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18 October 1984

USSR Report

ECONOMIC AFFAIRS

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USSR REPORT

ECONOMIC AFFAIRS

CONTENTS

PLANNING AND PLAN IMPLEMENTATION

INSTRUCTIONS FOR DRAFTING ENTERPRISE MODERNIZATION, RETOOLING PLANS

Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 84 pp 11-14

[Official document: "Reequipment Plans for Associations and Enterprises: Methodological Instructions for Working Out Reequipment Plans of Existing Production Associations (Combines) and Enterprises--Approved by Gosplan USSR 23 March 1984"]

[Text] The present methodological instructions were worked out on the basis of requirements of the decrees of the CPSU Central Committee and the USSR Council of Ministers of 12 June 1979 "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising Efficiency of Production and Quality of Work," of 14 July 1983 "On Additional Measures for Expanding the Rights of Production Associations (Enterprises) of Industry in Planning and Economic Activity and for Increasing Their Accountability for Work Results" and of 18 August 1983 "On Measures for Accelerating Scientific-Technical Progress in the National Economy" for the purpose of creating a single methodological basis of planning improvement of the material-technical base of existing associations (combines) and enterprises and raising the technical and organizational level of production and its efficiency.

The methodological instructions are intended for the working out of five-year and annual plans for the reequipment of existing associations (combines) and enterprises of the sectors of the national economy.[1]

1. The plan for reequipment of existing production associations (combines) and enterprises[2] is being developed for the purpose of improving work conducted at

1. Enterprises participating in the economic experiment in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers of 14 July 1983 "On Additional Measures for Expanding the Rights of Production Associations (Enterprises) of Industry in Planning and Economic Activity and for Increasing Their Accountability for Work Results" are developing reequipment plans according to sectorial methods effective as of 1 January 1984.

2. Henceforward the term "reequipment plan" will be used.

an association (combine) or at an enterprise for raising efficiency of production, creating new and improving the use of existing production capacities, expanding the output of high-quality products by ensuring growth of labor productivity and reduction of workplaces as well as economy of material and fuel-power resources, reduction of production cost and improvement of other technico-economic operational indicators of an association (combine) or enterprise.

The reequipment plan provides a complex of measures for raising the technical and economic level of a production facility or its individual shops, sectors, units or installations on the basis of introduction of advanced equipment and technology, mechanization and automation of production processes, modernization and replacement of obsolete and worn out equipment with new equipment of greater productivity as well as for improving facilities of the auxiliary or service type.

The complex of measures included in the reequipment plan is implemented as a rule without expansion of production areas according to plans and estimates for individual facilities and type of operations on the basis of a single plan for the association (combine) or enterprise.

The reequipment plan includes measures for the additional installation at existing production areas of equipment and machinery and the introduction of automated control and monitoring systems, the use of radio, television and other modern methods in production control, modernization and technical reorganization of nature-protection facilities, heating and ventilating systems and connecting of enterprises, shops and installations to centralized sources of heat and electric-power supply where this is called for by the work done on the reequipment of a production operation.

The reequipment plan may also include work of partial reconstruction and expansion of existing production areas, buildings and structures (within the limits of land plots previously allotted to the enterprise) due to the size of the new equipment being installed and the expansion of existing facilities on the construction of new facilities of the service or auxiliary type (warehousing facilities, compressor, boiler, oxygen and other similar installations) where it is based on the reequipment measures being carried out for reequipment of the basic production unit. At the same time, the volume of construction and installation work as a rule should not exceed 10 percent of the amount of capital investment allocated for reequipment. An increase in the amount of construction and installation work in excess of the above-mentioned correlation is only permitted by agreement with Gosplan USSR.

The reequipment plan is aimed at the attainment of goals and tasks specified by the scheme for development and location of the sector and by the long-term plan for development of the association (combine) or enterprise as well as by the planned balances of the association's (combine's) or enterprise's production capacity.

The indicators of the reequipment plan should be tied in to the corresponding indicators of different sections of the technical, industrial and financial plan of the association (combine) or enterprise.

2. Reequipment is carried out at associations (combines) and enterprises as well as at experimental production facilities and production laboratories of scientific-research, planning-and-design and technological organizations.

3. With the development of a reequipment plan, the following is made possible:

replacement of physically worn and obsolescent equipment with equipment of higher productivity and the simultaneous introduction of advanced production processes and the provision of a planned transition to the creation of robotic technical complexes, flexible production systems and automated production operations;

the priority elimination of bottlenecks both in basic production and in the auxiliary services;

elimination of manual, especially heavy physical, labor;

rational specialization and cooperation, especially in preparatory and intersectorial production operations included under basic production.

4. Organization, responsible performers and the time periods for doing the work of developing a reequipment plan are determined by the general director (director) of the association (combine) or enterprise.

The development of the reequipment plan and monitoring of its fulfillment are done by departments and services of the association (combine) or enterprise in accordance with the duties assigned them under the methodological supervision of economic-planning and technical departments. General supervision is entrusted to the chief engineer of the association (combine) or enterprise.

5. The working out of the reequipment plan is done in the following sequence:

making an analysis of the technico-economical level of production and quality of output, fulfillment of production and deliveries plan (including deliveries of products for export) and of existing proportions between individual technological elements of production;

study of patent information, scientific-technical developments, advanced domestic and foreign experience and efficiency proposals of personnel of enterprises;

development of a complex of measures for improving the technological scheme of the production unit, shops and sectors;

evaluation of changes of technico-economic indicators of production as a result of its reequipment and working out of measures for inclusion in the plan;

determination of need for capital investment, material resources and production equipment.

The worked-out draft of the reequipment plan is coordinated with the superior and the planning organizations and is approved by the head of the association (combine) or enterprise.

6. Analysis of the technico-economic level of production is done on the basis of groups of indicators specified in Appendix No 3 to the present Methodological Instructions. In this connection, the following are taken into consideration: the level of progressiveness of the production processes, equipment and other technical resources, raw and other materials and components being used and being recommended for introduction as well as the prospects of the products being manufactured or scheduled for manufacture in coordination with the scheme of development and location of the sector.

In addition to the standard indicators specified in Appendix No 3 of the Methodological Instructions for evaluating the technico-economical level of production, special indicators are used, reflecting the specific features of production at a specific association (combine) or enterprise. The makeup of the special indicators is worked out by ministries (departments) and is included in sectorial methodological instructions for developing the reequipment plan.

In the process of evaluation and analysis of the technico-economic level of production as well as in the establishment of plan targets for raising it, a comparison is made of this level with that achieved at leading domestic and foreign enterprises as well as with existing established norms for individual indicators.

The results of calculation and analysis of the technico-economic level of production at the association (combine) or enterprise are adopted as the initial basis for working out a system of plan indicators according to Form 01 tpdp PL [not further identified] and 01 tpdp PL--annual (appendixes Nos 1 and 2).

7. For the purpose of improving the technological scheme of production facilities, shops and sectors, an analysis is made of the technico-economic level of the equipment in operation. The need is revealed for its modernization and replacement according to the sequence indicated in the present table.

Replacement and modernization of equipment should provide an increase in the relative share of its progressive varieties, improvement of the technological structure of the equipment park, a higher level of labor-safety techniques, improvement of working conditions and protection of the environment.

8. The analysis of the reequipment plan is conducted on the basis of three groups of indicators.

The first group:

growth of commodity (net) output in percent of its volume in the base year;

capital investment calculated per ruble of growth of commodity (net) output;

Table

Sequence of conducted work	Source of information
1. Compilation of card files of machinery and equipment	Enterprise passport, inventory accounting cards of fixed capital (Standard Form No OS-7)
2. Determination of obsolete and physically worn out equipment and compilation of list of equipment needing replacement or modernization	Recommendations of departmental technical services, inventory accounting cards of fixed capital, document on conducting capital and medium repairs
3. Selection of new models and development of plans for modernization of equipment	Recommendations of departmental technical services, catalogs, prospectuses for equipment
4. Calculation of effectiveness of replacement and modernization of equipment	Manufacturer's certificates of equipment, primary accounting and operational-engineering documentation, enumerated under points 2 and 3 of this table
5. Determination of need for equipment replacement on the basis of technico-economic analysis and calculations of effectiveness	Inventory accounting cards of fixed capital, measures and types of work relating to reequipment providing for replacement of equipment
6. Compilation of tasks for replacement and modernization of obsolete and physically worn out equipment	Results of calculations of effectiveness of measures, ceilings for capital investments and allocations for equipment

capital-investment pay-off period;

relative share of growth of labor productivity in total growth of labor productivity;

growth of yield on capital;

growth of relative share of products of the highest category of quality;

curtailment of workplaces (in percent of base year).

The second group:

growth of production volumes (in products list);

growth of production capacities;

economy of material resources;

economy of fuel and power resources.

