3.N6.N7.N8.  COMMON/SYMRIL/NSYMB(37)  CDMON/SYMRIL/NSYMB(37)  CDMON/ANS/A(3,2500)  CDMON/IDN/NAME(2)  DIMENSION (3(3,2500)  EQUIVALENCE ((8,4)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME4(1).V2.V3.N4)  NAME(2) = NAME4(15.V6.V7.N8)  SET SEARCH (15.V6.V7.N8)  SET SEARCH (15.V6.V7.N8)  TEST FOR CASE 1 MANTED.  IF(ICASE.NE.1) GO TO 210  HERE FUR CASE 1. SET LIMITS FOR SEARCH TO THESE OF CASE  1 COLUNN STOAPGE.  LCOL = 1  MCUL = NCOL(1)  GO TO 250  HERE IF NOT CASE 1. SET LIMITS FOR ICASE.NE.1.  LCOL = NCUL(ICASE-1) + 1	00032200 00032300 00032500 00032700 00032700 00033200 00033100 00033100 00033500 00033100 00033100 00033100 00033100 00033100 00033100 00033100 00033100 0003400 0003400
			VECTOR NAMED N1.N2.N3.N4.N5.N6.N7.N8.  CONMON/SYMRUL/NSYMB(37)  CDYON/ANS/A(3.2500)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME 4(1).72.73.N4)  NAME(2) = NAME 4(1).72.73.N4)  SET SERCH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THOSE OF CASE 1 COLUNN STOAPGE.  LCOL = 1  MCOL = NCOL(1)  GO TO 250  MERE IF NOT CASE 1. SET LIMITS FOR ICASE.NE.1.  LCOL = NCOL(1CASE-1) + 1  MCOL = NCOL(1CASE-1) + 1	30032200 00032400 00032500 00032700 00032500 0003300 00033100 00033500 00033500 00033500 00033600 00033600 00033600 00034600 00034600 00034600 00034600 00034600
	CC CC CC .	210	VECTOR NA MED N1.N2.N3.N4.N5.N6.N7.N8.  CONMON/SYMRIL/NSYMB(37)  CD MON /ANS/A(3.2500)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3.2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME +(11.12.13.N4)  NAME(1) = NAME +(11.12.13.N4)  SET SE AC + LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1F(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THOSE OF CASE 1 COLUNN STOAPGE.  LCOL = 1  MCUL = NCOL(1)  GO TO 250  MERE IF NOT CASE 1. SET LIMITS FOR ICASE.NE.1.  LCOL = NCOL(1CASE-1) + 1  MCOL = NCOL(1CASE-1) + 1  MCOL = NCOL(1CASE-1) + 1  MCOL = NCOL(1CASE-1)  BEGIN SIMPLE SEQUENTIAL SEARCH OF 1CASE NAMES IN /18/.	30032200 00032400 00032500 00032700 00032500 0003300 00033100 00033500 00033500 00033500 00033600 00033600 00033600 00034600 00034600 00034600 00034600 00034600 00034600 00034600
	CC	210	VECTOR NAMED NI.NZ.N3.N4.N5.N6.N7.N8.  CONMON/SYMRIL/NSYMB(37)  CDYON/ANS/A(3,2500)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3,2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME+(11.72.73.N4)  NAME(1) = NAME+(11.72.73.N4)  SET SEACH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1P(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THOSE OF CASE  LCOL = 1  MCOL = NCOL(1)  GO TO 250  MERE IF NOT CASE 1. SET LIMITS FOR ICASE.NE.1.  LCOL = NCOL(1CASE-1) - 1  MCOL = NCOL(1CASE-1) - 1  MCOL = NCOL(1CASE)  BEGIN SIMPLE SEQUENTIAL SEARCH OF ICASE NAMES IN /18/.  DO 100 (=LCOL.NC.)L	30032200 00032300 00032500 00032500 00032700 000332700 00033100 00033100 00033100 00033100 00033100 00033100 00033100 00033100 00033100 00034100 00034100 00034100 00034100 00034100 00034100 00034100
		210	VECTOR NAMED NI.NZ.N3.N4.N5.N6.N7.N8.  CONMON/SYMRIL/NSYMB(37)  CDYON/ANS/A(3,2500)  COMMON/STAT/NCOL(3).NROW(3).CREAD(3)  DIMENSION 18(3,2500)  EQUIVALENCE (18.A)  PUT 1ST 4 CHARACTERS OF VEC NAME IN NAME(1) AND 2ND 4  IN NAME(2).  NAME(1) = NAME+(11.72.73.N4)  NAME(1) = NAME+(11.72.73.N4)  SET SEACH LIMITS FOR APPRUPRIATE CASE.  TEST FOR CASE 1 MANTED.  1P(1CASE.NE.1) GO TO 210  MERE FUR CASE 1. SET LIMITS FOR SEARCH TO THOSE OF CASE  LCOL = 1  MCOL = NCOL(1)  GO TO 250  MERE IF NOT CASE 1. SET LIMITS FOR ICASE.NE.1.  LCOL = NCOL(1CASE-1) - 1  MCOL = NCOL(1CASE-1) - 1  MCOL = NCOL(1CASE)  BEGIN SIMPLE SEQUENTIAL SEARCH OF ICASE NAMES IN /18/.  DO 100 (=LCOL.NC.)L	30032200 00032400 00032500 00032700 00032500 0003300 00033100 00033500 00033500 00033500 00033600 00033600 00033600 00034600 00034600 00034600 00034600 00034600 00034600 00034600

		IF(18(2.1).NE.NAME(2)) GO TO 100	060349)
• ••		HERE ONLY IF NAME MATCHED. PUT CORRESPONDING SETA VALUE	じじしろうろう
	č	IN HETA.	3003510
		BETA3 = A(3.1)	30 33320
	С	AND RETURN.	0303533
	•	RETURN	0003540
	100		303350
	c	HERE ONLY IF NO NAMES MATCHED-HENCE D.O RETA VALUE IS	JUJ353J
	Č	INPLIED.	30 33 370
	•	BETA3 = 0.0	3033583
		RETURN	303350
		END	0003000
-		FUNCTION BYALL'11, 12, 13, 14, 15, 16, 17, 18)	30336.0
	C	PFDREP 1.4 26 JANUARY 1973	3333623
	Č	CALLED INTERNALLY WHENEVER RHS. PI. OR LGL VALUE	0003030
	Č	IS NEEDED AND CASE A IS IMPLIED.	333343
	Č	RETURNS VALUE FUR ROW NAMED NI.NZ.NJ.N4.NJ.N6.NJ.N6	3003030
•	5	RHS VALUE FOR / BVAL /.	0003660
	Č	PI VALUE FOR / PIVAL /	3303070
	Č.	LGL VALUE FOR / RLGL /	333300
	Č	ENTRIES.	3003093
		COMMON/SYMBOL/USYMB(37)	30 33 700
		COMMON/RNS/RHAT(5,4000)	36 33 713
-	••	CJMMON/STAT/VCUL(3), VROW(3), CREAD(3)	000374
		COMMON/IDN/NAME(2)	333730
• • •	• •	DIMENSION (8(5,400))	000374
		EQUIVALENCE (IR,RMAT)	6003750
		N = 1	06 3376
		G) TO 90	UJ 33773
	C .	ENTRY PIVAL	0001784
		ENTRY PIVAL (N1,N2,N3,N4,N5,N6,N7,N8)	6303743
•		N = 2	2003434
		CP 07 C9	3033010
	C	ENTRY REGL	3033423
		ENTRY RLGL(N1, N2, N3, N4, N5, N6, N7, N8)	6003033
•		4 - 3	JU 33440
	C	PUT 1ST 4 CHARACTERS OF ROW NAMED IN NAME(1) AND 2ND 4	30 3345
• • •	C	IN NAME(2).	3333403
	90	NAME(1) = NAME4(N1, Y2. N3. N4)	30-3-74
		NAME(2) - NAME4(45, No. 47, NO.)	3033463
		MRG# = NROW(1)	36 33 493
	C	SEGIN SEARCH OF ARRAY / IR / FOR NAME MATCH.	0004731
		00 100 1-1-487W	3033473
	C	IF A NAME DOES NOT MATCH. CUNTINUE.	3333423
	•	IF(IR(1,1). VE. NA TE(1)) GO TO ICO	000151
		IF(IR(2.1).NE.NAME(2)) GO TO 100	UL 3344
	C	HERE INLY IF NAME MATCHED. BRANCH ACCORDING TO TYPE OF	ذر ودر دن
	Č	VALUE SUUGHT.	DOUJYOJ
	•	GO TO (110.111.112).4	3603973
_	5	RETURN RHS-VALUE.	035.3
	110	BVAL . MMAT(4,1)	J00195-
		RETURN	2004 303
	C	RETURN PI-VALUE.	30 34 3 1 3
	in	PIVAL - RMATES, ()	3334320
	J - •	RETURN	00 34333
• •	2	RETURN LSL-VALUE.	3037073
	112	ALGL . RHAT(5, 1)	000000

```
MEMBER NAME CONREP
  100 CONTINUE
                                                                          36040733
               HERE ONLY IF NO NAME MATCH, HENCE ZERO VALUE IS IMPLIED.
                                                                          30343800
                                                                          00040900
      BVAL - 0.0
      RETURN
                                                                           J30410JJ
       END
                                                                           30341133
       PFOREP 1.4 -- 27 FERRUARY 1970
INTERNALLY CALLED WHEN A CASE-SPECIFIC RHS. PI. OR LGL
                                                                          UU U4 1 7 U J
                                                                          00341200
               VALUE IS MANTED.
               RETURNS VALUE FROM LP CASE /ICASE/ FOR ROW NAMED
                                                                           JL 41641
               N1, N2, N3, N4, N5, N6, N7, NR
                                                                           JUU417JJ
                    RHS VALUE FOR / BVAL3 /
                   PI VALUE FOR / PIVALS /
                   LGL VALUE FOR / RLGL3 /
                                                                           30342033
               ENTRIES.
      COMMON/SYMBOL/NSYMBIRTI
      COMMON/RHS/RYATES, 40001
      COMMON/STAT/MCOL(3). MROH(3).CREAD(3)
      COMMON/ION/HAME(2)
      DIMENSION 12(5,4000)
      EQUIVALENCE (IR.RHAT)
                                                                          006-270-
      H = 1
      60 TO 90
                                                                          03042905
      ENTRY PIVALS
                                                                          00U+330U
      ENTRY PIVALSTICASE, NI, NZ, N3, N4, N5, N6, N7, NB)
                                                                          30343233
      M = 2
      60 TO 90
                                                                          00043300
      ENTRY REGES
                                                                          000-3400
      100003500
      H - 3
              PUT 1ST 4 CHARACTERS OF ROW NAMED IN NAME(1) AND 2ND 4
                                                                          00041103
               IN NAMETEL.
   TO NAMELLE - NAMESINA, MELISMAN OF
                                                                          204372
                                                                          000-400-
      MAME(2) - MAME4(M5, M6, M7, MA)
              SET SEARCH LIMITS FUR APPROPRIATE CASE.
      IFI ICASE.NE.11 GO TO 210
  200 LROW . 1
      MINON . MEDWILL
                                                                          30344>3-
      63 TO 253
  210 LROW - NRO411CASE-11 + 1
                                                                          00044400
      MROW - MROALICASED
              BEGIN SINPLE SEQUENTIAL SEARCH OF ARRAY /IR/ WITHIN CASE
              LINETS FOR NAME MATCH.
  250 03 100 I-LROW, MRD#
      IF A NAME DOES NOT MATCH, CONTINUE.

IF(IR(1,1).WE.WAME(1)) GO TO 1CO

IF(IR(2,1).WE.WAME(2)) GO TO 1CO
                                                                          ひいいく フィンノ
                                                                          0004>230
                                                                           30341331
              HERE UNLY IF NAME MATCHED. BRANCH ACCORDING TO TYPE OF
               VALUE STUGHT.
      60 TO (110.111.112).4
                                                                          06043603
                                                                          JJ45701
  110 BYALS - RYATIA.II
                                                                          939->BUJ
      RETURN
              PI VALUE.
      PIVALS . RMATIS, !!
111
                                                                          630-0131
      RETURN
      RLGL) - RMAT(5,1)
                                                                          3634033.
                                                                          دردودنو
```

MEME	ER NAME CONREP	
******	RETURN	360+6500
10	O CONTINUE	0004660
C	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
	BYAL3 = 0.0	333-3803
	RETURN	00346533
	EYN	10147331
<del></del>		300+7100
C	PFDREP 1.4 27 FEBRUARY 1970	00047200
	CALLED IF A SUBREPORT CALLED BEFORE LP SOLUTION WAS READ.	
	PRINT 1. ICASE	30047300
	STOP	202-7502
	1 FORMATI 54M ATTEMPT TO PRODUCE SUBREPURT BEFORE LP SCLUTION READ.	
<del></del>	SH CASE, [3,13H JOB KILLED.]	30047730
	EVO	36347833
	SUBROUTINE HEADS	000-7900
Ç	PFDREP 1.4 26 JANUARY 1970	01048000
Š	WRITES STANDARD REPORT HEADING AND NUMBERS PAGES.  # ITITLE(I) CONTAINS LINE 1 AND MEDIARY AND WORKFILE	200-8122
Č	* ITITLE(1) CONTAINS LINE 1 AND MEDIARY AND WORKFILE	00048200
C	NAMES FROM OPTIMA RECORD PAGES.	.00348300
	COMMON/HEDD/ITITLE(33,31,1PAGE	ひしょう はもひろ
	ADVANCE PAGE COUNTER	UQU485UU
	IPAGE = IPAGE + 1	30348633
C.	OUTPUT UPTING RECORD HEADING	UJJ487JJ
	OUTPUT UPTIMA RECORD HEADING WRITE(3,2) (ITITLE(1,1),1=1,33) 2 F3RMAT(1H1,3344)	06 04 1 600
	2 F3RMAT(1H1,3344)	30344735
C	OUTPUT CONREP HEADING	03049333
	CALL WAI	22244122
	RETURN	30349233
	EAD	03349333
	SUBRUUTINE HEADSZ	UCU47703
C		30049503
C	WRITES STANDARD REPORT HEADING FOR 2-CASE SUBREPORTS	33344031
Č	AND NUNBERS PAGES.	00044700
	COMMON/HEDD/ITITLE(33.3).IPAGE	U004940J
C		30044403
	IPAGE - IPAGE + 1	CCOC 5000
C	OUTPUT THO OPTIMA RECORD HEADINGS.	06030130
	WRITE (3,2) ((!T[[LE(1,J).[-1,10].([T[TLE(1,J).[-15,26],	JJU3020J
	• (!T!TLE(!.J).!•20.33).J•1.2)	リンションコンノ
	POPMATIONICASE L , 2844/8H CASE 2 , 2844)	60030400
C	OUIPUT CUNREP HEADING.	しいいかいちょう
	CALL WAI	33353633
	RETURN	00030703
	FYO	30020103
	SUBROUTINE HALLIVAR - HATGIT - MOECT - METRST - NOUT	22023222
	PEDREP 1.4 27 FEBRUARY 1970	2002202
	REAL TO HOLLERITH FORMATTING AND ZERO SUPPRESS ROUTINE.	
C	ARGUMENTS ARE	35-3110-
ž	1. VAR REAL VARIABLE TO BE FORMATTED.	
		900>1300
	2. VDISIT NUMBER OF PRINT POSITIONS CENCLUDING	33031400
Ç	DECIMAL POINT) ASSIGNED.	10-21-27
Ç	3. NDECT NUMBER OF DIGITS TO APPEAR TO RIGHT OF	J0 05 1000
Ç	DECTUAL POINT.	10021331
Ç	IF1. THEN NO DECIMAL PT EVEN IF ABSIVARI.GT	
Ç		36351933
Ç	4. MFINST FIRST POSITION IN ARRAY LINEILBOX	39 725 503 7
	ASSIGNED TO FORMATTED VARIANCE.	30322133
C	5. HOUT DEC. POINT CHARACTER FUR /BSIVARILE.TOL/	10025500

```
MEMBER NAME CONREP
                           O IF ALL BLANKS WANTED FOR ABSIVARILE.TOL.
                                                                              0002300
                           1 IF DECIMAL POINT WANTED FOR ABSIVARILETOL. 30032433
       COMMON/NPRINT/LIVE(130)
                                                                              GGJ3250J
       DIMENSION IDIGIT(10)
                                                                              ひひひっともひし
      DATA INEG/1H-/, 1001/1H./, [AST/1H+/, [BLNK/1H / DATA | IDIG[1/1H0, 1H1, 1H2, 1H3, 1H4, 1H5, 1H6, 1H7, 1H8, 1H9/
                                                                              05052730
                                                                              03352435
               VALUE TO BE REGARDED AS ZERO.
                                                                              30052930
      DATA TOL/0.0/
                                                                              いひひきょいひょ
               SET POSITION OF DECIMAL POINT -- FROM RIGHT.
      MDOTPL = NOECI + 1
       IF (NDEC1.E2.-1)
                          GO TO 10
      INSERT DECIMAL POINT.
LINE(NFIRST + NDIGIT - MONTPL) = IDOT
                                                                               16353434
                                                                               v3 i5 3 5ic
               TEST FOR VAR VALUE BELOW ZERO TOLERANCE.
                                                                              00033600
10
       IFIABSIVARILE.TOLI GO TO 500
               SET VALUE FOR POSITIONS OVERFLOW TEST.
501
      NIEST - 10++VOIGIT
                                                                              טנו בכטטם
      IFIVAR.LT.O.O) NTEST=10++(NDIGIT-1)
               PUT ALL DIGITS WANTED IN INTEGER PART.
                                                                              00354133
     · NOECIX - NDECI
       IF INDECI.EQ.-11
                         NOFCIX . O
      1X1330/++0.013 + RAY - HUG
               TRUNCATE TO INTEGER.
                                                                              00 05 4 500
      NOUM - INTIGUT)
               APPLY PSEUDO ROUNDING.
      TEST - FLOATINDUN)
      TEST - DUY - TEST
      IFITEST.GE.O.SI NOUN - NOUN + 1
      1F(TES1.LE.(-0.5)) YOUM - NOUM - 1
                                                                              6005 > 100
      INDUN - IABSINDUNI
                                                                              30055203
               NOW CHECK FOR DIGIT POSITION OVERFLOW.
      SFINDUM.GE. VIEST) GU TO 173
BEGIN ONE-4V-ONE PROCESSING OF DECIMAL DIGITS.
      1101CM.1-1 001 CO
                                                                              363>3600
               SKIP IF POSITION OF DECIMAL POINT.
                                                                              00055700
      SPEED RESULT.
                                                                              33455433
  PUCH - XPUON 191
               SHIFT ANOTHER PLACE TO RIGHT.
      NOUM = NOUM / 10
                                                                              0305-200
               CHECK FOR LAST WON-HULL DIGIT ALREADY PASSED.
                                                                              2005-30-
      161 CT CD (O.3M. YPUON 141
               CHECK FOR POSITION OF DECIMAL POINT ALREADY PASSED. ZEAUS TO BE INSERTED IF STILL RIGHT OF DECIMAL POINT.
  160 IFILLT.MDDTPL1 GO TO 161
                                                                              0005-703
               SAVE CURRENT POSITION IN FORMATTED RESULT.
                                                                              06350601
                                                                              60050433
               AND GO TO COMPLETE FILL CF NON-DIGIT POSITIONS.
                                                                              00us 700u
                                                                              06327132
      63 TO 140
               SHIFT LEFT BY POWER OF TEN. THE STRIPPED VALUE TO --
                                                                              33357233
  161 NOUNS - NOUN + 10
               ISJUATE THE FORMER RIGHT DIGIT.
      NCHAR - NOUTE - HOUTZ
                                                                              003>753J
  192 LINEINFINST . HOIGIT - II . INIGITINCHAR . II
                                                                              03U > 7 60.
  100 CONTINUE
                                                                              33357733
               HERE IF ALLOHED SPACES ALL FILLED. IF NO MORE DIGITS.
                                                                              ひり>1000
               OK TO CHECK FOR SIGN II.E. GO TO 1051.
                                                                              33357430
      ## (NOUT.EU.O) GJ 10 165
                                                                              こうじゅんひじょ
```

```
MEMBER NAME CONREP
                HERE FOR DIGIT OR SIGN OVERFLOW--FILL ALL SPACES BY .S. . 00058100
  170 00 200 I=1.NOIGIT
                                                                                  いいろうせょうり
       LINEINFIRST + I - II = IAST
                                                                                  いいひつ 430~
  200 CUNTINUE
                                                                                  JU 35 44 UJ
       RETURN
                                                                                  ひいいちゅういっ
                HERE IF NO FXCESS DIGITS. BUT CHECK SIGN.
                                                                                  30053034
  165 IFIVAR.GT.O.O) RETURN
OTHERWISE YO SPACE FOR NEG SIGN. THERE IS SIGN OVERFLOW.
                HERE IF DIGITS DID NOT FILL SPACE ALLOWED, CHECK FOR NEG.
  180 IF(VAR.GT.O.3) G3 T3 403

HERE ONLY IF MINUS SIGN NEEDED AND THERE IS FOOM FOR IT.

INSERT IT IN FIRST FREE POSITION.

LINE(NFIRST + NDIGIT - NSPOT) = INEG
                                                                                  ひいうタスコン
                                                                                 ULLPEUDO
                                                                                 66729477
                AND IF SIGN USED LAST FREE POSITION, RETURN.
                                                                                  30359532
       IFENSPOT.EQ. NOISETE RETURN
                OTHERWISE, ADVANCE SPACES USED BY 1 --
       NSPOT = NSPOT + 1
                                                                                  ひょうちゅうり
                AND GO TO BLANK FILLER INSTRUCTIONS.
                                                                                 00054400
     . 63 TO 420
                                                                                  3306300
                HERE DILY IF ABSIVARILE.TOL.
                SET SPACES USED TO 1.
  500 NSPOT - 1
       IF (NDEC1.EQ.-1) GO TO 400 CHECK FOR BLANK OR DOT REQUESTED IN DECIMAL POINT
                                                                                 00006203
                POSITIOY.
       IFINDOT.EQ.O) LINEINFIRST + NDIGIT - MORTPLE - IBLNK
                HERE FOR BLANK FILL AS NEEDED
  400 00 450 I=NSPOT. NOIGIT
                SKIP POSITION OF DECIMAL POINT-IT IS ALREADY FILLED.
                                                                                 33361337
       IFILEQ.MOSTPLI GO TG 450
                                                                                 00001100
                INSERT BLANK.
                                                                                 33361250
      LINE(NFIRST + VOIGIT - I) - INLNK
  450 CONTINUE
                                                                                 30361435
       RETURN
                                                                                  J00015JJ
                                                                                 3300103
       END
       FUNCTION MASKING, IT
                                     29 JUNE 72
                                                                                  JO36163J
                                                                                 2206227
          MASK IS A FUNCTION SURPROGRAM THAT MASKS-OFF CHARACTER I
OF INPUT WAS TO RETURNS IT AS LEFT-JUSTIFIED WAS
           ZERO-FILLED FUNCTION VALUE
                                                                                 00002400
      LOGICAL+1 E(4),Y(4)
                                                                                 03362533
       INTEGER XR.ZE40/4H0000/
                                                                                 00302033
       EQUIVALENCE ITTEMP. TI. I JTEMP. YI
       ITEMP . ZERO
                                                                                 33342 903
       JTEMP . XR
      K(1) . Y(1)
                                                                                 دنا لامدود
      MASK - ITEMP
      RETURN
                                                                                 UUU 5 5 5 5 5
                                                                                 30063 ...
       FYD
       FUNCTION NAME 41/41/,//2/,/A3/,/A4/)
                                                                                 -----
                                                                                 Lus Label
C
                                                                                 00363703
                                     29 JUNE 72
                                                                                 3000 18UJ
```

```
MEMBER NAME CONREP
      NAME IS A FUNCTION SUBPROGRAM THAT CONCATENATES FOUR (4)
                                                                                     60643933
          LEFT-JUSTIFIED HOLLERITH CHARACTERS TO FORM ONE-HALF
         OF CONFORM LP MODEL RUW AND COLUMN VECTOR NAMES.
                                                                                     30364231
       LOGICAL+1 A1.42,43,44,X(4)
INTEGER XR
       EQUIVALENCE (XR.X)
       X(1) - A1
       X(2) - A2
       X(3) - A3
       X14) - 44
       NAMES . XR
                                                                                     JUDO 5 LUU
       RETURN
       END
       SUZAGUTTRE -11
                CALLED BY HEADS AND HEADSZ TO OUTPUT CONREP SUBHEADING.
       COMMON/HEDD/ITITLE(33,3),1PAGE
                                                                                     ددوؤدددد
       WRITE 13.11 IPAGE
                                                                                     00045733
       AETURN
                                                                                     JC LosoDu
                                   CONFORM REPORT OF.
       FORMATE/13X,20H
                     16H SOLUTION VALUES, 104,
      .
      •
                     26HICUNTEP VERSION 1.0 6/721.4X.4HPAGE.15/1
                                                                                     30000133
       INTERPORT SHITUCARUE
                PFDREP 3.0 -- 28 APRIL 1970
                UTILITY ROUTINE TO ZERO OUT AN ARRAY.
       DIMENSION RMATINI
       DJ 1CO 1-1.N
       AMATELL . D.O
  100 CONTINUE
       RETURN
                                                                                     2024/201
       EAD
       ATEG POOL
       BLOCK DATA TRANS
C
                PFDAEP 3.0 -- 1 MAY 1970
       COMMON/SYHAOL/NSYMBI 37)
                                                                                     03-67533
                                                                                     3364776J
C MSYMBE 371
     INSTRUCTION OF THE CHERACTERS THAT APPEAR IN CONFORM LP ROW/COLUMN
C MAMES. ... ONE CHARACTER TO THE WORD, LEFT-JUSTIFIED. THE DATA C DECLARATION PUTS BLANK FIL TO THE RIGHT. IN FN ETRLY EXECUTED SFT C OF STATEMENTS, CONREP MISES THE CHARACTER TO MAVE ZERO FILL TO THE C RIGHT. NOTE THAT THE ORDER OF CHARACTERS IN MISM O DIFFERS FROM THAT C OF THE CORRESPONDING ARRIVING CONGEN. NEWNO RUNS THRU THE ALPHABET
                                                                                     JU JO 8 4 Ju
                                                                                     cuesuo
                                                                                     رز ۱۹۹۰ کا
                                                                                     200000
C POLLOSED BY THE DIGITS 2 TO 1.
                                                                                     0330066
                                                                                     30300733
       DATA MSYMB/IHA. 1HB. 1HC. 1HD. 1HE.
                                                INF. ING. I AM, INT. INJ. INK. INC.
      1000047
      • INL. INZ. 1113. 114. 1115. 116. 117. 118. 119.11 /
¢
                                                                                     ---
       EVO
                                                                                     W307632
       SUNTOUTER PRITY
       OVEPLAYESTANT. 1.31
                                                                                     ********
       PROGRAM INTEL
                                                                                     دود دمو بعد
       COMMON/A45/10175301
                                                                                     CUSTSUUG
```

```
MEMBER NAME CONREP
       03369735
                                                                                      ひいかりゅうい
         CCCCS15178NA/NCPD3
                                                                                      ロシシャナナシュ
        COMMON/STAT/VCUL(3). NATH(3). CREAD(3)
COMMON/STAT/VCUL(3). NATH(3). CREAD(3)
                                                                                      UC 373330
                                                                                      30073133
        LOGICAL CREAD
                                                                                      00070200
                                                                                      0007-130
                 CALL SUBROUTIVE BININ TO READ THE COMPLETE BINARY FILE DATA AS ARTITEN BY CONGEN ON CONGEN LOGICAL UNIT 11.
                                                                                      ひしいいしょうし
  Ė
                                                                                      7771777
                                                                                      00-10-30
         CALL BININ
                                                                                      36373633
            INITIALIZE ALLOCATION RULE COEFFICIENT (ARRAYS COEF, KJCOEF) DEDER INDICATUR TO TANT OF THE NATRIX GENERATOR (CONGRES).
                                                                                      -307.133
                                                                                      00071200
            INITIALIZE OUTPUT PAGE NUMBER
                                                                                      20-71333
                                                                                      30.174.33
                                                                                      30071530
                                                           .
                                                                                     30071030
            INITIALIZE STARTING APPARESS OF HONEFRO ROW AND COLUMN VALUES AND INDICATOR THAT CASP HAS BEEN READ FOR EACH CASE.
                                                                                      JC371735
                                                                                     00071433
                                                                                     36371933
00 500 (-1.3
MCOL(1) - 0
                                                                                     UUJ72UJ
                                                                                     99015100
        MR04(1) - 0
                                                                                     36372233
         CREADILL . FALSE.
                                                                                      33372333
SOO CONTINUE
                                                                                     00074-00
        03 601 1-1.37
    601 MSYMBELL - MASKEYSYMBELLILL
  6 300 I-1.2000
                                                                                     00012100
                                                                                     03372 10J
200 14(11 - 0.0 COLS INFO ARRAY.
                                                                                     26 288932
                                                                                     60011500
        00 201 1-1.7500
    201 18(1) - 0.0
        RETURN
                                                                                     60071333
        END
SJUROUTINE BININ
                                                                                     33073-3-
                                        13 MAY 71
26 MARCH 71
                                                                                     3607.1700
           THIS SURROUTINE READS IN CONSEN DATA THAT ARE REFERENCED
            BY COMMEP FART A SINGLY FILE LIMIT OF WALTER ON A CORRESPONDINGSUPPLIES
           CONGEN RUN AS UNIT 11.
                                                                                     22-11-11-5
           AL INPUT DATE VARIABLES AND ARRAYS ARE READ COMPLETELY BY
           LABELIO COTON OLOSE IN ALPMANTICAL DAME.
                                                                                      2014330
                                                                                     3037400
                                                                                     00-1-130
        COMMON /AGG/MAGGA.AGGLAB1251
COMMUN /DESCRP/STANFMITAD1.01MITAD1.COST(TAD)
COMMUN /EFF/MEFF.EFFLAMIA.31.EFF160.61
                                                                                     30-7463-
                                                                                     よういりゃうし
                                                                                     6607>660
        SURPLY PROPAS / CHEFT 10071, K JCHIFT 160001, HANT, MANE
                                                                                     00075100
        COMMIN /RESOLUTYCUTST. VSIPRT, WPRAM, WPRAMU
                                                                                     *****
                                                                                     66.275333
                                                                                     30373-03
        INTEGRA DIN
```