The third group:

improvement of working conditions and labor-safety measures;

reduction of number of workers engaged in manual labor;

reduction of number of workers engaged in hot, harmful and particularly dangerous work;

reduction of number of workers engaged in heavy physical labor;

reduction of harmful emissions.

The values of the said indicators are compared with similar indicators attained at the best domestic and foreign enterprises as well as with existing established norms for individual indicators.

9. Five-year and annual reequipment plans are worked up on the basis of indicators and forms shown in appendices Nos 1 and 2 to the present Methodological Instructions.

10. In the calculation of appropriate indicators, one should be guided by the Methodological Instructions for the working out of state plans of economic and social development of the USSR approved by Decree No 63 of Gosplan USSR of 31 March 1980 and the Standard Method of Working Out the Technical, Industrial and Financial Plan of a Production Association (Combine) or Enterprise, approved by Decree No 125 of Gosplan USSR of 19 October 1977.

11. The number of workers engaged in heavy physical labor and in hot, harmful and especially harmful work is determined in conformity with the instruction of the USSR Central Statistical Administration for filling in Form No 21-T "Report on Fulfillment of the Complex Plan of Improvement of Working Conditions, Labor-Safety Procedures and Sanitary and Health-Improvement Measures."

12. Calculations of indicators of use of production capacities should be done in conformity with the Basic Regulations on Calculation of Production Capacities of Operating Enterprises and Production Associations (Combines) approved by Gossplan USSR and the USSR Central Statistical Administration 8 December 1983 No NL-49-D/04-66.

13. In the determination of the indicator "Reduction of Workplaces," calculations are conducted in accordance with the concept "workplace" as applied to the category of basic-operation workers [rabochiye osnovnoy deyatel'nosti] (excluding basic-operation employees and nonbasic-operation workers and employees) in accordance with Standard Methodological Instructions for Planning, Accounting, Certification and Rationalization of Workplaces at Enterprises (Associations) of Machine-Building Ministries (No SA-2-D of 3 January 1984).

14. The working out and approval of reequipment plans and estimates are done in conformity with existing methodological and instruction materials regulating the composition, working out procedure, coordination and approval of plans and estimates for the construction of buildings and structures.

15. The financing of reequipment work is done with the resources of the production development fund, bank credit and special-purpose grants of ministries and departments as well as funds from the state budget.

The financing of work with resources of the production development fund is done in conformity with the Instruction on the Manner of Forming and Using Resources of the Production Development Fund at Production Associations, Enterprises and Organizations of Industry and at Construction-Installation and Planning-Prospecting Organizations Approved by the USSR Ministry of Finance, Gosplan USSR, Gosbank USSR and Stroybank USSR of 4 April 1980, Instruction No 27 of Stroybank USSR "On Financing Planning and Prospecting Work of 4 May 1982 and Instruction No 256 of Stroybank USSR of 23 October 1981.

The financing of work on modernization of equipment included in the reequipment plan is done with funds allocated for reequipment as well as with amortization deductions for capital repair.

The financing of expenditures on the acquisition of equipment not requiring installation is done by institutions of the bank in accordance with the reequipment plan of the association (combine) or enterprise without the presentation of planning estimates by associations (combines) or enterprises.

16. The association (combine) or enterprise presents to the ministry (department) a reequipment plan with an explanatory note that indicates:

the results of analysis of the technico-economic level of production and the determination on its basis of sectors of production requiring reequipment;

description of the contemplated complex of measures, its economic substantiation and the order of doing the work;

substantiation of the need for equipment and other material-technical resources for reequipment;

evaluation of the change in technico-economic indicators of production as the result of its reequipment;

results of analysis of effectiveness of capital investment.

17. Evaluation of fulfillment of the production reequipment plan is done according to the following indicators:

scope of introduction of measure;

size of outlays on introduction of measures;

growth of production capacities;

improvement of coefficient of use of production capacities of the reequipped facility;

growth of labor productivity;

reduction of the number of workers engaged in manual labor;

economy of material and fuel-and-power resources;

economy from reduction of production cost;

growth of profit.

(1) Приложение № 1

(3) ТИПОВЫЕ ФОРМЫ ПЯТИЛЕТНЕГО ПЛАНА ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ

(2) Форма 01 тпдп ПЛ

(4) **СВОДНЫЕ ТЕХНИКО-ЭКОНОМИЧЕСКИЕ ПОКАЗАТЕЛИ ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ НА 1986—1990 ГОДЫ**

(Объединение, предприятие) (6) _____ (5) Стадия планирования _____

(Местонахождение) (7) _____

(Отрасль) (8) _____

(Министерство, ведомство, Совет Министров союзной республики) (9) _____ (11) Дата составления _____

(10) ПРИМЕЧАНИЕ. Все формы приложения № 1 и № 2 заполняются по перечню отраслей, подотраслей и направлений, приведенному в приложении к форме 08 пкв ПЛ раздела 5 «Капитальное строительство» только по показателям технического перевооружения.

Key:

1. Appendix No 1
2. Form 01 tpdp PL
3. STANDARD FORMS OF FIVE-YEAR REEQUIPMENT PLAN
4. CONSOLIDATED TECHNICO-ECONOMIC REEQUIPMENT INDICATORS FOR 1986-1990
5. Stage of planning
6. (Association, enterprise)
7. Location
8. Sector
9. Ministry, department, Council of Ministers of union republic
10. NOTE. All forms of appendixes Nos 1 and 2 are completed on the basis of the list of sectors, subsectors and directions in accordance with the appendix to Form 08 pkv PL of Section 5 "Capital Construction" only according to reequipment indicators.
11. Date of compilation

Таблица формы 01 (1)

(2) Показатель	Единица измерения (3)	Код (4)	(5) 1981—1985 годы			(6) 1986—1990 годы — всего	(7) В том числе				
			(8) план	ожидаемое выполнение (9)			1986	1987	1988	1989	1990
				(10) всего	(11) в том числе 1985 год						
А	01	02	03	04	05	06	07	08	09	10	11

Key:

1. Table of Form 01
2. Indicator
3. Unit of measurement
4. Code
5. 1981-1985
6. Total for 1986-1990
7. Including
8. Plan
9. Expected fulfillment
10. Total
11. Including 1985

Column A contains the following indicators (units of measurement are in parentheses):

Growth of commodity (net) output of services (thousands of rubles and in percent of total growth of production)

Growth of commodity (net) output of the highest category of quality (thousands of rubles and in percent of total growth of production)

Products developed by production for the first time (thousands of rubles and in percent of total growth of production)

Obsolete products removed from production (thousands of rubles and in percent of total volume of commodity output)

Commissioning of fixed production capital (thousands of rubles and in percent of total growth of capital)

Growth of production capacity (in appropriate units and in percent of total growth of capacity)

Use of production capacity (percent)
Decrease of workplaces (units)

Number of workers performing work with mechanized and automated means (men and in percent of total number of workers)

Reduction of number of workers engaged in manual labor (men and in percent of total number of workers engaged in manual labor)

Reduction of number of workers engaged in heavy physical labor (men and in percent of total number of workers)

Relative release of workers (men)

Growth of labor productivity (percent)

Economy from reduction of production cost of commodity output (thousands of rubles)

Economy of material resources (thousands of rubles and in appropriate units)

Economy of fuel-power resources (thousands of rubles and in appropriate units)

Growth of profit (thousands of rubles)

Capital investment (millions of rubles)

From total sum of capital investment for equipment (millions of rubles)

including:

for equipment and machines not included in estimates of construction projects (millions of rubles)

for protection of environment (millions of rubles)

Coefficient of effectiveness of expenditures (for economy from reduction of production cost per ruble of expenditures for reequipment

(1) Форма 02 тпдп ПЛ

(2) МЕРОПРИЯТИЯ ПО ТЕХНИЧЕСКОМУ ПЕРЕВООРУЖЕНИЮ НА 1986—1990 ГОДЫ

Начало таблицы (3)

Наименование мероприятия (4)	Код (5)	Объем внедрения (в соответствующих единицах измерения) (6)	Затраты на внедрение (тыс. рублей) (7)		Ввод основных производственных фондов (тыс. рублей) (9)	Прирост производственных мощностей (в соответствующих единицах измерения) (10)	Сокращение рабочих мест (единиц) (11)
			всего (7а)	в том числе на оборудование (8)			
А	01	02	03	04	05	06	07

Продолжение таблицы (12)

Уменьшение численности рабочих, занятых (человек) (13)			(17) Относительное высвобождение работающих (человек)	(18) Рост производительности труда (процентов)	(19) Экономия материальных ресурсов (тыс. рублей) (21)	(20) Экономия топливно-энергетических ресурсов (тыс. рублей) (21)	(22) Прирост прибыли (тыс. рублей)	
(14) ручным трудом	(15) тяжелым физическим трудом	(16) на горячих, вредных и особо вредных работах			(в соответствующих единицах измерения)	(в соответствующих единицах измерения)	всего (23)	в том числе за счет снижения себестоимости (24)
08	09	10	11	12	13	14	15	16