4 5 70	ER NAME COUREP	
1121687	INTEGER AGGLAS	6307>503
2		00075030
č		J04757J
•	READ (4) STRNTH.DTM.COST	26-27-50-4
	ARAD 141 CUEF	0607543
	READ (4) KJCUEF	9991033
	READ (4) NAYLINBYFINTOMYFINSUPRE	Muloss.
	READ (4) NEFF.EFFLAA.FFF	0061020
	REID 141 NAGG4, AGGL44	0007-33.
C		3037643.
. t		0007653
1	RETURN	3307663
•	WE TOWN	2007073
	1 Aug. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	* * 1 1 1 1
	(10	3037033
	SURROUTING HUNDER	6307695
C	OFFILE PROCESSION	1901177
	PADGRAM HOADER	0001110.
C		0007723.
	PUT ALLOCATION RULE DATA LARRAYS KUCHEF.COE6) INTO SUPPORTING	JOUTTAN.
	UNIT DEDEK FOR USE BY UNIT ELLOCATION PEPONE ISUPPONTINE	Just193.
č	ALOCATI. HORDER IS CALLED FROM REPORT IMPEDIATELY REFORE & CM	
- 6	TO ALDCAT IF THIS DATA IS NOT ALREADY IN THIS UNDER.	J0J776J.
_	to account to this series to hot account the twist constitution	
ع. ـ	. 180	0007773
	COMMUN /OADER/ IORD	0007740
	COMPON /DESCRP/STRUTHETO 01.01#17601.COSTET601	9007743.
	\$MAN, 160601,\$COEF140001,\$COEF140001,\$ANZ,\$MANZ	03070300
	COMMUN /HESOLU/NIO497.NSUPRT.NPRAM.NPRAMU	30076166
	INTEGER DT4	300/685.
	1856 • NCONBT • 1	J047-30.
	IEND . NCOVIT . NSUPRT	00074476
	11 • 1	0007034
	NCDEF . NAME . NAME	
		063/8-3
	03 10 1 • 16EG.1EN3	00076700
	D3 80 3 • 31 · MC 36 F	0008383
	## (#JCOEF: J1-(KJCOEF: J1)/13031+1030.NC.DTM(11)	2231.47
	11emp - <3000F1311	00079000
	TEMP . COEFIJI	3301110
	GJCOFF(J1) - GJCJEF(J)	. 0991 1707
	COPPLAIN . COPPLAI	06674300
	(JCOE*(J) + 11649	30-7946
	CUEFIJI + TEMP	06-1950
••	J1 • J1 • 1	3007460
20	CONTINUE	03070733
10	C3/11406	3331463
	1040 • 1	3007+933
	ar tuan	46363666
	INO	36300133
	TREPUT BY TO BY	03000200
	OVERLAY (TURNER, 1, 0)	00000 00
Ċ	PROGANA TOROES	
	LEGISTE TOTAL	3330161
ç		3000000
Ç	PUT ALLUCATION RULE : OFFFICIENT DATA TAMAYS #JCOEF, CCEPT INTO	
C	SUPPORTED UNIT DIDIE FOR USE BY UNIT SUPPORT REPORT ISUARDITIES	
C	SUPPORTE. THIS IS THE SAME NOOFE AS IN CONSER. THREEA IS CALLED	اندورود ند ا
C	FROM REPORT IMMEDIATELY AFFORE & CALL TO SUPORT IF THIS DATA	00-1190
Ě	IS NOT ALLE LOV IN THES DADEA.	3334103
ě		30301101
	COPM 20 /OADEA/ 1040	
	TALL LANGE INTO	00001201

```
NEMBER NAME CONTEP
CONTEN /DESCAP/STANEMETODI, OTHETODI, COSTETODI
                                                                             ----- 00041300
       COMMON /46 UFAC /COEF ( 9007) . < JCOEF ( 9000) . NAME, MANZ
       COUNTY THESOLUTICOMINESUPATIONARIAM PARM
       INTEGER DIN
                                                                                   30001035
       MUNIT - NEUMAT + NEUPAT
                                                                                    00301730
                                                                                   03441433
       J1 - 1
       MCDES - MANE . YANE
                                                                                   46361900
      00 10 1 • 1. TUTIT
00 20 J • J1. CUEF
                                                                                    24242424
       05 05 05 (111) 1000 VE 314(11) 20 40 50
       ITEMP . GJCOSFIJII
                                                                                    30342335
       TEMP .
                  COEFEJII
      COEF(31) - < 3COEF(3)
                                                                                   604625--
                                                                                    77745077
      CJCOFFIJI . ITEW
                                                                                    300e2700
        COFFIJI . IEW
                                                                                    90005000
       11 . 11 . 1
      CONTINUE
                                                                                    363635.3
      CONTINUE
                                                                                   63063133
       1350 . 3
                                                                                   00041211
      RETURN
                                                                                    70741177
      SUSPICIONE SOCIA
                                                                                    20101010
      OVERLAVE SOL STA. 1. 31
                                                                                    0000Jau
      PROGRAM SOLSTR
                                                                                   60061733
                                                                                   ---
         THIS ROUTINE IS CALLED IMMEDIATELY AFTER EACH LP. AEAD TO RETRIEVE AND STOLE THE FORCE SOLUTION VALUES FOR USE BY
                                                                                    7074767
                                                                                    16 00 4 00 3
          SUBSCOUENT AEPOATS.
                                                                                   3034233
                                                                                   3630-300
      COMMON /FORSOL /FORSOL (760, 2). [FR SOL (760, 2)
COMMON /RESOLU/NC 3791. N SUPRT, N PAM, N PAMU
COMMON /OESCAP/STANIN (76 31.01 N 1760). COST (762)
                                                                                   ---
                                                                                   60004333
                                                                                   00000000
      CONNON /CUMMJ/ IOTALLAL
      COMMON/SYMBOL/NSYMEISTI
                                                                                 :
         RETRIEVE WHICH OF 2 POSSIBLE SQLUTION CASES HAS JUST BEEN READ JUNE 113
      15 - 101A(2)
                                                                                   1124 PFF
         RETRIEVE COMPAT JUST SOLUTION VALUES
                                                                                   30005000
      00 10 1 . I. NCOMBT
                                                                                   30365753
      CALL 844 303 (01 M( 11.11.12.13)
                                                                                   30-656-
      FORSOLES. (E) . # # 14 34 1 E. MSYMPESS. 11. 12.13. MSYMPESSI. ASYMPESSI.
                                                                                   UUU > 7UJ
                                                  NSYMO(37) , NSY PO(37))
      IFRSOLEI, IEI . FUASOLII.IFI . C.5
                                                                                   3334010-
      CONTINUE
                                                                                   36046233
                                                                                   Lut occus
                                                                                   Juston
         RETRIEVE SUPPORT UNIT SOLUTION VALUES
                                                                                   CCuso),
                                                                                   6004.633
      1016 - NCU101 + 1
11NO - NCU101 + 15UP11
                                                                                   30546735
                                                                                   ~~~~~
 00 20 1 - 10fd,1fm

 CALL BRA 306(014(1).11.11.12.13)
 00007000
```

```
MEMBER HAME CONREP
 FORSOLIT, IE1 - 0ETA3(IE, MSYMB(191.11, 12.13, MSYMB(371, ASYM9(37),
 6004713
 NS YMB (37) . NS YPG (37))
 33567233
 IFPSOLIT.IX1 . FRASCLIT.IX1 . 0.5
 33067 AUU
 IF (FURSOLE !. IE).GT.O.Z.ANO.FORSIL(I.IX).LE.O.S) IFPSOLIE.IX)
 سده 7 عددد
 CONTINUE
20
 79-41777
 33301000
 3030776.
 RETURN
 .JJ0740.
 3636743.
 EVN
 SUNTENT THE TREET
 WL WARL U.
 DVEAL AVI TRPOCK . 1.01
 2044613
 22-46-222
 PROGRAM TAPOCE
 3063630.
 A CALL TO THIS MOUTINE IS PRODUCED BY THE VERS--REPORT TROOPDCKSUCABAGE
 TH'S ROJTINE PRUDUCES A TROOPLIST FROM THE CONFORM MCCEL SOLUTION MUJESSATINAT IS IN THE SAME FORMAT AS THE CARD OFFIC UNITRUIT OF THE MULHBOOD BN SLICE MODEL. THE OUTPUT OF TAPOCK IS CARD IMAGES ON FORTRAN ANGLED TO
 LOGICAL UNIT 9 (TAPE 9).
 WASSES.
 60343930
 w) 11 1 Ju.
 COMMON /MESOLU/NCOMBT. YSUPRT. NPRAN. NPRANU
 0334913-
 CUMMON /DESCAP/STRNTHE 7601.0TP17631.CO3T17601
 .004120.
0041200
 COMMEN /EFF/NEFF. EFFLARIE. 31. EFF (60.6)
 COMMEN /FORSOL/FORSOL1760.21.1FASUL1760.21
 ALL AND & SALE
 COMMON /TITLE/ITITLETO1. ISAC(3), ITPSN(2)
 3060152
 REWIND 10
 0330 -033
 0001703
 PRINT COMBAI UNITS SECTION
 1004710
 IND . 0
 20 10
 CALL TGTOL DTMILL &
 MOVO 40.
 ISTAY . STANTHILL
 2010301
 WRITE (9,30) NT4(1).140.11717LE(J).J-1.0).(ISRC(J).J-1.3).
 3339363.
 [| TPSN(J) . J - 1 . 2) . ISTAN . FOR SOL (1 . 1) . IFR SCL (1 . 1)
 CONTINUE
10
 といりろい.
 03343903
 PRINT SUPPORT UNITS SECTION
 J304113.
 1NO - 9
 06.001.262
 TOEG - NCOMOT + 1
TEND - NCOMOT + NSUPAT
 MUNITED.
 06-19143.
 03 20 1 . 10EG.1ENO
 0004120-
 CALL TGTDE DTMESS 1
 ISTRY - STRNTHILL
 WRITE 19.301 DETILITION CETTERLES JOLOB . CESACCE II. J-1.31.
 3344100.
 (| TPSH(J) . J - L . ?) . | STAM . FOR SOL (| . 1) . | FR SCL (| 1 . 1)
 3039140
 CONTINUE
 3039233
 306941--
 END FILE 9
 003455--
 33012.
 OC 445447
 600925.
 F3RMAI(14.12.14.744.42.244.43.44.15.F8.3.17)
 JU492000
10
 JOJ1273.
 ENO
 Joursoi.
```

nem	DER NAME CONGEP	****
	SUMOUTINE TETRITOTAL	30092933 3004636
č	15 REC 70	0000313
ě	6 021 71	00041434
č	• • • • • • • • • • • • • • • • • • • •	3030330
č	FORTRAN IN SUMMOUTINE TO RETRIEVE THE SAC NUMBER AND TITLE	3000300
12 E	OF A UNIT FROM TAPELS FOR USE BY TADDPOCK.	00011200
č		3634163
į į	IDTHDTM YUMAFR OF A UNIT	334931-
Ċ		3609365
. : :		3067340
	COMMON /TITLE/ITITLE(8). ISAC(3). ITPSN(2)	3634.35.
C	Comment / 11 CE / 11 CE / 11 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 CE / 12 C	33,78410.
č	91 9 9 0000 1100 1010 00 000 000 000 000	6001-200
ž		33000
č		20.39443.
•	READ (10.40)JOT4.([TITLE([].[-].0].([SRC(]].J-].)].([TPSR(]).	0-07-20
	• 1-1.21	333946-3
	RETURN	JU3947JJ
	79 18 11 18 10 10 10 10 10 10 10 10 10 10 10 10 10	000+40-2
	FORMAT( 14, 3E, 4E, 7A4, 42, 2A4, 43, 4E, A4, A3)	16-4493
	Annual tat tat add add to the add at a definition to	30.00.00.0
•	enn	6309310
	SUARGOTTINE TRACEST	3-3954
C	OVERLAY (TAPLST, 2, 0)	3000330
	PROGRAM TRPLST	20075-0
č	AND AND AND AND AND AND AND AND AND AND	A. 1735
è	12 NOV 71	2009503.
č	12 404 11	Gueratus
	COMMUNICHECKE/ITESTIZS)	00075000
		3664347
	COMMON /OCSCAP/STAVINITAGI, OTMITAGI, COSTITAGI	
	COMMON /	6694400
	COMMON /LIVE/LIVE/LIVE/SOPAS	JOSTO LUJ
	CONNUN /RESULU/NCHYST, Y SUPRT, NPRAY, NPRAYU	00340303
	CONTON/STRADL/NST 191 37)	0034040
	COMMON /TITLE/ITITLETO1: ISAC(3): ITPSM(2)	0000000
C	AMPRICA APM	-
	INTEGER DEN	occes for
Ç		30000000
C	ASUSMA AA	3334-133
	160046	00017005
	Isonic • 0	36097100
C	6611 A A A	36397233
	5711 • 0.0	00017300
	\$112 • 0.0	33397433
	\$113 • 0.0	06 36 7 533
	\$114 • 0.0	00017600
	15715 • 0	20397733
	15116 • 0	30397033
C	. 11 . 7	3037743
(2)	CALL TEMPAD	30 348 000
C	707	03300100
	0) 1) 1 • 1.40491	00004501
	CALL TOTAL DINITI	07949777
	TUSOL + FORSOLITATI	0000000
	1 (11(\$1(11.\(\cdot\))) 60 10 40	00044300
	USTAN - STANFHILLS	33640000

```
MEMBER NAME COVACP
 60 10 10
 00346733
 if thestelline.21
 60 10 60
 22.564422
 USTAN . COSTELL
 06044400
 60 10 70
IF (ITESTE 1).4E.31
 03394333
..
 60 10 90
 JUJ MIDJ
 USTRY . 1.3
 00017500
 63 10 70
 3639933
 USTAN - EFFEI. 11
 50 TO 100
 36 24 9523
 53 10 10
 ひしいりりしょ
100
 USTRY . 0.9
 30 34 4730
70
 IUSTRY . USTRY
 TUSTAN . TUSOL . USTAN
 CALL BACSOCISTALL 1.11.12.131
 PII
 0311111
 • PIVAL INSTANTO, 11.12.13.457#1371,457#81371.
 45VM(37) .NSVM0(37))
 00130203
 SHORT . BETACKSV48(3), 11,12,13,NSV48(19),NSVM8(37).

 NSV461371,NSV 1013711
 ALONG . BETALVSYMBIBLE!.!?.!B.NSYMBILZI.NSYMPIBTI.
 457401371.4574013713
 rescrites
 TISOLE . TUSOL . SHORT - RLONG
 30133733

 2017047
 3017:07
 MISTIN
 TSUSTR . PIL . T ISOL
 05101300
 TSPSTR . TSLSTA - TUSTAN
 دىد ، د. ٥٥
 SPSTAN . PIL - USTAY
 00101-33
 ITUSOL . IPRSOLET. 11
ITUSTR . IUSTRN . ITUSOL
 30101279
 2012107
 LINE - LINE - 1
 IF ILIVE.61.601
 CALL TLHEAD
 DESTR . TUSTEN
 30.0.61.
 STISTE . TSPSTA
 33131020
 ITSSTR . TSLSTR
 30101810
 ISPSTA - SPSTAN
 69171847
 . . !!!
 1011
 93191490
 WRITE (3,20) DT4(1).(|T|TLF(J).J-1.0).(|SRC(J).J-1.3).
 (ITPSN(J), J-1.2), TUSQL, 1275TR, ITTSTR, ITSSTR,
 ILSTRY, ISPSTR, IPII, ITUSIZ, ITUSTR
 30132130
 FORMATIIN .13, 34, 74,45,544,45,444,45,474,57,5,517 .34,17,217
 33144444
 .38.13.171
• $711 • TUSCL
 36132333
 5111
 0-1-243-
 . STIZ . TUSTRY
 $112
 COCENTED
 $113
 . 5713
 . TSPSTR
 00175077
 5114
 . STI4 . TSLSTA
 00102700
 15115 . IST15 . ITUSUL
 99175477
 15116 . 15116 . 1T-151R
 JOLUZGUJ
10
 CONTINUE
 COULUIDO
 30133132
 LINE . LIVE . .
 IF ILINE.GI.631 CALL TLHEAD
 7017377
 15112 . 5112
 00103513
 15113 · 5113
 00133550
 15114 - 5114
 00107577
 WRITE (3,30) STILLISTLE. (STLD. ($14,15715, ($716
#3444f(1H //1H .664-4(7H----- 1,23%,2(7H-----)/
 00103303
30
 33131433
 1H . BH. USTUTAL . 50 K. FR. 3.317 .234.2171
 JU103530
¢
 0610 3000
```