Key:

1. Form 02 tpdp PL
2. REEQUIPMENT MEASURES FOR 1986-1990
3. Beginning of table
4. Name of enterprise
5. Code
6. Scope of introduction (in appropriate units of measurement)
7. Expenditures on introduction (thousands of rubles)
7a. Total
8. Including on equipment
9. Commissioning of fixed production capital (thousands of rubles)
10. Growth of production capacities (in appropriate units of measurement)
11. Reduction of workplaces (units)
12. Continuation of table
13. Reduction of number of workers engaged in (persons)
14. Manual labor
15. Heavy physical labor
16. In hot, harmful and particularly harmful work
17. Relative release of workers (persons)
18. Growth of labor productivity (percent)
19. Economy of material resources (thousands of rubles)
20. Economy of fuel-power resources (thousands of rubles)
21. (In appropriate units of measurement)
22. Growth of profit (thousands of rubles)
23. Total
24. Including through reduction of production cost

In column A, measures are indicated for five-year plan as a whole and by years of the five-year plan for the following directions:

I. Introduction of progressive technology.
II. Mechanization of production.
III. Automation of production.
IV. Modernization of existing equipment.
V. Improvement of production and management.
VI. Other measures.

The form is completed for each shop and for the association (enterprise) as a whole.

(1) Форма 03 тпдп ПЛ

ПОТРЕБНОСТЬ В ОБОРУДОВАНИИ ДЛЯ ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ НА 1986—1990 ГОДЫ

(2)

Вид внедряемого оборудования (3)	Код (4)	(5) Потребность в оборудовании (в числителе — количество в штуках, в знаменателе — затраты в тыс. рублей)								
		(5a) (узлах)				(11) В том числе:				
		(5b) 1981—1985 годы			1986—1990 годы — всего (10)					
		(6) план	(7) ожидаемое выполнение			1986	1987	1988	1989	1990
			всего (8)	в том числе 1985 год (9)						
А	01	02	03	04	05	06	07	08	09	10

Key:

1. Form 03 tpdp PL
2. REEQUIPMENT EQUIPMENT REQUIREMENTS FOR 1986-1990
3. Type of introduced equipment
4. Code
5. Equipment requirements (in numerator--quantity, in denominator--outlays in thousands of rubles)

5a. (Assemblies)

5b. 1981-1985

6. Plan
7. Expected fulfillment
8. Total
9. Including 1985
10. 1986-1990--total
11. Includes:

The form is completed for types of equipment, separately for equipment of domestic manufacture, imported equipment and standard assemblies for modernization of equipment.

Column A gives designation of equipment in the nomenclature adopted in the plan for distribution of equipment as well as standard assemblies designated for modernization of existing equipment.

Equipment produced by one's own efforts is shown on a separate line.

(1) Приложение № 2

(2) ТИПОВЫЕ ФОРМЫ ГОДОВОГО ПЛАНА ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ

(3) Форма 01 тпдп ПЛ — годовая

(4) СВОДНЫЕ ТЕХНИКО-ЭКОНОМИЧЕСКИЕ ПОКАЗАТЕЛИ ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ НА 198 год

(5) Стадия планирования _____

(Объединение, предприятие) (6) _____

(Местонахождение) (7) _____

(Отрасль) (8) _____

(Министерство, ведомство, Совет Министров союзной республики)

(9) _____

(10) Дата составления _____

(11) Показатель	(12) Единица измерения	(13) Код	(14) 198 год отчет	(15) 198 год (текущий)			(16) 198 год (планируемый)	
				по пятилетнему плану	план	ожидаемое выполнение	по пятилетнему плану	проект плана
				(17)	(18)	(19)	(20)	(21)
А	Б	01	02	03	04	05	06	07

Key:

1. Appendix No 2
2. STANDARD FORMS OF ANNUAL REEQUIPMENT PLAN
3. Form 01 tpdp PL—annual
4. CONSOLIDATED TECHNICO-ECONOMIC REEQUIPMENT INDICATORS FOR 198_
5. Stage of planning
6. (Association, enterprise)
7. Location
8. Sector
9. Ministry, department, Council of Ministers of union republic
10. Date of compilation
11. Indicator
12. Unit of measurement
13. Code
14. 198_ report
15. 198_ (current)
16. 198_ (planned)
17. According to five-year plan
18. Plan
19. Expected fulfillment
20. According to five-year plan
21. Plan draft

The lines of column A (and units of measurement) of this form coincide completely with Column A of the comparable form (01) for 1986-1990.

(1) Форма 02 тпдп ПЛ — годовая

(2) **МЕРОПРИЯТИЯ ПО ТЕХНИЧЕСКОМУ ПЕРЕВООРУЖЕНИЮ НА 198 ГОД**

(3) Начало таблицы формы 02

(4) Наименование мероприятия	(5) Код	(6) Объем внедрения (в соответствующих единицах измерения)	(7) Затраты на внедрение (тыс. рублей)		(10) Ввод основных производственных фондов (тыс. рублей)	(11) Прирост производственных мощностей (в соответствующих единицах измерения)	(12) Сокращение рабочих мест (единиц)
			(8) всего	в том числе на оборудование (9)			
А	01	02	03	04	05	06	07

Продолжение таблицы формы 02 (13)

(14) Уменьшение численности рабочих, занятых (тыс. человек)			(18) Относительное высвобождение работающих (человек)	(19) Рост производительности труда (процентов)	(20) Экономия материальных ресурсов (тыс. рублей и в соответствующих единицах измерения)	(21) Экономия топливно-энергетических ресурсов (тыс. рублей и в соответствующих единицах измерения)	(22) Прирост прибыли (тыс. рублей)	
(15) ручным трудом	(16) тяжелым физическим трудом	(17) на горячих, вредных и особо вредных работах					(23) всего	(24) в том числе за счет снижения себестоимости
08	09	10	11	12	13	14	15	16

Key:

1. Form 02 tpdp PL--annual
2. REEQUIPMENT MEASURES FOR 198_
3. Beginning of table of Form 02
4. Name of enterprise
5. Code
6. Volume of introduction (in appropriate units of measurement)
7. Expenditures on introduction (thousands of rubles)
8. Total
9. Including for equipment
10. Putting fixed production capital into operation (thousands of rubles)
11. Growth of production capacities (in appropriate units of measurements)
12. Reduction of workplaces (units)
13. Continuation of table of Form 02
14. Reduction of number of workers, engaged in (thousands of persons)
15. Manual labor
16. Heavy physical labor
17. Hot, harmful and particularly harmful work
18. Relative release of workers (persons)
19. Growth of labor productivity (percent)
20. Economy of material resources (thousands of rubles and in appropriate units of measurement)
21. Economy of fuel-power resources (thousands of rubles and in appropriate units)
22. Growth of profit (thousands of rubles)
23. Total
24. Including from reduction of production cost

Column A shows measures for the directions--all told, including individual measures:

I. Introduction of progressive technology
II. Mechanization of production
III. Automation of production
IV. Modernization of existing equipment
V. Improvement of organization of production and management
VI. Other measures

In referring measures to this or that direction of reequipment, use should be made of the Instruction for Completing Form 10-nt "Report of Scientific-Production or Production Association (Combine) or Industrial Enterprise on Outlays for Implementing Scientific-Technical Measures and Their Economic Effectiveness."

(1) Форма 03 тпдп ПЛ — годовая

(2)
ПОТРЕБНОСТЬ В ОБОРУДОВАНИИ ДЛЯ ТЕХНИЧЕСКОГО ПЕРЕВООРУЖЕНИЯ НА 198 ГОД

Вид внедряемого оборудования (3)	Код (4)	Потребность в оборудовании и узлах (в числителе — количество в штуках, в знаменателе — затраты в тыс. рублей) (5)					
		(6)	(7) 198 год (текущий)		(8)	198 год (планируемый)	
		198 год отчет	по пятилетнему плану (9)	план (10)	ожидаемое выполнение (11)	по пятилетнему плану (12)	проект плана (13)
А	01	02	03	04	05	06	07

Key:

1. Form 03 tpdp PL--annual
2. REEQUIPMENT EQUIPMENT REQUIREMENTS FOR 198_
3. Type of introduced equipment
4. Code
5. Requirement for equipment and assemblies (in numerator--quantity, in denominator--expenditures in thousands of rubles)
6. 198_ report
7. 198_ (current)
8. 198_ (planned)
9. According to the five-year plan
10. Plan
11. Expected fulfillment
12. According to the five-year plan
13. Draft of plan

The form is completed for types of equipment, separately for equipment of domestic manufacture, imported equipment and standard assemblies for modernization of equipment.

Column A provides the designation of equipment in the nomenclature adopted in the plan for distribution of equipment as well as standard assemblies designated for modernization of existing equipment.

Equipment manufactured with one's own efforts is shown on a separate line.

Appendix No 3

SYSTEM OF INDICATORS FOR ESTIMATION OF TECHNICO-ECONOMIC AND ORGANIZATIONAL LEVEL OF PRODUCTION

Par. No.	Indicator	Computing formula	Source of information--statistical or accounting reporting based on form
		DEGREE OF EQUIPMENT OF PRODUCTION AND LABOR	
1.	Capital-labor ratio	Average yearly value of fixed production capital (thousands of rubles) / Number of workers in biggest shift (persons)	11 / 9
2.	Machine-worker ratio of active part of capital	Value of active part of fixed production capital (thousands of rubles) / Number of workers in biggest shift (persons)	11 / 9
3.	Machine-worker ratio of progressive equipment (automatic equipment)	Value of progressive equipment (automatic equipment) (thousands of rubles) / Number of workers in biggest shift (persons)	11 / 9
4.	Electricity-labor ratio	Amount of consumed electric power (thousands of kilowatt-hours) / Average listed number of workers (persons)	22 / 9
5.	Existence of integrated mechanized (automated) shops, sectors and relative share in total number of shops and sectors	Number of integrated mechanized (automated) sectors and shops / Total number of sectors and shops x100	8-nt / 2-nt (annual)
6.	Existence and relative share of automatic lines in total number of lines	Number of automatic lines / Total number of lines x100	8-nt / 2-nt (annual)
7.	Presence of robots and manipulators	Number of robots and manipulators (units)	Accounting cards of fixed capital

Appendix No 3 (cont'd)

Par. No.	Indicator	Computing formula	Source of information--statistical or accounting reporting based on form
8.	Extent of coverage of workers by mechanized or automated labor	Number of workers engaged in mechanized or automated labor (persons) / Average listed number of workers (persons)	2-t (RT) / 9
9.	Employment of workers in manual labor	Number of workers engaged in manual labor (persons) / Average listed number of workers (persons) x 100	2-t (RT) / 9
10.	Employment of workers in heavy physical labor	Number of workers engaged in heavy physical labor (persons) / Average listed number of workers (persons) x100	21-T
11.	Employment of workers in hot, harmful and particularly harmful work	Number of workers engaged in hot, harmful and particularly harmful work (persons) / Average listed number of workers (persons) x100	21-T
		TECHNICO-ECONOMIC LEVEL OF EQUIPMENT	
12.	Quantity and relative share of progressive equipment in total equipment park[1]	Quantity of progressive equipment (balance value) (units, thousands of rubles) / Total value of equipment (thousands of rubles) x100	11 1-TP 75-TP Accounting cards of fixed capital
13.	Quantity and relative share of physically worn and obsolete equipment--total	Quantity of technically unfit, physically worn and obsolete equipment or its balance value (units, thousands of rubles) / Total value of equipment (thousands of rubles)	
	including according to basic types:		

1. Lists of progressive types of equipment and production processes as well as qualitative characteristics of raw and other materials and semifinished products are made up by the ministry (department).

Appendix No 3 (Cont'd)

Par. No.	Indicator	Computing formula	Source of information--statistical or accounting reporting based on form
14.	Quantity and relative share of equipment with a service life: up to 5 years from 5 to 10 years from 10 to 20 years more than 20 years	Number (balance value) of a certain type of equipment of a given age group (units, thousands of rubles) / Total number (balance value) of a given type of equipment x100	
15.	Shift coefficient of operation of equipment for basic types of equipment	Actually worked number of lathe or machine shifts per day / Total number of lathes (machines) in park x100	1-TP
16.	Integral coefficient of use of equipment	Coefficient of intensive use x coefficient of extensive use	1-TP
	coefficient of intensive use	Volume of annual production output (work) in physical or value terms / Maximum possible production output in appropriate units	Accounting cards of fixed capital, manufacturing certificates
	coefficient of extensive use	Time of actual operation of equipment in course of year, lathe- or machine-hours / Planned effective fund of time of operation of equipment in appropriate units	1-TP
17.	Coefficient of use of average annual production capacity	Volume of annual production output (work) in physical or value terms / Average annual production capacity	1-TP
	TECHNICAL LEVEL AND QUALITY OF USED RAW AND OTHER MATERIALS AND SEMIFINISHED PRODUCTS[1]		
18.	Relative share of progressive types of raw and other materials and semi-finished products in their total volume	Quantity (volume of one of the used progressive types of raw and other materials in appropriate units) / Total quantity (volume) of used raw and other materials for the manufacture of products (appropriate units) x100	6

1. [See preceding page.]

Appendix No 3 (cont'd)

Par. No.	Indicator	Computing formula	Source of information--statistical or accounting reporting based on form
		PROGRESSIVENESS OF PRODUCTION PROCESSES	
19.	Relative share of progressive processes[1] in technology of production (according to number of processes or volume of manufactured products)	Volume of products produced with progressive technology (thousands of rubles) / Volume of commodity output (thousands of rubles) x100	2-nt 22
		TECHNICAL LEVEL AND PRODUCTION QUALITY	
20.	Volume of output developed by production made by production for the first time in total volume of output	Volume of output developed by production for the first time (thousands of rubles) / Volume of commodity output (thousands of rubles) x100	2-nt 22
21.	Production volume and relative share of products of the highest category of quality	Output volume of products of the highest category or quality (thousands of rubles) / Volume of commodity output (thousands of rubles) x100	22
22.	Production volume and relative share of obsolete products subject to removal	Production volume of obsolete products subject to removal (thousands of rubles) / Volume of commodity output (thousands of rubles) x100	22 1-p
		PRODUCTION ORGANIZATION LEVEL	
23.	Level of production specialization (relative share of basic, specialized production in total production	Volume of output of basic (specialized) production (thousands of rubles) / Volume of commodity output (thousands of rubles) x100	1-p

1. [See preceding page.]

Appendix No 3 (cont'd)

Par. No.	Indicator	Computing formula	Source of information--statistical or accounting reporting based on form
24.	Level of production cooperation (relative share of value of unfinished work pieces, semifinished products obtained elsewhere in production cost)	Value of unfinished work piece, semifinished products, components obtained elsewhere (thousands of rubles) / Total cost of commodity output (thousands of rubles) x100	1-s
		EFFECTIVENESS OF RESOURCE USE	
25.	Unit materials intensiveness (expenditure of basic forms of raw and other materials, semi-finished products, fuel and power per unit of production)[2]	Expenditure of basic types of material and fuel-power resources (thousands of rubles, in appropriate units) / Volume of commodity output (thousands of rubles, in appropriate units)	11-sn 22
26.	Yield on capital	Volume of commodity output (thousands of rubles) / Value of fixed production capital (thousands of rubles)	11
27.	Outlays per ruble of commodity output	Full cost of commodity output (thousands of rubles) / Volume of commodity output (thousands of rubles)	6
28.	Labor productivity (production output per working person)	Volume of commodity (normative-net) output (thousands of rubles) / Average listed number of workers (persons)	22 9

2. In multinomenclature production, 1,000 rubles of commodity output are used as a unit.

Gosplan USSR Comments

[Commentary by N. Arbuzov, department chief of Gosplan USSR]

The published Methodological Instructions are directed at the further development of production capacities through the means of reequipment and ensuring the fullest possible use of the created production potential. Their purpose is to promote the creation of a single methodological base for planning improvement of the technical level of sectors of the national economy.

The preparation of the Methodological Instructions was conducted on the basis of planning, accounting and normative-methodological documentation for the reequipment of existing enterprises and generalization of planning experience and practice with the use of methods of economic analysis, a systems approach and selective surveys. The creation of a single form of planning measures for the introduction of new equipment and technology is directly connected to the improvement of organization and management of existing production on the basis of intensification as a most important direction of raising efficiency of production.

The basis of such an approach lies in a combination of centralization of planning with operational independence of associations (enterprises) and single-minded initiative of labor collectives for the fulfillment of targets while taking into consideration existing internal reserves in the conditions of existing production.

Before working out plans of reequipment of production associations and enterprises, a deep analysis should be carried out of the technico-economic level of existing production and a study made of the achievements of scientific-technical progress in the field of production technology, models of new equipment and quality of production, which unfortunately are not always done everywhere at the present time.

The Methodological Instructions provide a system which proposes planning not "from a base" but "from an objective" by means of tying in resource provision with end results: raising of labor productivity, improvement of use and growth of production capacities, reduction of unit outlays of different kinds of resources and other factors, including the results of social-economic development. With such an approach, the fulfillment of the production plan will directly depend on fulfillment of the reequipment plan.