(BAC)

```
REMBER NAME CONREP
 00103733
 . $121 . 0.0
 $122 - 3.5
 331-1033
 301-1933
 $123 . 0.3
 3010-033
 $124 . C.O
 931341-3
 15725 . 0
 15126 . 0
 ひとしてくしょ
 301-4333
 CALL TLHEAD
 9919->33
 IREG . NCOYAT . L
IEND . ACOYAT . NSUPRT
 3314-003
 3016474
 03 50 1 . 19EG. 1EV7
 3013-031
 CALL TOTLE DINETE)
 00104100
 TUSOL . FUASOLILI.11
 IF CITESTELL.NE.LI
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63 13 110
 60 10 22 W
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 IF (ITEST(1).ME.2)
 60 10 130
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 # 411EST(11.4E.3)
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 60 10 110
IF (1765(11).NE.4)
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 USTAN . [FF11, 1)
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 - בנו פר דמר
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 DC 100300
 SHORT . BETALMS VAB (19), [1, [2, [3, NSVHOLLB], NSVHOLLO),
 MSYMB(371,MSYMS(371)
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 ALONG - BETAINSVIBILED. 11.12.13. NSVISITAL NEVERLLED.
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 # (17657(1).46.5) PI - 405(PI)

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 TSL STR . PIT . TJSDL
TSPSTR . ISLSTR - TUSTEN
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 SPSTRN - PII - USTAN
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 IF ILINE.GI.ADI
 CALL TLHEAD
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LTTSTR . TSPSTR
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 ISPSTA . SPSTAN
 4817E (3.20) DEMILI. (1717LF(J). J-1.8). (158C(J). J-1.3).
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 CALL TLHEAD
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 CALL TLHEAD
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 14 . SHIOTAL .SA4.FA.3.317 .238.2171
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 00114-01
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 14 .654.52(14-1.34,13(14-1/
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 IN . O.R. ILE. SHTUTAL . ISE. OR, SHPER UNIT!
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 1H .65E.23(11-1, 14.21(1H-1/
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 IN .65K, 8X, 5MMIETS.IX, THEUPPORT.IX, SHELICE.IIX, THEUPPORT.
 12, SHISLECE, BE, SHUNLTS/
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 LOCALLE OF THE STRUCTURE . TO A STRUCTURE . THE STRUCTURE . TH
 3(44,1) 1,37,3(44,4) 1,12,5mm(TS,12,44,4) / 3311433
In ,34---,42,26(14-1,22, 9(14-1,52,7(14-1, 72,4(7M ---- 1,0011356))
32,3(7M ---- 1,32,3M---,12,5M----/)
 LINE . 20
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MEMBER NAME CONSEP
 15 DEC 70
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 PORTRAM IN SUBROUTING TO RETRIEVE THE SAC NUMBER AND TITLE
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 OF A UNIT FRUN TAPELO FOR USE BY TRPLST.
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 TIMU A TO RESPUR NTC...PTQL
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 COMMON /TITLE/ITITLE(0), ESAC(3). 17PSN(2)
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 AFAD (10,001)014.(1111Lf(1).1-1.0).(15AC(J),J-1.3).(11P5M(J).
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 FORMAT (14, 34, 44, 744, AZ, 244, A3, 44, A4, A3)
 60
 MALONA
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 TESUSE SIESTORISES
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 TO. A. TASCIAIVA INSVE
 01116400
 PRUGRAM ALOCAT
 33110303
 30110635
 36110100
 0011-863
 COMMON /DESCRP/STRNTHL7601.DTML7601.COSTL7601
 CONTON /EFF/TEFF.EFFLAGIE, TI.EFF160.61
 4-11-1-
 COMMON /FORSOL/FORSOL1760,21,1FRSQL1760,21
 30117300
 COMMON ILLIETLINE, ISAPAS
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 CONNIN /RESPA:/COEFI65031.KJCOEFI65001.NNN2.NRNE
 0011723-
 COMMON /RESOLU/ICOMST. NSUPRT, NPRAM, NPRAMU
 00117300
 00117400
 COMMON/SYMBOL/MSYMAI 371
 COMMON /TITLE/ITITLE(8). ISRC131, 17PSN(2)
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15RC(1) - INLANK
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 REWIND 10
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 ISBPAG - 0
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 CALL ALHEAD
 00144703
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-	-	R NATE CONSEP	
		SU41 • 0.0	0015300
		Sues - 3.0	33143100
		WAITE (3,53)	3012326
** *	50	FORMATILM )	33143333
	•	LINE . LIVE . 1	00130463
		18 • 1•NCO 451	36123305
		OTHI • OTHICE	03133003
		CALL BAR 30GIDT NI. IL. IZ. I 31	30120700
		PII • PIVALINS YARILO1.11.12.13.45 Y-8(37). NSY M8(37):	0614343.
• •		• NSVNB(371,NSVNA1371)	M153371
		SHORT . BETAINSY18(19), 11.12.17. NSYMS(18) . NSYMB(19),	0011100
	4 1	• NSVM6(37) NSVM6(37))	03121135
		RLONG . BETALYSYNR (191.11.12.13, NSYMS(181. MSYMB(121.	. 9313130
-		0 NSYMB(37), NSYMB(37))	6014130
		The Later County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County of the County	30121433
		TUSOLE . FORSOLITE. 1) . SHORT - ALONG	
		PCRED • 0.5	0015150
		IF (TUSDLE.GT.O.D) PCREQ + FORSOL([#.1] / TUSDLE	
		P 1 • P 1	30151600
		IF (PCREO.GT.O.3) PIX - PEI / PCREO	30151000
		IF (1TEST(1).53.1) 60 TO 90	00151411
		CALL TEALOR IN 1	00155222
		00 30 K • 1,0	9014440
	37	ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITURE + ITITUR	00122355
		140 • 0	30142403
	ξ,	IF (IPOINT-L.ST.NCOEF) RETURN	- 201552
	6.5	CALL KJUNPA((POINT+).K.L)	دند ۱۲۶ می
- 1		IF IL-NE-DINII GO TO 110	30144733
		IPOINT - IPOINT + 1	30155
		1ND = 1ND + 1	00155477
		CALL KJUMPA( [POINT.K.L)	01143333
	(C. 10.0)	JE • KJGETA( K )	00141103
		PHAT - PORTITABLET A ROBERT LE 11	3011433
• • 1	•	SUB1 - SUB1 + SUBT	20153333
		SUBS - SUBT - STANTH(EX)	00121400
		SUB2 - SUB2 + SUBS	00143500
		CP10.1 + SUST + P11	30143030
	* **	IF (17EST(1).E3.1) G3 TO 100	00141100
		CALL TGALOL JE I	JU143000
	190	IF (LINE+1.GT.63) CALL ALHEAD	30163930
		LINE . LINE + 1	00124055
		IF ( IND.GT. I) 30 TO 40	JÚ124135
		WRITE (3,43) DTMI, ( TITL2(M), M+1.8), FORSOL ( X,1),	00124203
• • •		• K,( T TLE(K),K=1,8),FORS(L(JX,1),	001243
		• COEFCIPOINTI, PIK, SUST, SUBS, CPI	0012++03
٠	40	FORMAT(1H , 13, 1%, 7A4, A2, F7.3, 3%, 13, 1%, 7A4, A2, F7.3,	3012+500
		• 3x, f0. 6, 1x, f7. 3, 1x, f7. 3, 1x, f7. 0, 1x, f11. 31	00124600
		GD TU 20	00124700
Z	60	WRITE (3,70)	30124835
	•	K,([T[TLE(K),K=1,8),FORSQL(JX,1),	00154407
		COEFCIPOINTI, SUBT. SUBS.CPL	0015>003
	70	FORMAT(1H :44X, [3,1x,744,82,F7.3,	00152101
	1	3x, f8.6, 1x, 7x , 1x, f7.3, 1x, f7.0, 1x, f11.31	00152570
		GD TO 20	00152307
	C		30125400
	110	IF (IND.GT.0) GU TO 120	00125500
		IF (LINE+1.GT.69) CALL ALMEAD	00152907
		LINE - LIVE + 1	05125755

1610	ER NAME CUNTEP	
	_ write (3,00) DT41.(111112(K).K-1.0).FORSOL([K,1].FIE	· 4014>434
	F38441(1m . (3,1x,744,42,F7.3,55x,F7.3)	79152607
	60 70 10	0012-000
120	IF ILINE+2.GT.631 C/LL ALMEAD	30150100
	LINE . LINE . 2	3114-231
	MITE (3.130) SUBL.SUB2	00140300
130	FORMATI IN , 1051, 2101 1/1H ,1054, F7. 3.14, F7.01	
		31140334
19	CONTINUE	3012003-
		00140700
č		3314.633
	AET JAY	30140477
	(NO	06147304
	SUBADUTINE ALHEAD	v01i/133
	COMMON /LINE/LINE, ISAPAG	03427235
	ISOPAG • ISOPAG • I	00127400
	CALL HEADS	30127-03
	WRITE (3,13) ISSPAG	03147555
		00141-00
	FORMATISM ////SH ,59x, 23HUNIT ALLOCATIONS REPORT, 48x, 7HSUBPAGE	
	11///	30127735
	14 , 134, 1545UPPORTING UMIT, 294, 1545UPPORTED UMIT, 254,	0014/000
	• 210HSUPTINS 1/	00151401
	• 1H .41(1H-1,3x,4)(1H-1,3x,	30144000
	10x,2(4MJMIT,4K),1K,3MSUB,4K,13M13 PERCE	
	•17	- 001545m
	• 1" , 2(354, 4457LN, 541, 2x, 4HCDEF, 4x, 4HMARG, 5x, 3HSUR, 44,	2015-332
	• SMTOTAL, SY, 4HCOFF/	13150491
	• IN .2(3HD[4,13x,5HT] ILE.14x,5HYALUE.4R).2(2x,5HYALUE.1X).	and the second second
	• SE, SHEDTEL, SE, OHSTRATE, LX, LOUE VALUE VALUE VALUE VALUE	00158000
	• 1H ,3H,24,20(1H-),2x,5(1H-),4x,	0015-171
	.0	-00159401
	0(14-),14,3404	00154377
	• ,11(14-1/1	30164777
	LINE - 18	00154109
	RETURN	03124477
	END	99:54399
****	SUBADUYINE YGELD(KJ)	00127750
C	KJ - RECORD TO RE READ ON UNIT 10	00129503
C	ILUCIO - RECURII CASI READ CA UNII IU	2015607
	COMMON /TITLE/ITITLE(8). ISAC(3). ITPSN(2)	00154 400
	COMMON /1LOC13/1L3C13	09154477
	IF (KJ.NE.ILUCIO) GO TO 10	30154407
	BACKSPACE 10	00133000
	60 10 20	00137100
10	1F (%J.GT.1L)C(10) GO TO 30	30:33533
	REWIND 19	00130330
	IEND = KJ - 1	05133400
	IF (IEND.LE.2) GO TO 20	ひじょうしついり
	00 42 1 • 1.1END	00136-00
40	READ (10,50)	30133700
50	FORMAT(10x)	20197877
	60 10 22	60110900
30	TEND = KJ - ILOC10 - 1 IF (IENO.LE.D) GO TO 20	30131000
	IF (IEND-LE-2) GO TO 20	2017170
	03 60 1 • 1,1END	00131203
60	READ (10,50)	60131333
20	READ (10,70) JDTM,([TITLE(1],1=1.8),([SRC(1],1=1.3),	23121400
20	• (17PSN(1), [+1,2)	22131403
	*	22121200

Alle Company parts

	der wase comes	
70	FORMAT   [4, 3E, 4E, 7A4, A2, 2A4, A3, 4E, A4, A3)	0011100
	ILOC10 • 4J	2212127
	At Ivan	2011107
	(10)	00111 W
	PONYJOLI AS CONSALICICAL LIPIDSA	3313200
	COMMIN /4E OFAT /COEF ( 400 ) I . A JCOEF ( 900 ) . NAME, MINE	wasels.
	101 • KJCNEF(LOC) / 1077	0011220
	108 - KJC08F1LUC1 - 101 - 1000	3313230.
_	RETURN	33,3246.
		0311630
	FUXTIUN KILETATIO)	JU1160J.
· C		33.3673.
C	10 DEC 70	9011500
C	13 667 70	3313243.
C	P	3311133
E	RIGETA IS A FORTHAM IN FUNCTION SUBPROGRAM THAT ACCEPTS AS A	\$6133 Lo.
. ė	CALLING PARAMER AN EXTERNAL IDENTIFICATION NUMBER OF A UNIT	3010344
č	IDTH NUMBERS AND DETERMINES THE CONGEN INTERNAL ICENTIFICATION	
ě	NUMBER1.2 "COMPT NCOMPTO L NCOMPT ON SUPERT.	001334
	EXTENDEL UNIT TO HUMBERS ARE STORED IN COMMON ARRAY OFMITOOD	
č	" FOR YCOUST COUSAT YTHILES, THEN FOR MEMPAT SUPPORT UNITS.	3311100
Ċ	AN FRADA NESSAGE IS PRINTED AND CONREP EXECUTION IS	
č	TERVINATED BY STOP DOOD IF PARAMETER ID IS NOT FOUND IN	6311160
č	ARRAY DIY	
č		3011193.
· č	TO SUPERIAL MARK SERVICE STATE AND ASSESSMENT OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STATE OF THE SUPERIAL STAT	v01460.
	IDEXTERNAL UNIT IDENTIFICATION NUMBER	3011-100
ç		3013450
C		2013433.
	COMMON /DESCRP/STANTHI7601.0THI7601.COST(760)	0011-400
-	COMMON PRESOLUPICOMATINSIPATINPRAMINPRAMU	0017+27
C		3313440
_	INTEGER DIN	00114100
C	** * * * * *	3011400.
C		3313433.
	NUNET - NCOMBT + NSIMPRT	00172000
	00 10 I • 1,4UMIT	0013510.
C		3077257
	IF (OTM(I).ME.(O) GO TO 10	00135303
	KJGETA • 1	2011541
	RETURN	JULIONAL
C		0011200
10	CONTINUE	30135700
C		30135833
C		03112433
	PRINT 20.1D	30110331
20	FORMATION 1//// AND AND AND FUNCTION RIGETA WAS CALLED WITH ID	
	95,26H HHICH IS NOT IN ARRAY DINE	20136577
	STOP 0004	0613630
C		00130433
· ···č		2043620
•	END	0011-000
-	SUNROUVINE CSYSTR	33136733
C	OVERLAY(CSTSTR.5.0)	20130122
č	PROGRAM CSTSTR	33136433
č		20130733
	10 FER 72	20131303
÷	10 FER 72	0013/133
C	PETETO BUNDINGE A DUC-PARE BEDIES CHIMILDICALE BELEFOLING	30137200
•	CSTSTR PRODUCES A UNF-CASE REPURT SUMMARIZING PEACETIME	00137300

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TERBER NAME COVER
 . . FORCE COSTS AND STRENGTH.
 86117433
 30137333
 00137000
 COMMON /DESCAP/STRATHITOCI.DTMITOOI.COSTITOOI
 361 17 130
 COMMON /FORSOL/FORSOL(7+3.21.1FRSOL1740.21
 20111000
 COMM 3N/ SYMAOL / 45 YM41 371
 COMMON /RESULU/VCJMAT, VSUPRT, NPRAM, NPRAMU
 DIMENSIUM CSTLABIA, 321, PTSLABIZ, 61, 1 PTSTAI32, 21, AVGSTAI61
 00.2013.
 0013435
 DIMERSION COSTINIESELITOTELSIALIDE
 DEMENSION A(8, 6), 6(8,6), C(8,8) .D(8,8)
 00 1.043.
 EQUIVALENCE (C(1,1),CSTLAU(1,17)),(D(1,1),CSTLAB(1,25)).
 West A solu
 00136733
 INTEGER DIM, CSTLAB, PISLAB
 00100000
 BL 13444
 33134333
 DATA IPENAL AMPEMA /
 DATA 10MA / 440MA /
 3013413
 DATA IMPA / SHMPA
 00119203
 JATA ACST/ 32 /
 30134130
 DATA APTSTA/ 6 /
 0.1.1.1.0.7,0.0.1.1.7.0.0.1.
 DATA IPTSTA/
 06 1 at 230
 1.1.1.1.1.1.1.1.0.1.1.1.1.0.0.0.0.1.1 .
 20134620
 1401 . 1803 /
 BOLLYTON
 . SHEURO, SHPE
 DATA PTSLAB! 4HCONU, 4HS
 . AHEORE, AHA
 0012453
 AHALAS, SHEA
 , AMSOUT, AMMERN , AMRYN , AM
 SHPEMA. SH MAJ. SHUR E. SHOULP. SHMENT. SH
 . 4H
 00 140 100
 SHPEMA, SH OPE, SHIATI, SHUNAL, SH REA, SHOINE, SHSS F, SHLOAT,
 00143230
 .44
 AMENA, AM REP. AMEIR . AMEYEL . AMP FL. AMONT . AM
 33163333
 .4H
 , 4H
 SHPEMA, SH REP. SHEET, SHPART, SHS
 ,4H
 011-0-00
 ANDMA , AH REP. 4HAIR , 4HPART, 4HS
 .4H
 .4H
 .4H
 30143500
 •
 AHOMA , 4H MIN, 4HOR E, 4HQUIP, 4HMENT, 4H
 .4H
 ,4H
 3-1-1-2-
 SHOMA . SH STA, SHTION. SH EQU. SHIPME, SHNT
 .44
 . 4H
 00146703
 4HOMA , 4H ORI, 4HGIVA. 4HL CL, 4HOTHI. 4HNG
 .414
 35143603
 .44
 DATA A/
 441411
 .4H
 .44
 SHOWS . SH PRO. SHIGRAY, SH S . SH
 ,4H
 36141633
 4HJMA ,4H PRO,4HGRAN, W: 75 ,4H
 .4H
 .4H
 . 4H
 99141139
 AHUMA . 4H ACC. 4HESSI. 4HOW A . 4HND T. 4HRAIN. 4HING
 .4H
 301-1230
 SHIPA . AH ACC. SHESSI . AHIN A . AHND
 T. SHRAIN, SHING
 .4H
 0014133.
 SHEWA, SH ACC, SHESSI, SHOW A , SHOW
 T. 4HRAIN. 4HING
 . 4H
 10141-31
 HA, HA, ESS HA, LAITHA, IVI HA, ESHHAHA, THE HA, APPENA
 .4H
 .4H
 36141530
 ,4H
 . 4H
 00141630
 .4H
 . 4H
 AMPENA, AM REP, 4114 IR , AMPART, AMS
 .4H
 00141733
 DATA C/
 001-1:00
 ,4H
 , 4H
 AHPENA, AH AMM, AHT
 ,4H
 301-1532
 .4H
 AMPENA, AM A IS. 4HSILE, 4HS
 .4H
 ,4H
 . 4H
 00142000
 SHOWA . SH PRO. SHIGHAN, SH 1 A.SHID 2. SH
 .4H
 03142100
 . 4H
 HONA , 4H BAS, 44E DP. 4HERAT, 4HERNS, 4H
 , 4H
 30442200
 .411
 SHOWA . 4H A IR, SHERRE, SHIT OP, SHERRE, SHIENS, SH
 , 4H
 03142330
 4H344 .4H PRO, 4HGR$4.4H 4 .4H
4H044 .4H PRH, 4H384P.4H 7M .4H
 .4H
 ,4H
 .4H
 06142-3
 .411
 ,4H
 .4H
 07145277
 4HUMA , 4H PHO, 4HGRAM, 4H 75 , 4H
 .4H
 .4H
 35142030
 DATA D/
 00142730
 4H0MA , 4H PRO, 4HGRAM, 4H 8M , 4H
4H0MA , 4H PRO, 4HGRAM, 4H 8O , 4H
 ,4H
 ,4H
 30142333
 .4H
 .4H
 .4H
 001-2433
 .411
 .4H
 .4H
 SHING . SH PR'S, SHIGRAY, SH 9 . SH
 361-3330
 .44
 4HOMA . 4H ACC. SHESSE. 4HON A . 4HND T. 4HRAIN. 4HING
 LLALGEOL
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HEMBER NAME CONREP
 SMINA, AN ACC. OF SSI, AMON A CHAD T. GRAIN, AND SAME AMPEND, AN ACC. OF SSI, AND COMP. OF SAME AND A COMP. A
 دواره واشد
 AMPA, AM LAN. ANDUAL, AM ETC. AMEDOL. AMOS P. AMESI . AM
 00 14 1400
 .41
 20141337
 AMPA . OH LAN. ANDUML. OH PCS. OH . OH
 30:43730
 READ (1.10) (AVSSTALL), (-1.MPTSTA)
 301436-1
 F3844114E13.61
 CALL ZERULTOTALS. 1231
 RETRIEVE STRENGTH TOTALS FROM LOL VALUES OF ALTERNATIVE
 STRENGTH OSJECTIVE FUNCTIONS.
 30144333
 TOTALS(41,1) - ABS! RIGI(NSYMB(23).NSYMB(3),NSYMB(19).NSYMB(20). JOI.46UJ
 NSVNB(18), NSVNB(14), NSVNB(37), NSVNB(37)) 001--703
1 - 1000-3 Juli-4603
 TOTALSI-1.21 . AUSI REGENSYMBIZOT, NSYMBILOT, NSYMBILGT, NSYMBIZOT, JOHN-GOL
 MSYMB(181, WSYMB(141, MSYMB(37), MSYMB(37)) 0614-566
 1 . 1200.2
 . TOTALSIAI, 3) - ABSI REGEINSYMBIZO), NSYMBI 61, NSYMFITTI, NSYMBIZOI, JÖLGSZÖJ
CUCCOLU (171) MSYMBILIAI, NSYMBILIAI, NSYMBILIAI, NSYMBIZOI, JÜLGSZÖJ
 1 • 1020.2
 39742277
 THE CUST DATA LIBRARY IS ASSUMED TO HAVE ALL WEEDED COSTS. EACH AVAILABLE SLOCK OF COST DATA IN THE LIBRARY IS READ AND IF IT CURRESPONDS TO A MODELED UNIT, THE DATA IS USED
 33145730
 TO COMPUTE THE COST TOTALS.
 20142401
 MUNIT - NCOMBT + NSUPET
C 50
 READ ILLI ID. COSTIN
 00140203
 IF (EOF, 111 230, 30
 00140311
 001.0000
 20
 READ (11.EVO-233) ID.COSTIN
 30
 D3 40 | - 1. YUYIT
 36140300
 1F (10.4E.0T4(1)) 60 TO 40
 361+0607
 0014603
 IF (I.LE.NCOMAT) : . 1
 00140703
 1x . 1
 60 TO 50
 301+700.
 0014,177
 40
 CONT INUE
 63 13 23
 00147203
C
 J0147333
 HAVE FOUND THIS UNIT IN THE DATA LIBRARY TO PE A MODELED
 30.47432
 . .
 UNIT.
 JU147>JU
 00147430
 03147733
50
 J - 0
 331-763-
 D3 60 1 - 1,NCST
 IF SIPTSTACL, 11.EQ. LI
 GU TO 70
 00141900
 30144330
 TOTALS(1,4) . TOTALS(1,4) . COSTINIJ) . FORSOL(14,1)
 33146132
 TOTALS(1,3) - TUTALS(1,3) + COSTIN(J) + FORSUL(1x.1)
 00146207
 63 TO 60
 001-8300
 03 00 L = 1.4PTST4
70
 30140400
 03144200
 TOTAL SILL . TOTAL SILL . COSTINILL . AVGSTALL) . FORSOLITALL
 33146633
 TOTALS(1,3) . TOTALS(1,3) . COSTINIA) . AVGSTAIL) . FORSOL(1X,1)
80
 LLIBELUL
 CONTINUE
 00148830
63
 GU 10 20
 30144133
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HEMBER NAME CONSEP
 COMPUTE TOTAL PENA, DNA, MPA, TOTAL FOR EACH OF INITIAL AND
 001-4103
 RECULATING COSTS.
 101-45-1
 001-934-
 $ 30
 03 90 1 . 1. NCST
 00144-06
 991-423
 IF CIPISTACLICATIONS . 1 . 2
 J . MCST . 1J-11.4
 TOTAL PENA
 IF CCSTLABILLILINE.IPENLE GO TO 240
 00164444
 03 250 < • 1.3
 250
 TOTALS(J+1.<) . TOTALS(J+1.K) . TOTALS(1.K)
 00123133
 APO JATOT
 1F (CSILAGI1,11.48.1044) GO TO 260
 00 270 K . 1.3
 30150403
 TOTAL NA PA
 273
 20123234
 MIL SUALLA
 IF (CSILABILILIANE.IMPA) 60 10 283
 240
 20120732
 D) 290 K . 1.3
 290
 TOTALSEJ. 3.41 . TUT:LSEJ. 3.41 . TOTALSEE. #1 .
 JATET JATOF
 00 100 K . 1.3
 200
 33.5.133
 TOTALSIJOA, KI . TOTALSIJOA, KI . TOTALSII, K)
 00121500
 103
 10
 CONTINUE
 30121332
 SCALE COSTS IN MILLIONS OF DOLLARS.
 00121003
 00 110 1 . 1.47
 00151744
 00 110 3 . 1.3
 0015141
 110
 DOLL \ IL. III ALSII. - IL. III / L.CEO
 C
 PRINT REPORT -- ARRAY TOTALS WITH HEADINGS
 30134133
 00152203
 CALL HEADS
 05152333
 WASTE (3.120)
 00132400
 FORMATILH /// IN .402.35HPEACETIME COST AND STRENGTH SUMMARY.
 20125002
 OUTSECUCION TOTAL TARGET SUPPORT SUPPORT SUPPORT OF TOTAL COSCIONAL SUPPORT OF TOTAL COSCIONAL SUPPORT OF THE S
 PLIONSII

00 130 f = 1.NCST

IF (IPTSTATT-21.NE.1) GO TO 130
 70125677
 30153635
 06133133
 WRITE (3.140) (25TLAB(J.().J-1.0).(TOTALS(1.J).J-1.3)
 140
 FJRMATI 1H . 124, 144, 3(5x, F9. 3))
 20121777
.. 119
 SONT THUE
 WESTE (3.190) (TOTAL SENC ST+1.11.1-1.3)
 00151503
 FORMATION / IN , 124,1 GITTIAL INITIAL PEMA, 144, 3(54, F9.3))
WRITE (3,230) (FINIAL SETSE ST. 2, 1), 1-1, 3)
 193
 いいりょうしょう
 . 200
 FORMATI IN . 124.144,44041 . 144,3154,F9.311
 WRITE (3.210) (THIALSCHESTOS.11.1-1.3)
 F38481(1M . 12E.14T.4H4P1 .14T.3(5E,F4.3))
HTTE (3.20) (174L5(7:57-4.1).1-1.3)
 210
 20150001
 220
 FORMATCIH . 124.144,5:11:2141,134,3(54,F9.3))
 Jul 20234
 #RITE (3,150)
 03154333
 .. 00150403
.... 150
 FORPATEIN // IN ,104,21HAMMUAL OPERATING COSTI
 0) 140 | - 1.4557
 3015->30
 IF (1PTSTACE.21.EQ.1) GQ TO 160
 33154600
 WRITE (3.140) (CSTLAR(J. 11. J-1. W). (TOTALS(1. J). J-1. 3)
 UU 1>+70.
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MEMBER YAME COVAEP
 BUFITHES
 #116 (3.195) (7374LS(%CST+5.1),1+1.3)

#2416 (3.195) (7374LS(%CST+5.1),1+1.3)

#3417 (3.7974 (4.7974 (
 m12+139
 30.3-933
 195
 30153303
 991>>1-1
 WELLE 4 3. 2131 GLOLAR 21 AC 24. 11. 1-1.31
 かいろうとろっ
 WRITE 13,2231 17074L SINC STOR, 11, 1-1,31
 CALL HEADS
 001>>441
 4111E (3.303)
 WISSE.
 FORMATION //// IN .40%. SEMPEACETIME COST AND STRENGTH SUMPARY.
 witten
 +21E, PHSUBPASE 2/
 00155/44
 old .40%.35(1H-1///1H .49%.8H COMSAT .7%.8H SUPPORT.7%.8H
old .40%.3f(13H-------.5%)/1H .21%,16MPRESENT WORTH OF/
 TOTAL /3515500.
 00133433
 old .log. Johnstial investment . 10 years operating//1
 3013-300
 I . MCST . 1
 Persorie.
 2017-50-
 J . NCST . 4
 L . MCST . .
 DR - DSCHT[3.133,131
 30.2043
 10 010 R + 1.3

13 10 R + 1.3

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18 10
 001>>501
 00156650
 FORMATIEN . 124.26401 SCOUNTED AT TO PERCENT.68.3158.FLO.31//I
 PR - DSCNT(3.053.13)
 00130433
 00 300 % - 1.3
1314(511.4) - 1314(513.4) + 00 - 1014(51(.4)
10118 (3,3-0) (1014(51].4).4-1.3)
10118 (3,3-0) (1014(51].4).4-1.3)
10118 (3,3-0) (1014(51].4).4-1.3)
 سدا د زند
 330
 60137103
 30157203
 FURNATE IN . 124. 26HOL SCHUNTED AT 5 PERCENT. 6E, 3(SE, F13.3) 1
 04 - DSCNT(0.975.13)
 0015740-
 00 350 K + 1, 3
1374LS(1, 4) + T374LS(1, 4) + DR + T074LS(1, 4)
WEITE (3, 363) (T074LS(1, 4), 4-1, 3)
FORMAT(1)H . 124.26H7(5COUNTED AT 7.5 PERCENT.6X, 3(5X, F19.7))
 10151500
 350
 30 45 7 60 J
 00157763
 340
 2012102
 Pt - DSCMT(0.125,13)
 JUL STVJJ
 D) 370 K + 1.3

F) TALS(1.4) + F) TALS(1.4) + DR + TOTALS(L.R)

+ R) TC (3.300) (TOTALS(1.K).K+1.3)
 0345-33-
 370
 00110111
 MIDELI.
 FORMATCIN . 124.26HOLSCOUNTED AT 12.5 PERCENT.6X.3(5X.F10.3) 1
 300
 COLDEIDS
 DR - DSC47(0.150, 10)
 3013443.
 00 300 R = 1.3

1314LS(1.4) = 1314LS(J.K) + DR = 1014LS(L.K)

WRITE (3.400) (1314LS(1.4),K=1.3)
 001>100-
 w1>476)
 FORMATIEN . LET. 26HDISCOUNTED AT 15 PERCENT. 6X, DIST, PEO. 31 1
 400
 4012161
 0315-933
 04 . 13.0
 DO 410 K . 1.3
 0012477
410
 TOTALSELICE . TOTALSEJONE . DR . TOTALSELIE
 30120133
 450
 .6x,3(5x,F10.3))
 001>4355
 3015403.
 170
 30124563
 00159000
 MPTSTAIDDLD+1D.
 PERCENTIAN AND DETERMINED COSTS ESTERATED USING THICOLOUSE OF ALLOCATION OF ALL DEATLOSTED OF ALL UNITS TO PERCENTE STRIPONS: ALL DEATLOSTED OF ALL DEATLOSTED OF ALL UNITS TO PERCENTE STRIPONS: ALL DEATLOSTED OF ALL DE
 0/1H .304.6(F8.6.3E))
 24103000
 Mioria
 RETURN
 FUNCTION DECUTA, APOT
 33707507
 30103300
 0010-030
 210-27-
```

```
HEMBER NAME CONREP
 77107177
 -((1/(1-A/4)--(N-MT1)) - (1/(1-A/N)--(N-MT2))) , R & 0.0 Outoubu
 MINIMA
 WHERE R - WOTIVAL INTEREST RATE

M - NUMFER JIF COMPOUNDINGS PER YEAR

TL- BEGINNING YEAR OF PERIOD CONSIDERED

TZ- ENDING YEAR OF PERIOD CONSIDERED
 937-1999
 001-1100
 - 93101 599
 וונוווו
 ITI.TZ RELATIVE A DEGINATING YEAR OF PLANNING PERIODI
 J0101-Ju
 00101500
 STIPLE
 DATA N/ 1 /
 30161700
 NT1 - 0
 - 00101803
 30101430
 03102303
C
 00102100
 05CYT - () / (N-ALOG()-A/N)-(NT2-NT3))) (NT2 - NT3) C
 33102200
 ししいとうしょ
 RETURN
 JJ. 02 00-
 END KOUTTKE SUNDA
 001-2703
 JUADA GUU
 OVERLATISUSARY. 6. 31
 001-4930
 PROGRAM SUNARY
 _. 30103635
 30103133
 00163233
30163333
00163400
 25 966 72
 SUMARY PRODUCES & FORCE SUMMARY REPORT.
 40164500
 CONTON /AGG/NAGGY.AGGLAB129)
 COMMON /DESCAP/STRUTHT TOOL DIMITOOL COSTITADE
 CCMMM /EFF/MEFF.EFFLAA(6.31.FFF(60.6)
COMMON /FORSOL/FURSOL1760.21.1FASOL1760.21
 . 001+400
 COMMON PRESOLUTION TO THE SUPERINDER MANAGEMENT
 0010-13-
 ... 30104232
 CONTON/SYTAGE/NSTRAI 373
C
 DIMENSION COVENTIS. 201
C
 00104533
 INTEGER DIN. FORVSH
 REAL MOFE
C
 APAD (1, 001) 4077, F78484
 30193333
101
 8f45 (1.70)) ((C)#f#f(1.J),J-1.201.[-1.5]
930
 FJAMATEZJAAL
 13103500
 IF (FOLVS4.NE. II CALL HEADS
 001-300J
 33165703
 WEIT (3.13) ((COMPTEEL.)).3-1.231.1-1.51
 FURNATION ////IN .554.27HFURCE SUMMARY REPORT/IN .554.29(1H-3// UDIJOHCHU
 0,12110-1,23E,1711m-1//1
 33100330
```

```
MEMBER NAME CONREP
 0010040
 CALCULATE NUMBER OF CONEAT UNITS IN FORCE
 221 00 277
 001----
 CUNIT . 0
 00100700
 40100601
 DO 20 1 - 1,4C0497
30
 CUNIT . CUVIT . FORSOLITAL
 33100433
 00107333
 33107130
 36101200
 TESTRY . ABSIRLELINSYMBIZOLINSYMBI BLINSYMBILDIINSYMBIZOL
 "Lolw
 MSYM4(14), MSY43(14), MSY48(37), MSYM8(37))}
 2101430
 . 1000.0
 30107333
 TESTEN . ABSIRLGLINSYNGI 201. NEVNOLLO1. NEVNOLLO1. NEVPOLZO1.
 UU 16/60J
 MSY48(10).NSY4H(14).NSYH0(37).45Y#0(37)))
 3010773.
 • 1000.0
 997-1499
 JU 10 7 40 J
 MSYMAC 101, NSYMAC 141, NSYMAC 371, NSYMAC 37111
 33104000
 • 1000.0 PCCBTS • (TCSTAY/TFSTAY) • 100.0
 70 - ne 1 7 -
 00104200
 CSRATS . TOSTRY / TSSTRY
DEESTR = TESTRN / NOFE
 -LE 2010L
 00106430
 TECOST - AUSTRESEINSYMBIEDI, NEVADI DI, NEVADI DI, NEVADIEDI.
 06100000
 MSYM31 191, MSYMB1201, NSYM91371, NSYM8137111
 30100030
 TSCOST - ABSTRLGLTHSYMBT 201.457461141.457401 31.457001151.
 3:10173.
 MSY491141.MSY461201.NSY441371.NSY46137111
 UULaddu
 FFCOST - ABSTRECT TASYANT 201. NSYTHE 61. Nº 481 31. NSYMOTISI.
 7-10-4-1
 45749(19).NSY48(?:.,45746(37),NSY#813711)
 99104377
 PCCOTC - ITCCOST/TF:OSTI - 100.0
 00104100
 CSRATC - TOCOST / TSOOST
DEECST - TECOST / MOFE
 931-4501
 J610910-
 11 - MASKI EFFLABIL. 11 . 1)
 061-9433
 12 - MASKI EFFLABILIAL . 2)
 20104501
 13 - MASKI EFFLAS(1.1) . 3 /
 30104077
 14 - MASKI EFFLAGILILI . 4 1
 001-9703
 15 - MASKE EFFLAGEL 21 . 1 1
16 - MASKE EFFLAGEL 21 . 2 1
 031-4437
 0-1-4477
 TATIFF - ABS(AVAL(11.12.13.14.15.16.NSY49(37).NSY48(37))-
 00173000
 RLGL(11,12,13,14,15,16,45YMA(37),45YMB(37)))
 03173013
 . MASKE EFFLISER, 11 . 1)
 33173131
 12 . MASKI EFFLAS(2.1) . 2 !
 43110233
 13 - MASKE EFFLABLE. 11 . 3 1
 30170333
 14 . MASKI EFFLANIZ.11 . 4 1
 23112011
 15 . MASKE EFFLAREZ. 2) . 1)
 0017L 300
 16 . MASKI EFFLABIZ. 21 . 2 1
 6317360.
 TAPIFP - ASSIAVALIII.12.13.14.15.16.85481371.854491371)-
 ALGL (11.12.13.14.15.16.NSYM0(37).NSYM0(37)))
 11 . MASKI EFFLABIS.11 . 1)
 00173005
 12 . MASKE EFFLAGES, 11 . 2 1
 30173933
 13 . MASKE CFFLABES. 11 . 3 1
 001/1000
 14 . MASKE EFFLASES. 11 . 4 3
 33171135
 15 . MASKE EFFLATED. 21 . 1)
 30.71233
 16 . MASKE EFFLANIS. 21 . 2)
 CULITION
 . ABSIBVALIII.12.13.14.15.16.457881371.4578813711-
 33171430
 ALGL (11.12.13.14.15.16.NSYM(37).NSYM6(37)))
 3317.41.
 11 . MASKI EFFLANC-. 11 . 1)
 QUATA >30
 17 . MASKE EFFE 5814.11 . 2 1
 36171-3,
 13 . MASKE EFFLARIA.II . 3 1
 30171730
 14 . MASKI EFFLAGIA. 11 . 4 1
```

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MEMBER NAME CONREP
 15 . MASKI [PFLAGIA. 21 . 1)
 80171933
 16 - MASKI EFFLAGIA. 21 . 2 1
 3017403-
 - ABSI BVAL (11, 12, 13, 14, 15, 16, MSYM9(37), MSYM9(37))-
 30.74133
 06174113
 4LGL 111.12.13.14.15.16.457451373.45746137313
 11 - MASKE EFFLAGES. 11 . 1)
12 - MASKE EFFLAGES. 11 . 2)
 40172205
 4417/343
 13 . MASKE EFFLASES. 11 . 3 1
 06112464
 14 . MASKI EFFLASIS.LI . 4 1
 00172333
 15 . MASKE EFFLASES, 21 . 1 1
16 . MASKE EFFLASES, 21 . 2 1
 0047203
 . A65(#44L (11.12.13.14.15,16.45446137).N5448137) 1-
 03172030
 RLGL (11.12.13.14.15.16.NSYM6(37).NSYM6(37)))
 03474813
 . MASKI EFFLANCO. 11 . 1).
 63172930
 12 . MASKI EFFLABIO.11 . 2 1
 00171000
 13 · MASKI EFFLANCO. 11 . 3 1
 33173100
 10 - MASKI EFFLAGIO.11 . 4)
15 - MASKI EFFLAGIO.21 . 1)
10 - MASKI EFFLAGIO.21 . 2)
 06173233
 33173333
 30173433
 - ABSCOVALCIL, 12, 13, 14, 15, 16, MSYM9137), MSYMHE3731-
 00173500
 TECC
 ALGL(11.12.13.14.15.16.45Y*4(37).45Y*0(37)))
 30173513
C
 30171030
 301/1700
Č
 061736-3
 WRITE (3, 32) YCONST. TESTRY. TCCOST. TATIFP

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CO
10
 MATTE (3.40) CUNITATESTANATSCOSTATAPIFF
 J01742JJ
 F3R4AT(1H .13H43. CST UNITS.7K,F7.2.3K.7HSUPPORT.13K,F7.0.5K,7HSUPJU1743JJ