Existing production associations (combines) and enterprises develop five-year and annual reequipment plans on the basis of forms and in accordance with the basic regulations contained in the Methodological Instructions in time periods by central planning organs. The accelerated character of working out of reequipment plans compared to other sections as well as the high priority of providing the work of improving existing production with all types of resources will make it possible to utilize them as a tool for the elimination of disproportion in the development of production between accumulation and renewal of tools of labor.

A letter of 8 May 1984 of Gosplan USSR, Gosstroy USSR, Stroybank USSR and the USSR Central Statistical Administration rendered more precise the terms--new construction, expansion, renovation and reequipment of existing enterprises.

Reequipment of existing enterprises, as pointed out in this letter, refers to the complex of measures for raising the technico-economic level of individual production facilities, shops and sectors on the basis of introduction of advanced equipment and technology, mechanization and automation of production and modernization and replacement of obsolete and physically worn out equipment with new, more productive equipment as well as for improving general plant management and auxiliary services.

Reequipment of existing enterprises is done according to plans and estimates for individual items or types of work, developed on the basis of unified technico-economic validation and in accordance with the plan for raising the technico-economic level of a sector (subsector) without, as a rule, expanding production areas.

The aim of reequipment of existing enterprises is all-out intensification of production, increasing production capacities and production output and improving its quality while ensuring growth of labor productivity and curtailment of workplaces, reduction of materials intensiveness and production cost, economy of material and fuel-power resources and improvement of other technico-economic operational indicators of the enterprise as a whole.

In reequipment of existing enterprises, there may be carried out additional installation of equipment and machines at existing production areas, introduction of automated systems of control and monitoring the employment of radio, television and other modern resources in production control, modernization and technological reorganization of nature-protection installations, heating and ventilating systems and the connection of enterprises, shops and installations to centralized sources of supply of heat and electricity. At the same time, partial reconstruction and expansion of existing production buildings and structures are permitted because of the size of the new equipment being installed. Partial reconstruction includes strengthening of supporting structures, replacement of roofing and change in the planning of existing buildings and structures and other measures.

Also permitted is expansion of existing facilities or the construction of new ones of the auxiliary or service type (for example, warehousing facilities, compressor, boiler, oxygen or other installations) where it is connected with the implementation of reequipment measures. Here the share of construction and installation work as a rule should not exceed 10 percent of the capital investment designated for reequipment.

Raising of production efficiency largely depends on the reequipment of existing enterprises. Unfortunately, the organization and monitoring of this work are not set up in a number of ministries. No specific services exist that would head and organize the entire complex of reequipment work. Arguments occur between the technical services and the capital construction services as to who should head this work. All this has a negative effect on carrying out of reequipment work. Ministries, departments and other organs engaged in reequipment should make clear-cut decisions in regard to this question.

In the evaluation of effectiveness of reequipment measures, a basic criterion is acquisition of high indicators of the technico-economic level of production in short periods of time with the smallest specific outlays per unit of useful effect compared to other forms of reproduction.

A logical continuation of work on the Methodological Instructions is their practical approval at ministries and departments as an obligatory document in the development of reequipment plans for 1985 and for the 12th Five-Year Plan.

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CSO: 1820/155

FINANCING, REVIEW OF ENVIRONMENTAL PROTECTION RULES URGED

Moscow KHOZYAYSTVO I PRAVO in Russian No 6, Jun 84 pp 74-76

[Article by G. Mironov, candidate of legal sciences, under rubric "Questions of Legislation": "The Effectiveness of Environmental Protection Norms in Economic Activity"]

[Text] The Basic Directions for the Economic and Social Development of the USSR in 1981-1985 and the Period Until 1990 pose the task of intensifying the protection of the environment, the land and its mineral wealth, the atmospheric air, bodies of water, and the animal and vegetable kingdoms, and the task of guaranteeing the efficient use and reproduction of natural resources. An important role in the resolution of this task belongs to environmental protection legislation. The conditions for increasing its effectiveness in the area of economic-production activity (industry, capital construction, agriculture, etc.) can be divided into two groups: 1) those that arise at the stage of norm establishment; and 2) those that are to be realized at the stage of application of the law.

One of the most important conditions for the first group is the maximum "ecologization" of economic legislation. We have in mind the concretization in that legislation of the general and branch environmental protection principles and rules for the protection of the environment. That concretization is carried out in a number of areas, particularly in the legislative acts of the USSR and the union republics that regulate the designing, construction, and activation of economic-production projects. However, the questions of protecting the environment have not received sufficient reflection in them.

One sees references only to general principles concerning the protection of the environment, without any concretization of them. The departmental normative acts that are taken as their basis, as a rule, do not contain any articles that are aimed at the protection of the environment.

The duty to take into consideration the ecological requirements frequently is not observed either in the normative documents that regulate the designing and construction of specific economic projects, for example, the irrigation system in the steppes of Kalmyk ASSR. For that reason, in May 1977 alone, a large

number of saigas [sheeplike antelope] perished there[1]. The death of the animals occurred because the planning assignment for the construction of the canals, which assignment had been developed by Yuzhgiprovodkhoz [Southern Institute for the Planning of Water Management and Reclamation Construction] failed to provide for the construction of overpasses by which the animals could cross the canals, which became an obstacle on the migratory paths of the saigas.

The concretization of the base environmental-protection legislation is closely linked with the legal regulation of economic activity. The statute governing the socialist state production enterprise, and the General Statute Governing the All-Union and Republic Associations in Agriculture stipulate, among the chief tasks, the carrying out of all the necessary measures for the protection of the air, the soil, and bodies of water against pollution by industrial or economic waste, runoff water, or production waste products, as well as the combatting of noise.

The requirements for the observance of the environmental-protection rules were taken into consideration both in the General Statute Governing USSR Ministries (paragraph 26), and in the statutes governing the individual ministries. In the statutes governing the USSR Ministry of Chemical Industry and Ministry of the Light, Woodpulp-and-Paper, and Wood-Processing Industry, that were approved by the USSR Council of Ministers respectively on 10 February and 6 April 1982[2], the chief tasks that were mentioned included the need for the prompt construction and correct operation of purification structures and the carrying out of other measures to protect the environment. At the same time a number of statutes, including those that govern ministries whose enterprises are directly linked with the operation of natural resources (for example, those governing the ministries of the navy, gas industry, machine-building for animal husbandry and fodder production, and energy machine-building) fail to provide for the resolution of environmental-protection tasks in their activity.

In the legal regulation of the activity of the industrial associations, the situation is better. Although the General Statute Governing the All-Union and Republic Industrial Associations does not contain any environmental-protection requirements at all, individual statutes governing industrial associations in this respect go considerably farther than their base document and fill in the gaps that were left. For example, in the Statute Governing the Republic Industrial Association for Coal Production (Rosugol') of RSFSR Ministry of the Fuel Industry, which was approved by the RSFSR Council of Ministers on 22 August 1975[3], it is stated that the administrations in those associations carry out the protection of the environment against pollution by runoff water or by industrial discharge, and other measures that are aimed at the preservation and efficient use of natural resources.

A condition for the effectiveness of the legal norms that guarantee the observance of the rules for the protection of the environment when carrying out economic-production activity is the providing of economic incentives for their execution. The activity of enterprises and associations with regard to their observance of the environmental-protection rules does not reflect upon the extent of the monetary means that are diverted to the material-incentive

funds. This situation not only fails to provide the enterprise and the association with an incentive for the observance of environmental protection legislation, but also, frequently, in the interests of the fulfillment of the production plans, forces its conscious violation.

For example, the Sumgait Synthetic Detergents Plant built up production without taking any concern for the construction of local shop-type purification structures, in violation of the requirements stated in the Principles of the Water Legislation of the USSR and the Union Republics Concerning the Protection of the Water Against Pollution. On two occasions the administrators of that plant broke the seal at the runoff-water pumping line which had been installed by the drainage-area inspectorate[4].

In order to avoid such instances, it seems to us to be necessary to include among the cost-accounting indicators that determine the size of the material-incentive funds at the enterprises those indicators that are linked with the guaranteeing of the protection of the environment. Interesting experience in this regard was accumulated by the Khimvolokno Production Association imeni Leninskiy Komsomol in Barnaul, which experience was supported by many enterprises and associations (the Azot Production Association in Shchekino; the Azot Production Association in Dneprodzerzhinsk; the Kaprolaktam Production Association in Dzerzhinsk; the Kaustik Production Association imeni 50-letiye Oktyabrya in Volgograd; and certain others), which extended the cost-accounting system to the relations that are linked with the protection of the environment. The statute governing intra-organizational cost accounting, which is in effect in all subdivisions of the association, establishes the inclusion as part of the production costs of the output of the basic shops the cost of the substances that exceed the maximally permissible norms for concentration in the gas-air mixture which is subject to purification. In addition, the environmental protection department that exists there has the right to determine the real losses that are incurred by the enterprise as a result of the violation of the rules for the protection of the environment. Those losses are also included in the production costs in the appropriate subdivision. These measures exert a substantial influence upon the size of the material-incentive funds for the workers in the combine, providing an incentive for their work to protect the air environment.