•P3RT.13K,F9.3.5K.6HSP [FP.14K,F7.1]
 WAITE 13.501 TESTAN. FEC 35T. TIFF
 00174535
 FORMATCIN . 304.5MTOTAL. 144.F8. 3.5K, SHTOTAL. 15K, F9. 3.5K, 9HTOTAL IFP30174633
 · 114. F7. 11
 00174733
 WRITE (3.40) PCCBTS.PCCSTC.THOR
 2011-07
 FORMATILM , JOX, 11 MPERCENT CBT, 9K.FT. J.SX, 11MPERCENT CRT, 9X, F9. J. SXJJ 17-95J
 00172334
 WALLE 13.701 CSAATS.CSRATC.TINT
 30175133
 FORMATILM . JOY . LIGHED T/SPT RATIO, TX. FT. J. SK. LIGHEBT/SPT RATIO, TY. FS. JJ. To Ju
 OB. SE. 12HINTELL ISENCE . PK . F7.1)
 001/2300
 WRITE 13,831 NUFE, MESTR, DFECST, TCCC
 00175-00
 FORMATION . THNO. DFE.134.FT.2.38.7MPER DFE.138.FT.9.58.TMPER DFE. 40.47.00
 •134. F9. 3. S4. 3HCCC . 174. F7.11
 UO 4 7 2234
 IF INAGGA.EQ.OI
 RETURN
 36175730
 WRITE (3,100)
FORMAT(1H // 1H ,53x,24HSUPPORT FUNCTIONAL AREAS/
 30172633
 JO1 /5553
 oln ,534, 24(1H-1/1H .34%.AMSTRENGTH.448%.15HCOST (MI/LICNS)/IH .14%.00170000
 04911H-1,104,4911H-1/1H .174,4HTH15,134,5HF(RCE,112,12H4FQUIREMENTSJJ.7J1)
 o, 1 47, 4HTMIS, 13 T, 5HF 27C E, 11 T, 12 PRECUIREMENTS/1H .4 AREA. 10 x, 114L TEOU. 762JJ
LLLG-1. LLI TEMPS T, 14 HSHORT / LONG FALL .5 x, 14 HSHORT / LONG L, 10 x, 1 HALT E 4 MAT LUJ. / LLG-1 X R, 14 HSHORT / LONG FALL . 5 x, 14 HSHORT / LONG FALL . 17 X PRECENTI. JULIONE SELL . 18 X PRECENTI. JULIONE SELL . 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI. JULIONE SELL / 18 X PRECENTI / 18
 PLOE, OHIP FROENT 1, 31E, THIP FROENT 1, 10E, THIP FROENT 1/1H , 4H----, 10E, 1110U 1763JU
 00110000
 5x,14(1H-),5x,14(1H-),10x,11(1H-),5x,14(1H-),5x,14(1H-)/)
 •
 33.70103
 TTASTA . 3.9
 00170LJU
 TOASTR . 0.0
 001704.3
 TFDSTR . 0.0
 Jul 27111
 TROSTR . 0.0
 00177100
 TTACST . D.D
 3017/;30
 TBACST . 0.0
```

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MEMBER NAME CONREP
TFDCST = 0.0
 00177430
 TROCST . 0.3
 33177533
 D3 110 | = 1.445GH
 00177600
 11 - MASKIAGGLABIII.1)
 00177733
 12 - MASKIAGGLABII), 2)
 03177433
 TASTA - WALLELLE, 12, 45444(19), NSYMB(20), NSYMB(18), NSYMB(37),
 00177900
 NSYM4(37), NSYM8(37))
-RLGL(11,12,NSYM8(19),NSYM8(20),NSYM8(18),NSYM8(37),
 30174000
 J0.761JJ
 NSY48(37), 15YM8(37))
 00173230
 TASTR - TASTR - 1000.0
 30711333
 TTASTR - TTASTR + TASTR
IF (FDEVSW-EQ-1) GO TO 140
 30178433
 UUCL7100
 FOSTR . BYAL(11,12, VSYM3(19), NSYMB(20), NSYMB(10), NSYMA(6),
 00170000
 NSY481 41. VSYM8(37))
 JU1737JJ
 -RLGL(11.12. VSY 45(19), NSY M5(20), NSY M5(18), NSY M5(6),
 00173400
 33174933
 45448(4), NSYMB(37))
 FDSTR - FDSTR - 1909.0
 00179300
 PCFSTR . 0.0
 30179133
 DENOM . TASTR - FOSTR
 00179233
 IF (DENOM. NE. D. 2) POFSTR - FOSTR / DENOM + 100.0
 00179303
 *GO TO 150

FDSTR = BV4L3(2,11.12,NSYMB(19),NSYMB(20),NSYMB(19),NSYMB(37),

MEMBERTYL,NSYMB(37))
 00179400
 301/9533
 73714007
 ٠
 -RLGL3(2,11,12,NSY19(19),NSYM9(20),NSYM8(18),ASYMB(37),
 00179700
 NSY45(37), NSYMB(37))
 FOSTR - FOSTR - 1000.0
 J01799JJ
 DENO4 . FOSTE
 00180000
 TBASTR - TBASTR + FOSTR
 00183133
 FOSTR - TASTR - FOSTR
 30183500
 PCFSTR - 999.9
 30180300
 PSFSTR . FOSTR / DENOM . 100.0
 16 (DENOM. NE. 0.0)
 TEDSTR . TEDSTR . FOSTR
 DOTATOTO
 ROSTR - BVAL(11,12, VSYM9(19), NSYMB(20), NSYMB(18), NSYM4(18),
 00150600
 NSYMBI 41, NSYMBI3711
 04144744
 -RLGL(11,12, VSYMY(19), NSYMR(20), NSYMB(18), NSYMB(18), VSYMB(4), NSYMB(37))
 20187902
 60143435
 ROSTR - ROSTR . 1000.0
 06161300
 TROSTR . TROSTR . ROSTR
 JJ181133
 PERSTR . 0.9
 00191500
 DENOM . TASTR - ROSTR
 06181355
 IF (DENDM.NE.D.D) PCRSTR = RDSTR / DENOM + 100.0
 30.41433
 TACST . HVAL([1,12, VSY'19(3), NSYMB(19), NSYMB(20), NSYMB(37),
 00131500
 MSY49(371. 45Y49(37))
 00141000
 -RLGL(11,12,45744(31,15748(19),45748(20),85748(37),
 30181733
 00141400
 MSYMB(37),MSYMB(37))
 TTACST . TTACST . TACST
 CO141933
 IF (FDEVSW.EQ. 1) GO TO 160
FDCST = BVAL(11,12, VSYMR(3), NSYPR(19), NSYPR(20), NSYPR(6),
 33187337
 00195100
 NSYBE 41, NSYMS(37))
-PLGL([], [2, NSYMS(3), NSYMB(20), NSYMB(6),
 00182255
 90185390
 MSY48(4), NSYM9(37))
 00162400
 PCFCST . 0.0
 30102533
 DENON . TACST - FDCST
 30185-07
 IF (DENOM.NE.3.3) PCFCST - FDCST / DENOM . 100.3
63 TO 173
 JO 182706
 Juluzauu
 FOCST - 8411312,11,12,454481 31,45481191,45481231,45481371,
160
 00185477
 MSY431371.HSYM813711
 00141010
 -ALGL3(2,11,12,N5Y4A(3),N5YAA(19),N5YMB(20),A5YMB(37),
 30183130
```

DAG

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MEMBER NAME CONREP
 NSY48(37), NSYMB(37))
 03143201
 DENOM - FOCST
 00181300
 TBACST - TBACST + FOCST
 DOTRIANO
 FDCST = TACST - FDCST
 30183535
 PCFCST = 999.9
 IF (DENIM.NE.O.O)
 PCFCST = FOCST / DENOM + 100.0
 00183700
... 170 . TEDOST . TEDOST + FOOST
 ..._ 00183630
 RDCST = BVAL([1,12, NSYM1(3), NSYM1(19), NSYM9(20), NSYM8(18),
 33183933
 NSYMB(4), NSYMB(37))
 00144630
 -REGE(11.12.NSYM3(3).NSYM3(19).NSYMB(20).NSYMB(18).
 33184133
 NSY48(4), 45YM8(37))
 TROCST = TROCST + ROCST
 00184300
 PCRCST = 0.0
 30184433
 DENCH = TACST - RDCST

IF (DEN)M.NE.J.O) PCRCST = RDCST / DEN)M + 100.0
 30184500
 00184600
 WRITE (3.120) AGGLAB(I). TASTR. FDSTR. PCFSTR. ROSTR. PCRSTR.
 3318+730
 TACST, FOCST, PCFCST, ROCST, PCRCST
 00184830
 120 FORMAT(1H ,1%,A2,1%,10%,F7.0,9%,F7.0,1%,1H(,F5.1,1H),4%,F7.0,1%,
 00184900
*1H11
 33185135
... 110 .
 CONT INUE
 00185200
 00145333
 IF (FDEVSW.EQ.1) GO TO 180
 J01824JJ
 PCFSTR = 0.0
 00145500
 DENOM - TTASTR - TFDSTR
 00185633
 IF (DENOM.NE.O.)) POFSTR = TEDSTR / DENOM * 100.0
 JU185700
 GJ TO 190
 0018580u
 PCFSTR = 999.9
 180
 20182672
 IF (TBASTR.NE.O.O) POFSTR = TFDSTR / TBASTR + 100.0
 00180000
 PCRSTR = 0.0
 0018-100
 DENUM = TTASTR - TROSTR
 33186233
 IF (DENOM.NE.O.)) PCRSTR = TRDSTR / DENOM * 100.0
IF (FDEVSW.E2.1) GO TO 200
 UJIdosuu
 00146400
 PCFCST = 0.0
 00186500
 DENOM = TTACST - TFDCST
 J018660J
 IF (DEVOM.NE.D.) POFCST = TFDCST / DENCM + 100.0
 00186700
 GO TO 210
 00145603
 PCFCST = 999.9
 200
 00180933
 IF (TBACST.NE.O.O) PCFCST = TFDCST / TBACST + 100.0
 00187600
 PCRCST = 0.0
 210
 00137103
 DENOM = TTACST - TROCST
 33.67200
 IF (DENOM.NE.J.J) PORCST = TROCST / DENOM + 100.0
 00167306
 WRITE (3,130) TTASTR, TEDSTR, PCFSTR, TEDSTR, PCRSTR, OULB7400
 TTACST, TEDCST, PCFCST, TROCST, PCRCST
 J0147533
 FORMAT(1H .14x.7(1H-),9x,7(1H-),12x,7(1H-),18x,9(1H-),5x,9(1H-),
 00167600
 +13x,9(1H-1/
 30187733
 1H ,5HTCTAL,9X,F7.0,9X,F7.0,1X,1H(,F5.1,1H),4X,F7.0,1X,
 33147433
 +1H(,F5.l,1H),13x,F9.3,5x,F9.3,1x,1H(,F5.l,1H),2x,F9.3,1x,1H(,F5.l,U)1879U
 •1H11
 RETURN
 JULIBIO
 END
 DULSBELDO
 SUBRUUTINE LPRO IP
 C
 OVERLAY(LPRDDP.14.0)
 30138432
 PAOGRAM LPADOP
 00144530
 PFD1EP 3.0 -- 5 MAY 1970
 CCIGGOOD
 READS NOTI-NULL COL AND ROW INFO FROM OPTIMA RECORD INTO STOULDS TJJ
 COMMON/ANS/4(3,2500)
 30100000
 COMMON/CUMMO/INTA [16]
 00144400
```

```
MEMBER NAME CONREP
 COMMON/STAT/NCOL(3), NROW(3), CREADI3)
 03193137
 COCHICT TAPES
 COMMON/HEDD/ITITLE(33,3).IPAGE
 3018 1230
 DIMENSION 18(5,4000),130W(2)
 30194370
 DIMENSION 18(3,2500), 10ENT(2), IBASE(2), 1COL(2), N1(2), IND(2)
 EQUIVALENCE (18,4)
EQUIVALENCE (18,RMAT)
 36184503
 LOGICAL CREAD
 30147730
 DATA IDENT/4HCOLU, 3H4NS/, IRHS/3HRMS/, IBL/1H /, IDENTR/4HROWS/
 UC16 JaDu
 / JPTIMA RECORD / IS ON LTAPE.
 00189900
 LPTAPE . IOTA(1)
 201 12 222
 MCASE = IOTA(2)
 00193130
 REWIND LPTAPE
 00140509
 READ UPTIMA RUN TITLE FOR MCASE.
 READ(LPTAPE, 36) (ITITLE(I, MCASE), [=1,33)
 *****FORMAT INSERTED 5 MAY 1970
36 FORMAT(22x 1444/15x,744,24x,244,42,16x,244,42///52x,544,41)
 ندەت19ن
 *****FORMAT PRIDE TO 5 MAY 1970
 36 FORMAT(2x,2544,/15x,844)
 00190800
 FIRST READ THE COLS INFO ALTHOUGH IT FOLLOWS ROWS INFO ON 00193903
 LPTAPE.
 SET, 1ST COL READ WORD OFF = 0.
 00191100
 . 00191401
C.
 SET NO. COLS. STORED COUNTER FOR CASE.
 LLOG = 0
 30191300
 ... 00191430
 IF(MCASE.EQ.1) MCOL = 0
 IF(MCASE.GT.1) MCOL = NCOL(MCASE - 1)
 03191300
 SEARCH FOR BEGINNING OF COLS SECTION OF OPTIMA RECORD.
 0019100
 50 READ(LPTAPE, 100) (COL(1), (COL(2)
 00191703
 100 FJRMAT(2X, 244)
 COTATANA
 IF(ICOL(1).NE.IDENT(1)) GO TO 50
IF(ICOL(2).NE.IDENT(2)) GO TO 50
WHEN COLS LINE FOUND SKIP NEXT 3 LINES.
 001920J
 00192135
 READ(LPTAPE, 1001 (COL(1), (COL(2)
 00192200
 READ(LPTAPE, 100) [COL(1), [COL(2)
 30192333
 READ(LPTAPE.100) (CCL(1).1COL(2)
 30192455
 READ UP TO 47 COLUMN VARIABLES ON / PAGE /.
C
 30192505
 DO 180 [=1,47
TEST FUR 1ST COL READ.
 30192633
 IFILLOG.NE.OJ GO TO 161
 00192300
C 160 READILPTAPE. 1591
 00192900
 160 READ(LPTAPE, 159, END=220)
 33193000
 • ICOLF-N1(1)-N121-1122-N123-N124-IND(1)-IND(2)-VALUE
159 FORMAT(2X,16,10X,A4,2A1,1X,2A1,12X,2A4,1X,F13.0)
 00194104
 03193203
 1ST CUL HAS REEN READ, SO LLOG ON = 1.
 33192333
 00193403
 KJ OF LAST ROW IS KJ OF 1ST COL MINUS 1.
C
 00193500
 LASTR - ICOLF - 1
 77783677
 GO TO 162
C 161 READ(LPTAPE. 140)
 00193602
 161 READILPTAPE.14J.END=220)
 2474737
 M1(1), V121, V122, M123, N124, IND(1), IND(2), VALUE
 0019-011
 140 FORMAT(18x, 44, 241, 1x, 241, 12x, 244, 1x, F10.0)
 30194103
 00177200
 NITE COC EUF TEST.
C 162 IFIEOF, LPTAPET 223,150
 00144300
 HERE IF PREMATURE END OF LPTAPE ENCOUNTERED.
 6019+405
 220 PRINT 30, MCASE
 3014+500
 30 FORMAT(27H BAD OPTIMA RECORD FOR CASE, 13, 134-- JOB KILLED.)
 001440
 STUP
 0614-70v
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(BAC)

MEN	BER NAME LOWREP	
162	CONTINUE	00194800
	CONTINUE  IF RHS ID FOUND, LAST COL HAS BEEN READ.  50 IF (IND(1).EQ.1RHS) GO TO 200  DO NOT STORE ANY ZERO-VALUED BETAS.	03194933
٠,	50 [F(IND(1).EQ.1345) GO T/) 200	30195333
	DO NIT STORE ANY PERCHANTER RETAS	00195160
•	DO NUT STORE ANY ZERO-VALUED BETAS.  IF(VALUE.E2.0.0) GO TO 180  N1(2) = NAME4(N121,N122,N123,N124)  ADVANCE NON-ZERO BETA COUNTER.	66195233
	MIA S MANGAMISI MISS MISSA	41104311
•	NATE - NATE NOTE OF THE CONTROL	30195500
	MODI - MODIA -	00195430
_	MCOL = MCOL + 1	00195500
	CHECK FOR SETA-STORAGE OVERFLOW.	20142022
_	IF(MCOL.GT.2500) GD TO 230	00195700
C	STORE COLUMN NAME.	00142800
	IF(MCOL.GT.2500) GD TO 230 STORE COLUMN NAME.  IB(1,MCOL) = N1(1) IB(2,MCOL) = N1(2)	20142427
		02149900
C	STORE BETA VALUE.	00196135
	A(3,MCOL) = VALUE	00140577
1	BU LUNIINUE	COLIABORCO
	GO TO 50	00196433
C	SAVE LOCATION OF LAST WORDS USED FOR THIS CASE COLS.	J0196500
2	GO TO 50  SAVE LOCATION OF LAST WORDS USED FOR THIS CASE COLS.  DO NCOL(MCASE) = MCOL	00196610
	SAVE LOCATION OF LAST WORDS USED FOR THIS CASE COLS.  00 YCOL(MCASE) = MCOL PRINT 32, MCASE, WCUL(MCASE) 32 CORMATIST AND ASSESSED RETAIN CHMIN ATTUE.)	00195700
	PRINT 32,40ASE,40LLMCASE) 32 FORMATISK,4HCASE,13,18H. NON-ZERO BETAS =,18,12H CUMULATIVE.) NO4 EXTRACT ROWS INFO.	10160877
C	NOT EXTRACT ROWS INFO.	00146943
•	APILING LATIAS	00197000
Ċ	SET ROWS STORED COUNTER FOR THIS CASE.  1F(MCASE.EQ.1) MROW = 0	30197165
		.00197200
	IF(MCASE.NE.1) MRUH = NAUH(MCASE-1)	00197300
C	IF(MCASE.NE.1) MRU# = NRU#(MCASE-1)  SEARCH FOR ROWS SECTION.  55 READ(LPTAPE,100) ICOL(1),ICOL(2)	34197411
Č	55 95 96 96 96 96 96 96 96 96 96 96 96 96 96	33:675.11
L	55 READ(LPTAPE,103) [CUL(11,1CUL(2) 55 READ(LPTAPE,103,EN3=220) [CUL(1),[CUL(2)]	20101432
	77 REAULTIAPETUTENT=2207 ICULTIFILULTZI	601077
		60197755
C.	IF(EDF, LPTAPE) 220,800  CHECK FOR INTO COLS SECTION, SHOULD NEVER HAPPEN, BUT DO IF((ICOL(1).EQ.IDENT(1)).AND.(ICOL(2).EQ.IDENT(2))) GO TO 899  IF LINS OF ROWS. READ ANOTHER LINE.	30197833
C	CHECK FOR INTO COLS SECTION, SHOULD NEVER HAPPEN, BUT	00141402
8	DO IF((IC3L(1).E2.IDENT(1)).AND.(ICOL(2).EQ.IDENT(2))) GO TO 899	90149999
C	IF LINE OF ROWS. READ ANOTHER LINE.	22128122
	IF LINE IS ROWS. SKIP 3 LINES.	00198200
C	READILPTAPE, 100) IROH(1), IROH(2)	J01983JJ
	READ(LPTAPE,100) [ROJ(1),[ROW(2)	00169470
	## (** COL(1) - NE - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10 E - 10	00140500
	READ(LPTAPS-100) IROW(1).IROW(2)	30148677
C .	READ UP TO 47 ADA VARIABLES PER PAGE.	00198700
	READ(LPTAPE,100) IROW(1),IROW(2) READ(LPTAPE,100) IROW(1),IROW(2) READ UP TO 47 ROW VARIABLES PER PAGE. DD 880 I=1,47	30144000
C	READ(LPTAPE, 145) KJROW, V1(1), N121, N122, N123, N124, RLGL, PT, VALUE	00198433
	READ(LPTAPE, 145, END=220)	06199000
		6019910-
1.	55 FURMAT(2x. 16. 104. A4. 211. 1x. 2A1. 21x. F10. 0. 10x. F10. 0. 8x. F10. 0)	00199205
. c		30199335
	**** NOTE CO; EOF TEST.	00149404
č	1F(EUF,LPTAPE) 220,850	0014940
		03149600
· · ·	KO 16191.60.3.0.ANN.VAL'U.F3.0.0.3NN.WIGL.FD.3.3) GO TO 890	33129733
•	N1(2) = NAME4(N121, V122, N123, N124)	00199803
,	N1(2) = NAME4(N121, N122, N123, N124)	33199955
C		
•	THE T IN STORAGE DURIELOU	00230003
C	MROW = MROW + 1 CHECK FOR ROW STORAGE OVERFLOW. 1F(MROW.GT.4007) GJ TO 235	70200103
	1F(MROW.GT.4007) GJ TO 235	30233203
C	STORE ROW NAME.	30530333
	IR(1, MROH) = N1(1)	JU20040U
	IR(2,MRUH) + N1(2)	3223350

		a mandy agencial	
	MEMBE	R NAME CONREP	
		STORE PE VALUE.	05233633
		RMAT(3,MROJ) = PI	00200700
	C	STORE RHS-VALUE.	00230830
•		RMAT(4.MRDA) = VALUE	00200900
	C	STORE LOGICAL VALUE.	90491999
	•	RMAT(5, MRUH) = RLGL	02501107
	C	CHECK FOR PRE-DETERMINED LAST ROW.	00201200
**	-	IF(KJROW-EP-LASTR) GO TO 899	ひっとっしょうしょ
		CONTINUE	00201403
	850		
		GO TO 55	30731505
	C	SAVE LOCATION OF LAST MORDS USED FOR CASE ROW STORAGE.	33531033
	899	VROW(MCASE) = MROW	00231705
		PRINT 34, MCASE, NRUWINCASE)	00501800
	34	FJR44T(5X, 4HCASE, 13, 254. NON-ZERO PI. B. OR LGL=,18,	20577277
		• 12H CUMUL4TIVE.)	00202000
•	C	TURN ON CASE READ WORD.	30232103
		CREAD(MCASE) = .TRUF.	<b>J</b> JZJŽŽŽŽ
•		RETURN	00232303
	230	PRINT 31. MCASE	30232433
٠.	31	FORMAT ( 40H BETA STORAGE OVERFLOW JOB MILLED. CASE, 13, 1H.)	30232503
		STOP	03202033
•	225	PRINT 33,4CASE	00202703
		FORMATI 40H ROWS STORAGE OVERFLOWJOB KILLED. CASE. 13. 1H.)	
	. 33		12575877
		STOP	30232900
-		END	00503022
	_	SUBROUTIVE LAKEMA	03203100
	C	OVERLAY(LPROMP.15,0)	20203201
	C	PROGRAM LPROMP	05233300
	C	PFDREP 1.4 9 MARCH 1970	JU2334UJ
	C	READS ROW AND COL THEO FROM AN MESSED RELATED SOLUTION	37573507
	C	FILE INTO PERREP STORAGE.	00233000
		CONSTANT 3, 2500)	00203703
		COLVERAGE COLVERNO	30233853
	•	COMPONISTATION (3), NROW (3), CREAD(3)	00203900
		CUMMON/RNS/MMAT(5.40CO)	03264333
		COMMON/HEDD/IT ITLE(33,3), IPAGE	J320410J
		DIMENSION (R(5.400)) 13(3.2500) IDENTE(2) N1(2) VALS(3) N(3)	06264235
**		EQUIVALENCE (VALS(1), RAST), (VALS(2), SLACK), (VALS(3), P(VS)	00204300
		EQUIVALENCE (IB.A). (IR.RMAT)	00204435
			00204500
		DATA IDENTR/44ROAS/, IDENTC/4HCOLU, 4HMMS /	30204603
		DATA LUCHTANIAS/FISE TIC/ANGUED/ANGUE	
			33234733
		LPTAPE = 13TA(1)  4CASE = 10T4(2)	6 6 11 1
			7 7
	,C	READ MPS35D RUN TITLE FROM INPUT CARDS.	00202000
		READ(1,1) (ITITLE(1,MCASE),1=1,33)	00205100
		FORMAT(1X,1744)	33205230
	C	MPS 360 SOLUTION IS ON LPTAPE.	30205303
		REWIND LPTAPE	30205400
	C	SET ROWS STORED COUNTER FOR THIS CASE.	03235555
		MRD# = 0	ひっとひうゅうり
		IF(MCASE.NE.1) M4OW = NAUM(MCASE-1)	60205755
	C	READ TO RUAS SECTION.	CCBF020
	C 100	READILPTAPE, 21 NIII	30233911
		READ(LPTAPE, 2, EV7+970) N1(1)	
		FORMAT(1x, A4)	00206100
	c -	SHOULD NOT ENCOUNTER EDF.	30236235
	č	IF(EOF, LPTAPE) 900,101	3-2-53-
	_		

MEMBER NAME CONKEP	
C SHOULD ENCOUNTER ROWS.	03236433
AAR ECANALAR NE INCLUENT AN TO LAA	AA ICA BA I
C MERE WHEN AND IF ROWS SECTION FOUND.	JU200533
C SU NOW READ ROW INFO.	062067uu
200 READURATES 11 NICIDIANICAL STACK PIVS	00246844
C SU NOW READ ROW INFO.  200 READ(LPTAPE.3) NI(1).NI(2).RACT.SLACK.PIVS  9 FJRMAT(1X,44,44,9x.F13.5.2x.F13.5.1x.F13.5)  C CHECK FOR INTO COLS SECTION YET.	70596474
CHECK FOR INTO COLS SECTION YET.	33237300
IF(N1(1).E).[DENTC(1)) GU TO 300	00267105
C COMPUTE RHS VALUE.	00267105 00267200 30207355
RHS = RACT + SLACK	33237334
RHS = RACT + SLACK  S	00207404
TECRHS FO. O. D. AND. SI A"K . FO. D. O. AND. PLYS . FO. D. O. T.C. 200	30237533
C OTHERWISE ADVANCE ROW COINTER.	34237634
MROW = MROW + 1	00207700
C CHECK FOR BON STORAGE OVERELOW.	30207633
IF(MRDW.GT.4000) GO TO 910	00207944
G STORE ROW NAME.	00208000
IR(1, 4ROH) = 41(1)	00208100
IR(2.MROW) = N1(2)	00438201
F(MROW.GT.4000) GO TO 910   GO	00208300
.RMAT(3.MROA) = PIVS	35200434
C STAR RHS VALUE.	30206533
, RMAT(3, MROA) = PIVS C STORE RHS VALJE. RMAT(4, MROA) = RHS C STORE LOGICAL VALUE.	00204600
C STORE LOGICAL VALUE.	03208734
C STORE PI VALUE. , RMAT(3, MRO#) = PIVS C STORE RMS VALUE. RMAT(4, MRO#) = RHS C STORE LOGICAL VALUE. RMAT(5, MRO#) = SLACK	ひかとひゅるひょ
RMAT(5,MROH) = SLACK C READ NEXT RECORD. GD TO 200 C MERE WHEN COLUMNS SECTION ENCOUNTERED. C SAVE INDEX OF LAST WORDS USED FOR ROW STORAGE. 300 NROW(MCASE) = MROH C SET COLUMNS STORED COUNTER FOR THIS CASE.	33204900
GO TO 200	00239505
C . HERE WHEN COLUMNS SECTION ENCOUNTERED.	30209100
C HERE WHEN COLUMNS SECTION ENCOUNTERED. C SAVE INDEX OF LAST WORDS USED FOR ROW STORAGE.	00209230
SAVE INDEX OF LAST WORDS USED FOR ROW STORAGE.  300 NROW(MCASE) = MROW  C SET CULUMNS STORED COUNTER FOR THIS CASE.  MCOL = 0  IF(MCASE.NE.1) MCOL = NCOL(MCASE-1)  C NOW READ COLS INFO.  C 310 READ(LPTAPE.4) NI(11.NI(2).VALS(11.NI)	00209300
C SET CULUMNS STORED COUNTER FOR THIS CASE.	00239403
NCOL . O	30209500
ff(MCASE.NE.1) MCDL = NCOL(MCASE-1)	00239600
C NOW READ COLS INFO.	00239703
C 310 READ(LPTAPE.4) V1(1).N1(2).VALS(1).N(1)	00239830
310 READ(LPTAPE, 4, END=800) N1(1), N1(2), VALS(1)	05209935
C 310 READ(LPTAPE,4) V1(1).N1(2).VALS(1).N(1) 310 READ(LPTAPE,4,END=800) N1(1).N1(2).VALS(1) 4 FJRMAT(1x,44,44,F13.5) C IF(EOF,LPTAPE) d03,320	00213000
C IF(EDF, LPTAPE) 600,320	03213133
C DU NOI STORP DAD VALUE BETA.	(3(1) - 1) 2.4(1
FJRMAT(1X, 44, 44, 13, 5)  C	いりさしょうい
C _ CHECK FOR MEGATIVE VALUE.	03213400
IF(V(1).EQ.NEG) V4LS(1) = (-1.0) + VALS(1)	00210500
C ADVANCE CULUANZ ZIOKED COUNTEKA	ונפנוצטט
MCOL = MCOL + 1	33210733
CHECK FOR BEIN SITINAGE DACKFEDWS	30213830
1F(MCOL.GT.2500) GO TO 920	20512827
C STORE COLUMN NAME.	06211300
B12,MCOL) • N1(2) C STORE BETA VALUE.	30211233
C STORE BETA VALUE.  A(3,MCOL) = VALS(1) C READ NEXT RECORD.	03511333
A(3,4COL) • VALS(1)	JUST 1 400
C READ NEXT RECORD.	00211503
60 TO 310	00211000
GD TD 310  C MERE IF BOTH ROWS AND COLS BOTH READ.  C SAVE INDEX OF LAST COL STORAGE WORDS USED.	00517103
DOD MEDI IMPAGE - MEDI LOTE STURAGE MIROS USED.	00511303
GOO NCOL(MCASE) = MCOL C PRINT STONAGE STATISTICS.	00211400
C PRINT STONAGE STATISTICS.	90515707
PRINT 32, MCASE, NOUL (MCASE), MCASE, MROW (MCASE)	00515100

MEMBE	R NAME CONKEP
32	FORMATIOX, 4HC4 SE, 13, 18H. NON-ZERO BETAS =, 18, 12H CUMULATIVE./
	SX.4HCASE.13.25H. NON-ZERO PI. B. OR LGL=.18.
	• 12H CUMULATIVE.)
· C	SX,4HCASE, 13,25H. NON-ZERO PI, B, OR LGL=,18,     12H CUMULATIVE.)     TURN ON CASE READ WORD.
•	CREADIMCASE) . TRUE.
•	RETURN HERE IF PREMATURE END OF FILE ON LPTAPE.
C	HERE IF PREMATURE END OF FILE ON LPTAPE.
900	PRINT 30.4CASE FORMAT(29H BAD MPS360 SOLUTION FOR CASE.13.13HJOB KILLED.) STOP
30	FJRMAT(29H BAD MPS360 SOLUTION FOR CASE, 13,13HJOB KILLED.)
	STOP
910	PRINT 33,MCASE
33	FORMAT(40H ROWS STORAGE OVERFLOWJOB KILLED. CASF, 13,1H.)
	PRINT 33,MCASE  FORMAT(40H ROWS STORAGE OVERFLOWJOB KILLED. CASF,13,1H.)  STOP  PRINT 31,MCASE
720	PRINT SIEMLASE
31	FORMATIAOH BETA STORAGE OVERFLOWJOB KILLED. CASE, 13,14.1
	STOP
	END
	SUBROUTINE SUPORT
:	
	OVERLAY(SUPORT,7,0) PROGRAM SUPORT
•	CUMMON /DESCRP/STRYTH(760).DTM(760).CDST(760) COMMON /EFF/NEFF.EFFL38(6.3).EFF(60.6)
	FRANCE / SESONE / STATEMENT TOUT   THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF THE CONTROL OF T
	FOMMON JEORGE JEORGE JAN 21 TERCOLATA 21
	COMMON /EFF/NEFF,EFFLBB(6,3),EFF(60,6) COMMON /FORSOL/FORSOL(760,2),IFRSOL(760,2) COMMON /LINE/LINE,ISBPAG
	COMMON /LINE/LINE,TSBPAG COMMON /REGFAC/CDEF(80CO),KJCOEF(80CO),NANZ,NBNZ COMMON /RESOLU/NSCONT,NSUPRT,NPRAN,NPRAMU
	ONAN, TREWIAL FUNCTION OF THE TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL TOTAL
	CUMMUM /KESOLU/NCUMMITASUPRTANPRAM, NPRAMU
	COMMUNICATION (37)
	COMMON /TITLE/ITITLE(B). (SRC(3), ITPSN(2)
	COMMON /RESOLU/NCOMBT.NSUPRT.NPRAM.NPRAMU COMMON/SYMBOL/NSYMB(37) COMMON /TITLE/ITITLE(B).ERC(B).ITPSN(2) COMMON /ILOC10/ILOC10 GOMMON /CHECKX/ITEST(25)
	COMMON /CHECKX/ITEST(25)
	INTEGER DTM.DTMI
•	UATA IBLANK/ 4H /
	DO 40 1 = 1,8 174TLE(1) = 19LAYK
0	STATLE(1) = ISLANK
	ST-ITLE(I) = ISLAYK DD 60 I = 1,3
0	D3 60 I = 1,3 ISRC(I) = IBLANK D3 70 I = 1,2
	ISRC(1) = IBLANK DD 70 1 = 1,2
1.1	DJ 70 ( = 1,2 1TPSN(1) = 1BLANK
	REWIND 10
	KENIND ID
	ILOC10 = 0 IPOINT = 0
	Iruni = u
	MURLI = NCOMBT + NSUPRT
	NCJEF = NAVZ + NONZ
	ISBPAG = 0
	IPOINT = 0 TERUS + TOMOT + NOIPRT  NOIR = TINUM  SNEW + SPAN = TERUS  SAGE = 0 CALL SHEAD
	D3 10 1 = 1-NUNIT
	\$JB1 = 0.0
	\$195 = 0.0
	1F (LINE+1.GT.60) CALL SHEAD
	WRITE (3,50)
0	
•	LINE = LINE + 1
	FINE - FINE A T

```
MEMBER NAME CONTEP
 CALL BRK30G(DTMI, 11, 12, 13)
 03219133
 _ 1x = NSYMB(19)
 00214203
 IF (I-LE. YCONST)
 IX = NSYYB(3)
 30218333
 ,11,12,13,NSY48(37),NSY48(37),
 PII - PIVALIIX
 03214433
 NSYMB(37), NSYMB(37))
 00214500
 . 11,12,13,NSYM8(18),NSYM8(19),
 SHORT =-BETACIY
 NSYMB(37),NSYMB(37))
 RLONG . BETALLX
 , (11, E2, 13, NSYMB(18), NSYMB(12),
 00218807
 NSYMB(37) . NSYMB(37)
 CLEPISOD
 REQDEV = SHORT + RLONG
 03419333
 TJSOLX = FORSOL(1 ,1) - REQDEV
 IF (TUSOLX.GT.0.2) PCREQ = FORSOL(1 .1) / TUSOLX IF (TUSOLX.GT.0.2) PCDEV = REQDEV / TUSOLX = 100.0
 PIX = PII
 IF (I.GT.NCOMBT.AND.PCREQ.GT.O.O) PIX = PII / PCREC IF (ITEST(1).EQ.1) GO TO 80
 00214500
 00219633
 CALL TGSPT(1)
 IF (LINE+1.GT. 69) CALL SHEAD
 -30518800
 ISTR = STANTH(I)
 WRITE (3,93) DIMI+(ITITLE(J)+J=1+8)+FORSOL(I+1)+REQUEV+PCDEV+
 * | ISTR | COST(I),PIX
FJRMAT(IH ,13,1X,744,42,1X,F7.3,1X,F8.3,1X,F6.1,1X,I5 ,1X,F7.3,
 00223000
 .
 1X,F7.31
 00223203
 LINE = LINE + 1
 00220300
 IND = 0
20
 30220500
 IF (IPOINT+1.GT.NCOSF) RETURN
 00220606
 60220700
 CALL KJUNPS(IPOINT+1,K,L)
 IF (K.NE.DIMI) GO TO 110
 IPOINT = IPOINT + 1
 IND = IND + 1
 00221000
 CALL KJUNPS (IPOINT, K.L)
 JX = KJGETS(L)
 00221200
 CALL BRK3DS(L
 PII = PIVAL(NSYM3(19),[1,[2,[3,NSYMB(37),NSYMB(37), 00221300
 00221500
00221600
 NSYMB (37) , NSYMB (37))
 SHORT =-BETA(NSYHB(19), [1, [2, [3, NSYMB(18), NSYMB(19),
 NSYMB(37),NSYMB(37))
 RLONG = BETA(NSYMB(19), 11, 12, 13, NSYMB(18), NSYMB(12),
 00221900
 NSYMB(37),NSYMB(37))
 REQDEV = SHORT + RLONG
 TUSOLX - FORSOLIJX.11 - REQUEV
 00222700
 PCREQ - FORSOL(JX,1) / TUSOLX
 IF (TUSOLX.GT.O.O)
 PCDEV - REQUEV / TUSOLX + 100.0
 IF (T'ISOLX.GT.J.O)
 PIX - PII
 IF (PCREQ.GT.O.O) PIX = PII / PCREQ
 PCREO - ABSIPCREDI
 00222303
 SJBT - COSF(IPUINT) + FORSOL(I +1)
 SUBTU - SUST
 IF (RESDEV.NE.O.O) SUBTU - PCREQ - SUBT
 SUBS = SUBT + STRNTH(JX)
SUB1 = SUB1 + SUBS
 SUBSU . SUIS
 SUSSU . PCREQ . SUBS.
 IF (REQUEV.NE.3.3)
 30223334
 SUB2 - SUB2 + SUBSU
CP1 - - 0.1 + SUBT + P11
 00657220
 IF (ITEST(1).EJ.1) GO TO 100
```