An important role in increasing the effectiveness of production is played by various incentive payments paid to the workers, the engineer-technical personnel, and the employees (bonuses). However, the indicators that determine the payment of bonuses and their size do not include the observance of the ecological requirements. The 1 December 1978 decree of the CPSU Central Committee and the USSR Council of Ministers, entitled "Additional Measures for Intensifying the Protection of the Environment and for Improving the Use of Natural Resources"[5], stipulate the possibility of denying bonuses completely or partially to the managers of enterprises and organizations, or to other workers who are guilty of failure to observe the environmental-protection rules. And yet the paying of bonuses to them is based chiefly on the fulfillment of the plan for sale of output and the profitability of production. The establishment of a dependency between the observance of environmental-protection measures and the payment of bonuses to workers (especially for the administrative personnel), in our opinion, exerts a

substantial influence upon improving the protection of the environment. It would seem to be desirable to extend further the experience of those enterprises and organizations where this system of paying bonuses has been introduced.

That is how the situation is with regard to material incentives, for example, in the system of enterprises under Glavtransneft', Ministry of the Petroleum Industry. The workers there do not receive a bonus until statements have been submitted concerning the returning of the environment to the proper condition (chief the land, since the enterprises under the main administration engage basically in the laying of petroleum pipelines). This is an extremely effective economic incentive for the workers at Glavtransneft' with regard to the preservation of the environment. The following example is also typical in this regard: whereas in 1977 the construction workers were to blame for approximately 30 accidents on the petroleum pipelines, during the subsequent years accidents occurred in extremely limited instances[6]. Refusal to pay the workers a bonus because they violated the environmental protection rules at the Kaspmorneft' Production Association (currently the Kaspmorneftegazprom VPO [All-Union Production Association]) also made it possible to achieve good results: in 1976 the Caspian Basin Inspectorate and Yuzhkasprybvod recorded 65 violations; in 1977, 38; and during the first quarter of 1978, only two[7]. During subsequent years there were practically no violations.

There is no doubt that the mechanism for providing material incentives for enterprises for the observance of the environmental protection norms requires careful analysis. Apparently, the ones who must carry out this analysis first of all are the representatives of the economic sciences for the working out of the appropriate recommendations. Unfortunately, this research is encountered very infrequently, and this has had a detrimental effect upon the development of the environmental protection legislation.

The effectiveness of the environmental-protection norms in economic-production activity depends to a significant degree upon the degree of provision with the material-technical needs, but which one should understand the total aggregate of a number of material factors. In particular they include the financing of the environmental protection measures. For example, paragraph 1 of the 23 September 1968 decree of the USSR Council of Ministers, entitled "Measures for Preventing the Pollution of the Caspian Sea"[8], required certain ministries and departments to take the necessary steps to prevent the pollution of the Caspian Sea by petroleum, petroleum, products, industrial and everyday runoff water, or by ballast or bilge water from ships. It is understood that this norm will go into effect only in the event that new purification structures are built or the existing ones are redesigned or remodeled, the tanker fleet is put into conformity with the technical specifications, etc. Therefore it is important for the ministries and departments, in the established procedure, to include in the financial-estimate computations the capital investments for the carrying out of environmental protection measures.

Article 11 of the Principles of the Land Legislation of the USSR and the Union Republics requires enterprises, organizations, and institutions that are carrying out construction operations on land that is provided to them for their temporary use to carry out, at their own expense, the restitution of

those areas of land to a condition that is suitable for the use for which they are intended. The effectiveness of this norm depends substantially upon whether the monetary funds allocated for these purposes are sufficient. For example, the enterprises of Glavtransneft', during the construction of petroleum pipelines in 1977, recultivated more than 25,000 hectares of land. The expenditures for these purposes came to more than 10 million rubles[9].

The enterprises that are part of the Ministry of the Gas Industry are making considerable capital investments to the development of the gas fields and the building of structures for the protection of the environment. For example, for the Kirpichli gas fields those expenditures came to 6.7 percent of the total capital investments; Urengoy, 6.65; Vuktyl, 4.7; and Shatlyk, 4.5 percent[10].

Under conditions of scientific-technical progress, the increase in the effectiveness of the legal norms that are being considered is possible only on the basis of further scientific research on the entire range of relations that are linked with the protection of the environment in the activity of the associations, enterprises, and organizations.

FOOTNOTES

1. Data from the combined scientific expedition of the All-Union Scientific Research Institute of the Hunting Industry and Trapping, RSFSR Glavokhota, which was carried out in 1977.

2. "SP SSSR" [Collection of USSR Decrees], No 6, 1976, Article 26; "SP SSSR", No 13, 1982, Article 69.

3. "SP RSFSR" [Collection of RSFSR Decrees], No 19, Article 137.

4. This incident was mentioned by LITERATURNAYA GAZETA, 6 October 1982.

5. "SP SSSR", No 2, 1979, Article 6.

6. Data provided by the environmental-protection commission of the Central Committee of the trade union of workers in the petroleum and gas industry.

7. From a report by the chairman of the Kaspmorneft' Production Association at a session of the environmental-protection commission of the Central Committee of the trade union of workers in the petroleum and gas industry.

8. "SP SSSR", No 9, 1968, Article 134.

9. Data provided by the environmental-protection committee of the Central Committee of the trade union of workers in the petroleum and gas industry.

10. Data provided by the environmental-protection committee of the Central Committee of the trade union of workers in the petroleum and gas industry.

SIMULATION MODELS IN ANALYSIS OF FIRST STAGE OF EXPERIMENT

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian No 2, Mar-Apr 84 pp 232-247

[Article by G. A. Krupenina, I. V. Magarik, S. M. Movshovich, Yu. V. Ovsiyenko, Ye. M. Olevskaya, and N. V. Pavlov: "Bi-level Optimization-Simulation System of Models: Formulation and Analysis of Results of First Stage of Experiment"]

[Text] The experience in planned management of the economy gained in the USSR and in other socialist countries allows us to define with sufficient clarity the traits which have become stabilized within the system of management. Among these are primarily the presence of a singular system of plans which are mutually interrelated and which encompass all levels of the national economic hierarchy and, secondly, the combination of centralized management with the decentralization of individual management functions on the basis of a system of stimulation methods which is called upon to bind together the interests of individual collectives with the goals of society as a whole. Therefore, the process of improving the management of the national economy is implemented along three basic directions. Efforts are made to seek out means of improving the organizational structure, as well as improved methods of planning and more effective economic levers and incentives to facilitate plan realization.

However, practical experience has shown that in some cases the measures which provide for improvement of the management mechanism may turn out to be insufficient to effectively stimulate the labor collectives toward achievement of the optimal ultimate national economic results. One of the most obvious examples of this may be the situation in capital construction. The basis for planning and evaluation of the activity of construction-installation organizations is the indicator of commodity building production -- the cost of facilities ready for operational introduction. At the same time, however, the methodology for computing labor productivity, as well as the wage fund, remains the same. As a result, the above mentioned indicators continue to depend on the "gross". As before, builders have an interest in retaining an excessively high material consumption for the facilities being erected [1, p 2].

The example presented serves as an additional reminder of the fact that all the elements of the economic management mechanism are interrelated, and that the introduction of individual measures for its improvement, in spite of their seeming attractiveness, may even lead to negative results if this circumstance

is not sufficiently taken into consideration. Economic science has been called upon to play an important role in solving the problems of comprehensive development of the economic management mechanism.

The June (1983) Plenum of the CPSU Central Committee, having reviewed the state of affairs in the social sciences, presented the requirement "...to intensify the scientific search, to ensure a decisive turn for scientific institutions and all social scientists toward the key practical problems which are currently facing our country" [Materials of Plenum, CPSU Central Committee 14-15 June 1983, Moscow: Politizdat, 1983, p 70]. For economic science, "such questions as the stimulation of scientific-technical progress, the improvement of the system of management and planning, the provision of a priority for all-people's and state interests, the development of allocation relations, the principles of scientifically substantiated price formation, etc. are particularly current" [Ibid].

In accordance with the decisions of the November (1982) Plenum of the CPSU Central Committee, as of 1 January 1984 large-scale economic experiments are being conducted at five ministries. The purpose of these experiments is to work out principles and methods of management directed toward the achievement of optimal end results. In preparing such measures, it is necessary to give comprehensive consideration to the practical experience gained in the USSR and other socialist countries, as well as to the recommendations of economic science which have been worked out on the basis of the latest research methods.

In recent years the arsenal of means for studying economic processes has been enhanced by such a method of experimentation as simulation modeling. Unlike the real situation, the simulation experiment using a model which reflects only the most important economic ties may be conducted on any scale, up to the national economy as a whole, and at the price of relatively low expenditure of time and resources. Thus, conditions are created for a comprehensive and systemic study of certain proposals for improving the economic management mechanism [2].