MEME	ER NAME CONREP	
	CALL TGSPT( JX )	00223700
100	IF (LINE+1.GT.60) CALL SHEAD	00223400
	LINE - LIVE + 1	0045760
111	ISTR = STRYTH(JY)	00557410
	WRITE (3,30) L.(ITITLE(J),J-1.0),FORSOL(JX,1),REDDEV,PCDEV	90554933
	• ISTR ,COSTIJXI,PIX,COFF(IPOINT),SUBT,SUBTU,	7055.577
	SUBS. SUBSU. CPI	03224255
30	FORMATCLM . [3,1x,744,42,1x,F7.3,1x,F8.3,1x,F6.1,1x,15] ,1x,	30554307
	• F7.3,14,F7.3,3x,F8.6,1x,F7.3,1x,F7.3,1x,F7.0,1x,F7.0,1x	13664477
	• F7.31	33224500
	GO TO 20	00224600
c		3022-730
110	IF (IND.EQ.3) GO TO 13	30224400
	IF (LINE+2.GT. 60) CALL SHEAD	30224935
	LINE . LINE + 2	33225000
	WRITE (3,130) SUA1,5UB2	00225133
130	FORMAT(1H , 108x, 2(8H )/1H ,108x, F7.0, 1x, F7.0)	30552577
C		30225335
10	CONTINUE	0022:430
С		00425503
, , Č		30223601
	RETURN	00223703
	END	00223911
	CF 3H TULKEUZ	00222900
	COMMON /LINE/LINE, ISBPAG	0022000
	ISBPAG = ISBPAG + 1	£022610-
	CALL HEADS	00226200
• • • •		00240333
• •	WRITE (3.10) ISBPAG	
10	FORMATILH //1H ,554,19494IT SUPPORT REPORT,39X,7HSUBPAGE,14///	00226405
	U DAITFORGUE-461.xes. HIVI-HI) DI.xes. HIVIINU CET PCGGUEHEL.xoE, HI*	
	*ITS.51x.22HDIRECT UNIT ALLOCATION/1H ,92x.31(1H-1/1H ,40(1H-1,	7755000
	#17%, 5HUNITS, 10%, BHSTRENGTH, 4%, 7H10 P.C./IH , 43%, 15HRECHT DEVIATIO	
	+,15x,7HLP MAR-,3x,7HCOSF OF,2x,15(1H-),1x,15(1H-),2x,4HCOEF/	30226603
	+1H ,36x,4HSOLY,3x,15(1H-),1x,4HUNIT,4x,4HUNIT,3x,5HGINAL,4X,7H4LL	030250637
	- CA-, 2X, 2(16HN) REQ UNIFORM 1, LX, 64MARGNL/1H , 3HDTM, 13X, 5HTITLE,	00221333
•	+15x.5HVALUE.3X.5HVALUE.3X.	JU2271JJ
	+ 6HPERCYT.1X.4HSTRN.4X.4HCOST.3X.5HVALUE.6X.4HTION.	33227230
	*4x.2(5HDEVTN.2x.7HREQ DEV.2X).5HVALUE/1H .3(1H-).1X.30(1H-).1X.	00227303
	+7(1H-).1x.5(1H-).1x.6(1H-).1x.5(1H-).1x.7(1H-).1x.7(1H-).3x.8(1H-	
	4.5(1x,7H)/)	00427700
	LINE • 21	00441600
	RETURN	00227703
	EVO	00227333
	SUMMONTINE TORPYTKIT	33227703
, C	KJ = RECORD TO BE READ ON UNIT 10	30254333
C	ILOCIO = RECORD LAST READ ON UNIT 10	30259103
	COMMON /TITLE/ITITLE(8), ISRC(3), ITPSN(2)	00259577
	COMMON /ILOC10/ILOC10	90558301
	tf (KJ.NE.ILOC12) GO TO 10	00224400
= -	BACKSPAGE 10	OCS58220
	63 10 23	00224633
10	IF (KJ.GT.1LOC10) GR TO 30	30224732
••	REWIND 10	00228600
	IEND • KJ - 1	36450137
	IF (IEND-LE-0) GJ TO 20	22554227
	D1 40 [ • 1, LEND	20554100
40	READ (10,50)	02556500
50	FORMATELOGI	00556377

HEN	DER NAME CONTEP	
	6) 10 20	30229433
30	1649 - KJ - ILO:10 - 1	36224563
	15 11500 15 01 50 70 30	00227001
	03 43 1 • 1.1ENO	33229734
60	READ (13,53) .	. 30225-003
40	3610 (10.70) (00M. (1717) 6(1) (10.61) (1586) (11.161.3)	00174407
	0 (12,52)	30230303
70	FORMAT(14.34.44.7A4.42.2A4.43.44.43)	01217177
10	IL3C10 • KJ	00513535
	RETURY	4144311
	£40	06416401
-		00230300
	SUBRUUTINE AJUN751LUC, TOI, TOZI COMMON /REOFAC/COEF190001, KJCUEF190001, MANZ, MBNZ	03230303
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	101 • KJC0EFILOC) / 1000	00234740
-	102 • KJCOEFILOC) - 101 • 1000	30537970
	RETURN	92577477
	(Y)	00331600
	FUNCTION RUGETS(10)	22521702
<u>C</u>	the first the section of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company	93511597
Ç	THE CARE OF A	PRESTAGO
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C	CALLING PARAMIER AN EXTERNAL IDENTIFICATION NUMBER OF A UNIT	025771377
C	COTH NUMBERS AND DETERMINES THE CONGEN INTERNAL ECENTEFICATION	
ε	NUMBER1,2, NCOMBT. NCOMBT. 1 NCUMBT. NSUPRT.	00511400
C	EXTERNAL UNIT IN NUMBERS ARE STORED IN COMMON ARRAY DIMIGOOD -	-0:175077
C	FOR NCCMST COMBAT MODULES, THEN FOR MSUPRT SUPPORT UNITS.	11612111
	AN ERROR MESSAGE IS PRINTED AND CONREP EXECUTION IS	22515527
C	TERMINATED BY STOP OOG IF PARAMETER ID IS NOT FOUND IN	10575791
	ARRAY DTN	03414403
C		00535233
C	IDETTERNAL UNIT IDENTIFICATION NUMBER	30535071
C		CETSESUU
C		06232850
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	COMMON /RESCLU/NCOMAT, NSUPRT, NPRAMU	99511993
C		03233130
•	INTEGER DTM	00233200
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Č		03233433
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•	IF (DTM(1).ME.1D) GO TO 10	00244430
	KJGETS + I	34571477
	RETURN	00214033
		00414100
10	CONTINUE	0323-233
	THE TOTAL A	00427300
č		60234400
	PRINT 20.10	U321453J
20	FORMATI 1H1/////H .42H+++++ FUNCTION KUGET WAS CALLED WITH ID + .	
	CHIO VARRA PI TER 21 HIRW HOS.CO	03234733
	\$10P 0004	30234833
: ···	9111F 4447	01210 000
č		00415630
	<b>SND</b>	00235030
	END	

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MEMBER NAME CONSEP
 SUMMOUTINE CAVER
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 PROGRAM COVER
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	DATA M/ 4HSSS .4H S. 2HSS .	304-2430
	· • • • • • • • • • • • • • • • • • • •	332033-
	• 40000,4H 00,2H00 .	6024,100
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	• 486 .486 .286	20402203
	0 4000 ,4000 ,2000 ,	-03443-30
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	Will (3,1)	3330-533
1	FORMAT ( 1 H1 . /// /// // // // // // // // // )	00444 303
41.00	00 10 1 • 1.12	0250.02
10	walte (3.2) (C(J, (1.J-1.3), (0(J, (1.J-1.3), (4(J, (1.J-1.3),	225-25-2
	•	105++003
	• (413.11.3-1.31	30340100
	P30141114 ,23E,71244,42,2E11	09544677
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	RETURN	********
	(10	0324-100
	JUNEOUT INT TUTSTE	00 350,00
E	OVERLAYETE ISTE. 10.31	362-53-3
E	PROGRAM ILISTE	03201000
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	COMMON /4557611/467457. VSUPAT, NPASA, NPASAWU	0120000
	COMPANSAGE VARA AND DATE	
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	COMMON /111LE/1111LE101.154C131,11P54171	0-20-032
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TERBER NAME CONSEP
 INTEGER DTY
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 . 0024-00-
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 ISOPAG . O
 READ (1.403) ((COMENTIL.J),J-1,201,1-1,5)
 30247433
900
 FURNATI 20A41
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 CALL TYMEAD
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 DO 10 1 - 1.4CO481
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 CALL TOTUEL OTHERS !
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 CALL BACSOGIST 4111.11.12.131
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 . PIVAL(45744(3).(1.(2.13.45746(37).45740(37).
 P11
 # (11657(11.63.1) 50 f0 77
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 NSYAR(371, NSYMR(371)
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 *ALUNG . BETAINSYNDIDD. 11.12.13.NSYMDILLD.NSYMDICTD.
 JU248 TUJ
 M5Y48(371, N5Y48(371)
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 IF (LIME.CT.60)
 CALL TEMEAD
 D3 30 J - 1.60
LIMEA(J) - NSYM3(37)
 325>1111
30 .
 00253232
 CALL HOLLISTANTHIII.S.-1.1.01
 20252300
 CALL HOLL(SOST(11,7.3,7.0)
 30256433
 CALL HOLLIPIT. A. 3.15.01
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 CALL HOLL(FORSING)
RISOL + IFRSOL(I-1)
HOLL(RISOL -3-1-32-0)
 032>3603
 30253834
 CALL HOLLIFURDEV. A. J. 36. 01
 J02>J40J
 LINEX(47) = NSY48(14)
LINEX(48) = SLASH
 20251600
 30231132
 LINERIASE - MENAS(T)
 00231200
 CALL HOLLETAFSTR, 7.-1.54.01
 03431333
 CALL HOLLETAISTA. 7.-1.62.01
 00231400
 CALL HOLLEFDYSTR. 8.-1.73.01
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 LINCKIALL . MSYTO(14)
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 CONTINUE
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 MSYMB(37) . NS YMB(37))
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TUSOLE - F3-53L(1,1) - REGOEV

IF (TUSOLF,GT.0.0) - PIREQ - FORSOL(1,1) / TUSOLY

IF (PCREQ.ST.3.3) - PII - PII / PCREQ
 2025 .403
 03227706
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 ADVSTR - REDOEV • STANTH(!)

POVSTR - FORDEV • STANTH(!)

TAFSTR - FORSOL(!,!) • STANTH(!)

TAISTR - [FRSOL(!,!) • STANTH(!)
 3323463J
 002>4933
 00455334
 00444100
 00255233
 LINE . LINE . 1
 10 (LINE.GT.63) CALL TEMEAD 60 40 J = 1.86
LINEE(J) = NSYMICSTE
 30233533
 CALL HOLLISTRATHIII.S.-1.1.0)
 JU253000
 CALL HOLL(COST(1).7.3.7.0)
CALL HOLL(PII.4.3.15.0)
CALL HOLL(FORSOL(1.1).7.3.24.0)
 0023>703
 30255833
 RISOL - IFASUL(I.1)
CALL MOLL(RISOL .3.-1,32.0)
CALL MOLL(RISOL .3.-1,32.0)
 002>-603
 03456133
 03420233
 CALL HOLLIRE JOEV, 8, 3, 45, 01
 00230333
 CALL HOLLITAFSTA, 7.-1.54.01
 00250403
 CALL HOLLETAISTA, 7.-1.62.01
 06220533
 CALL HOLLIFOVSTR. 8,-1,70,01
 CALL HOLLERDYSTR. 8.- 1. 74.01
 00256735
 # TTE 13,251 DTM(1). (1111TLE(J).J-1.8).(15AC(J).J-1.3).
 JUZ Sadu
 (60.1-1.11)
 ロレンシャリン
25
 FORMATELM , 13, 1x, 744,42, 244,43,1 x, 8641)
 00251333
50
 00257135
 00257200
 00237300
 RETURN
 00251403
 END
 SUBATUTINE TRHEAT
 20127777
 COMMON /CHECKY/ITEST(25)
 60227600
 COMMON /COMENT/COMENTIS. 201
 33257733
 CONNON /LIVE/LINE, ISSPAG
 2025/033
 COMMON PLITER THE LEGAL TERMIN
 00227430
 CALL HEADS
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 IF (ITEST(11.54.1)
 CALL HEADSE
 33254133
 ARITE (3,40) | SHPAG, ((CUMENT([.J).J-1.20), [=1.5)
 00238200
 FORMATI IN / IN .54x, 22HUNIT DEVIATIONS REPORT, 37X, 7HSUMPAGE, 14 JO238JOJ
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MEMBER NAME CONREP
 0//511H , 25E, 2044/1/1H . 014, SHUNI TS, 23E, 0HS TRENGTH
 00420404
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 OIN . GIE, THEP MEA-. LY. LLATHIS ALTERN. TOT. ISHINGS ALTERNATIVE
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ST. SHFRACT. 2T. JMINT. ET. 7MSRC. 6T. 4MS TRN. ST. 4MCUST. 4T. SMYALUE.
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 •1m .3(1H-).1c. 33(1H-).1c.11(1H-).1x.5(1H-).1x.7(2M-).1c.7(2M-).
 33239230
 014,7H-----,1E, 3H---,14,8H-----,18,8H------,18,7H----
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 014,7H-----,1 E, 6H-----, 1 E, 6H-----/1
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 LIME . 20
 OF THEY
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 00241657
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 F3RMAT(14.3x,4x,7A4.A2.2A4.A3.4x,A4.A3)
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## GLOSSARY

APROG a routine of the Battalion Slice Model Battalion Slice Model The Modular Force Planning System a routine of the Battalion Slice Model **BPROG** CDC Control Data Corporation Constrained Force Model CONFORM CONFIL CONFORM Preprocessor for CONREP CONCEN CONFORM Automated LP Matrix Generator CONREP CONFORM Automated LP Reporter CONUS Continental US COSTALS Cost Analysis System, now the Force Cost Information System (FCIS) DFE Division Force Equivalent **DPROG** a routine of the Battalion Slice Model DTM Number a 3-digit identification number used in the Battalion Slice Model FCIS Force Cost Information System, formerly the Cost Analysis System (COSTALS) Hand-prepared LP Matrix Structure input Handgen to CONGEN International Business Machines Corporation IBM LP linear programming MPA military pay and allowances mathematical programming system MPS

computers

computers

MPS/360

OMA

OPTIMA

one of IBM's MPS for its 360 series

one of CDC's MPS for its 6000 series

operation and maintenance, Army

PDWA procurement of equipment and missiles,

Army

RHS right hand side of LP model row

SRC Number Standard Requirements Code number for

Army units

TPSN troop sequence number for Army units

USAMSSA US Army Management Systems Support Agency

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