The models of certain economic subjects which imitate the most important aspects of their functioning made it possible to monitor the effect of certain elements of the economic management mechanism on the results of their activity. The systems of models which correspond to individual levels and segments of the national economic hierarchy and are adapted to a description of the functioning of the economy as an integral whole are of particular interest. It is specifically within the framework of such simulation systems (IS) that we can study such key problems as the effect of various relations between centralized planning and independent action by local facilities on the ultimate national economic results within the overall process of management of the national economy; the effectiveness of a certain system of economic levers and incentives (various concepts of price formation, principles of financing and crediting, systems of priorities in the distribution of limited resources, income, etc.). Moreover, the above mentioned systems make it possible to evaluate the effect of the dynamics of key parameters in the economy (specific labor consumption, output-capital ratio, material consumption, etc.), as well as the quality of their prediction for the development of the national economy.

This work gives a brief description of one such IS[1], and analyzes the results of a series of experimental computations performed on its basis.

Let us examine the structure of the IS by its general traits. The sphere of production and the sphere of consumption are the objects of planning and management within this system. The former is subdivided into production complexes. In order to more clearly define the most important moments within the process of reproduction, the entire totality of sectors, and accordingly products, within the system is broken up into three groups: capital forming, used for creation of fixed production capital; indermediate, going toward the replacement of current material expenditures in the productive sphere; and products of non-productive function. Each product in the system may appear in only one of the above-mentioned categories. Complexes have at their disposal the production capacities which have been allocated to them, financial, labor and natural resources, as well as purchased raw goods, materials, and semi-finished products.

Consumption in the IS includes personal (goods and services obtained by the population) and social, which includes other production of non-productive function paid for by budget allocations.

Planning and management of production within the IS is implemented on two levels: the national economic and the local.

The functioning of economic management in the IS takes place within the framework of a definite system of finance-credit relations. The finance-credit subsystem encompasses the account of state income and expenditures (the state budget) as well as the bank system (in the IS there is one bank which performs certain functions of the real Gosbank [USSR State Bank] and Stroybank [Bank for Financing Capital Investments]).

The following processes are simulated within the system: 1) average time planning of production; 2) development of plans for capital construction; 3) preparation of current plans for complexes; 4) planning of finances and credit; 5) planning of monetary income and expenditures by the population; 6) price formation; 7) distribution of the national product; 8) realization of plans for capital construction and the production program.

The calendar year is taken as the unit of time. All the stages of functioning with the exception of development of the average time plan are repeated annually.

Let us deal in greater detail with a description of each of the above-noted aspects of the overall process of economic management functioning. We must note, however, that we do not examine such an important stage of management as long-term prediction. The process of compilation of an average term plan, which encompasses 5-7 years, is simulated and periodically (once every 2-4 years) reviewed. This makes it possible to consider the sliding character of planning. Since the inter-sectorial accounting balance for 1972 was taken as the basis for obtaining the initial information, the first year for the functioning of the system is 1973. In subsequent years, the initial data is the information on the state of the economy for the year preceding the current year as worked out within the system itself.

The preparation of the average term plan begins with the formulation of a normative base and an expert evaluation of the dynamics of labor resources and the structure of consumption. The reporting indicators of production complexes on the availability of production capacities, the volumes of unfinished construction, output, material expenditures, and expenditures of labor and natural resources are combined (within the cross-section of the complexes) and form the matrices of "inter-complex" (i.e., intersectorial in the given nomenclature) coefficients for current material expenditures and output-capital ratios, as well as aggregated vectors for labor consumption and "natural resource consumption" for production of the complexes. Based on these and analogous data for past years and on expert evaluations, the appropriate predictive norms are established for the average term plan period.

Among the expert evaluations in the development of each average term plan, a prediction of the structure of non-productive consumption is utilized, based on the information obtained from the IS. Having been given certain values of future prices, income of the population and expenditures for social needs, the expert predicts the structure of non-productive consumption for the last year of the average term plan. The system functions and formulates information on the actual formed prices, the income of the population and the expenditures for social needs, after which the expert clarifies his evaluations if necessary. Computation variants may thus be produced. In the computational experiment realized at the present time, prices, as well as the plan structure of non-productive consumption, were taken to be invariant. This approach makes it possible to obtain and compare different variants according to their end results.

The average term plan defines in combined indicators the tasks for output of production by each complex by year, the distribution of labor resources among the complexes, as well as the annual volumes of personal and social consumption (separately). The development of the average term plan is simulated by solution of the problem of dynamic intersectorial balance with limitations on labor and natural resources and stockpiles of unfinished construction. The criterion for plan selection is maximization of the growth rate for total consumption.

At the next stage, the tasks of the average term plan are de-aggregated. The indicators on product output within the system in their detailed nomenclature by years of the plan period which are obtained as a result serve as the starting point for determining the dynamics of the corresponding production capacities and development of plans for capital construction.

The selection of the composition of future product output by the complex which has been implemented in the course of de-aggregation depends on the formulated structure, its past development, the degree of shortage of individual products and their profitability for production. The details may be determined informally with the participation of the expert. We will note that at this stage the IS contains the possibility of deviating from strict balance of production and consumption by detailed nomenclature, even though balance of expenditures-output is achieved in the average term plan in terms of the combined indicators. Therefore, at the subsequent stages it is necessary to

balance production and consumption in detailed nomenclature, which is what occurs in the development of annual plans. The transition from combined plan indicators at a higher level to the detailed tasks of local indicators (by term of planning or by position of the object in the economic structure) is associated either with a partial loss of information or with inadmissably large volumes of plan computations. In the IS the computations do not include the dynamic intersectorial balance in detailed nomenclature and, consequently, planning is implemented on the basis of incomplete information.[2]

The process of capital construction is implemented within the system in the course of several years (each complex has its own term of construction). The volumes and structure of capital investments per unit growth of capacity for the output of each product and their distribution by years of construction are assumed to be known factors.

The planning of capital construction includes the following stages: computation of deduced expenditures, compilation of the preliminary plan, and its subsequent correction.

The production of each product in the IS is possible through different means which require different types of production capacities. Therefore, the basic task of the plan for capital construction is the selection of specific methods of production with the aid of minimization of the deduced expenditures necessary for the operational introduction and subsequent functioning of capacities ensuring the given output growth. The expenditures for each variant are adapted to a single moment in time by discounting and subsequent summation of various future capital and current expenditures. The prediction norms are used for evaluation of future investments.

The preliminary plan determines the volumes of introduction of capacities by types for the entire period of the maximal construction time, except for those capacities whose creation is completed in the current year. The values of the latter are established in the development of annual plans for complexes. The need for such division and subsequent correction of preliminary plans is caused by the insufficient interconnection of tasks for the introduction of new capacities obtained in the process of de-aggregation. The introduction of capacities in the current year (i.e., volumes of completed construction) is planned with consideration of the balances of expenditures and output, while the capacities of facilities which are new starts or under continued construction are determined (in the preliminary plan) on the basis of de-aggregated tasks in the average term plan and, generally speaking, are not coordinated with each other.

The preliminary plan of construction in the current year is formulated sequentially for each type of product by time of introduction (in a year, two, etc., up to the interval equal to the period of construction). The construction plan for ensuring the given yearly output growth $t_o + \tau$, where t_o is the current year, is established in the course of sequential review of the degree of readiness greater than or equal to τ_k - according to increasing incurred expenditures of previously unused stockpiles of unfinished construction. (Here τ_k is the normative time for construction of capacities of type k). In

other words, the presence of unfinished facilities with possible introduction time of no more than years is verified. Such a review continues until the plan assignment for yearly operational introduction $t_0 + \tau$ is fulfilled or until the entire stockpile of unfinished construction of a degree of readiness greater than or equal to $\tau_k + \tau$. is exhausted. In the latter case, the underfulfilled task is carried over to the following year.

Correction of the plan for capital construction is performed after formulation of the current plans for the complexes. At this stage the plan is more accurately defined with consideration for the deviation of actual assignments for the introduction of capacities in the current year from those obtained in the process os de-aggregation, as well as for the purpose of utilizing any possible remnants of stockpiles of unfinished construction for those capacities which are only one year from complete introduction. Correction takes place along the same scheme as the development of the preliminary plan. However, at this stage the compilation of the plan for capital construction is not yet complete. Only after coordination of the production plans for the complexes is it possible to evaluate the degree of provision of this variant with the necessary resources and, if needed, to introduce final corrections.

Planning of current production is implemented in the process of iterative information exchange between the central management organ (organ of current planning -- OTP) and the production complexes. The OPT works out plan recommendations, and the complexes -- proposals. The number of iterations is small- ranging from two to four. At the last one, the proposals of the complex are fixed as its annual plan.

The production capacities of the complex depend on the presence of capacities by types of material, labor, natural and financial resources, as well as volumes of unfinished construction with a degree of readiness equal to $_k{}^{-1}$. Every type of production capacity ensures the output of a certain product (one), and is associated with the expenditures of material, labor and natural resources. The norms for these expenditures are assumed to be known to the local plan organ. Since each complex may turn out a number of products, and moreover any product may be manufactured by numerous methods (capacities of various types), the complex has a certain freedom of selection in determining its production program.

The annual plan establishes the volumes of product output by each method (the intensity of utilizing capacities of the appropriate type), the volume of introduction of new capacities in the current year, as well as the volumes of restructuring of capacities of one type to another, if such a possibility is present. The plan for the complex fixes the delivery of intermediate products required for its on-going activity. With consideration for the preliminary plan for capital construction, the necessary product deliveries of the capital-forming sectors are determined, which comprise the material base for construction and restructuring of capacities. The development of the plan is simulated by an approximated solution to the problem of quadratic programming. Its limitations describe a multitude of the complex's production capacities. The target function consists of two parts. The first represents the complex's own interests. They may be expressed as profit, net production, material

incentive fund, etc. The second characterizes the effect of OTP tasks on the selection of the complex's plan, and is a "fine" for unfulfilled output tasks, as well as for over-expenditure of allocated resources. The total fine is comprised of the penalties for deviations from individual plan positions. Every such penalty is described in the form of a quadratic deviation function.

The system provides for the possibility of forming individual types of production reserves, with distinctions drawn between plan reserve, security (subject to provision in mandatory order) reserve, and mandatory above-norm reserve (discussed in greater detail below). If a shortage arises in a certain product, the reserve accumulated at the given moment may be utilized. As a result, the shortage may be eased or entirely liquidated.

Having compiled their plans, all the complexes hand them over in the form of proposals to the OTP. Each complex supplies information on its proposed expenditures and net output according to all types of products. Having at its disposal the data on planned volumes of current non-productive consumption obtained after de-aggregation of tasks in the average-term plan, on available reserves, as well as on the planned remainder of these reserves at the end of the year, the OTP compares the proposal and the demand. If the proposed output is insufficient to meet all the orders, the producers are given the recommendations to increase their output, while the consumers are told to reduce their expenditures. The plan recommendations of the OTP are forwarded to the complexes in the form of lower limits for output and upper limits of expenditures.

As we have already noted, after coordination the plan for capital construction is corrected and this concludes the stage of formulation of production plans in the IS.

Within the framework of the IS financial-credit subsystem, a state budget, Gosbank credit plan and financial plans for the complexes are developed.

The state budget income is formulated as a result of the system's functioning in the previous year and, consequently, is predetermined at the moment of its compilation. It includes the complex's payment for production capital as well as for the natural resources presented for its disposal, deductions from profits, mark-ups for wages and direct taxes on the population. The budget expenditures include the financing of capital construction in the production sphere, allocations for the maintenance of the non-productive sphere, monetary payments to the population aside from wages, and reimbursement of expenditures for the creation of production reserves. The volume of financing of capital construction in each complex is determined in combined indicators on the basis of tasks set forth in the average time plan for the introduction of capacities. The expenditures for the maintenance of the non-productive sphere include the payment for products of non-production function (with deduction of the total cost of goods and services obtained by the population on personal budgets) and the wages of workers in this sector. The latter sum, as well as other payments to the population, are given in the form of a certain percentage in relation to the wage fund in the sphere of material

production. The dynamics of wages in the production sphere are established on the level of average term planning in such a way as to ensure a balance of income and expenditures by the population with consideration of the tendency toward savings.

Credit within the framework of the IS is presented to the complexes for needs of capital construction for a period of one year, and the interest on it is paid from the profits in the year in which it is received. The credit plan, as usual, has a balance form. The bank resources in the current year are made up of the return of credits from the past year, the payment of interest for credit in the given year, the growth in savings by the population for the previous year and the capital carried over to the start of the current year. Thus, the basic part of the bank capital, as in the case of the budget, is formulated as a result of the system's functioning in the previous year.

The bank expenditures include crediting of complexes and payment of interest on savings by the population. The emergence of non-disbursed surplus is also possible.

The financial plans of the complexes, as in real life, consist of clearly delineated sectors: income and influx of capital, expenditures and deductions, credit relations and interrelations with the budget. The income of the complexes are made up of the profits and taxes on turnover. However, the latter is not clearly delineated and for the sake of simplicity is included in the profit. The expenditures of the complexes in the present version of the IS include only the expenditures for capital construction of facilities of productive function. The credit relations of the complex with the bank appear, as we have already indicated, as follows. In the current year the complex receives a bank loan for its capital construction needs. It pays the interest for this loan from the profits, and also repays the credit received in the previous year.[3]

The system provides for credit management with the aid of a regulated percentage rate. Specifically, comparing the total requests of the complexes for credit with the available resources, the bank may in the course of coordinating the current plans either increase or reduce the percentage rate, depending on the relation of supply and demand. Another variant may be a periodic (for example, annual) change in the percentage rate on the basis of previous years' data.

The types of payments made by the complexes to the budget have been listed above. Here we must only note once again that the source of capital for the above-mentioned payments is the profit from the previous year. In turn the complex receives funds for capital construction from the budget.

The level of monetary income of the population is determined in such a way as to ensure (with consideration of the interest payments on savings to be made in the given year) the planned level of personal consumption and growth in savings. The expenditures by the population are comprised of payments for goods and services which make up the personal consumption fund, as well as growth in savings and payment of direct taxes.

In accordance with the fact that the IS is intended for studying the process of planning and affecting the development of the economy for different variants of the economic management mechanism, considerable attention is given to the processes of price formation and the role of prices in plan development. However, in the version of the model which we have worked out for purposes of simplicity the retail prices have been fixed at the 1972 level, and only the wholesale prices change. (In the system, as in the real economy, they are not too closely tied with one another and one of them may vary within rather broad margins while the others remain unchanged).

In the process of functioning, the role of prices is manifested in the compilation of the annual plan, in the computation of incurred expenditures in the process of adopting the plan of capital construction, in aggregation and in de-aggregation. At the stage of development and coordination of the current production plans, the price structure affects the form of expression of the complex's own interests and through them -- the selection of the plan variants.

For experimental study, the IS provides three possible variants of price formation. In the first the wholesale prices are fixed at the 1972 level, and in the second they are set according to the accounting data at the level of average sectorial expenditures. The computation of prices according to expenditures is allowed with varying profitability norms, which may also be differentiated according to sectors. Price formation is done according to the actual expenditures of past years, or else with the aid of the solution of a system of balance type equations. Fixing the number of iterations in the method of sequential approximation in the balance system solution gives rise to intermediate variants. A review is performed periodically, ranging from an annual review to one every five years. The prices are assumed to be invariant in the process of plan coordination.

The third variant provides for simultaneous and integrated formulation of the plan and prices. The price formation mechanism here is built into the process of coordinating the annual plans. If at a certain iteration, in accordance with the plan proposals presented by the complexes, the demand for a certain product exceeds its production, then its price increases (and vice versa), after which the process of working out plan proposals is repeated. An alternative variant is also possible, in which prices are reviewed not by plan indicators, but by actual annual supply and demand once a year.

The role of prices is evident at the stage of computing incurred expenditures. With aggregation they fulfill the function of making different products commensurate with each other. With de-aggregation and compilation of current plans they determine the relative benefit of production for one product or another, i.e., they give a specific quantitative expression to the interests of the producer which take on the form of profit.

The problem of distributing the social product arises when balance is disrupted. In the present version of the IS this occurs only in the case of imbalance in supply and demand for products of production function.

There are two sources of possible disruption in balance in the IS: de-aggregation and time limits on the process of coordinating the annual plans. The former gives rise to potential imbalance in the structure of production capacities with the planned needs and solvent demand, and may also lead to imbalance in plans for capital construction and cash funds for investment resources, since at the level of the complexes these plans are compiled only on the basis of tasks set for growth in capacities without consideration of resource limitations. The effect of this factor is reduced with increase in the portion of reserve capacities.

The second source leads to a real imbalance. Since the system does not take into account the stochastic character of the current processes, the possibility of imbalances is the only factor determining the need for introducing corrections into the initially compiled annual plans. This need is determined by the fact that their fulfillment is not ensured by the material and other resources.

The IS takes two approaches to the distribution of manufactured production. The first is used for production by capital-forming sectors, and the second -- for intermediate products. After all the stages of plan formulation are completed, the total orders for all products and the proposals of the complexes for their production are computed. If the output exceeds the production demands, the excess portion forms an extra-plan reserve and the stored products are taken into consideration in the compilation of plans for subsequent years. When the output is insufficient, special regulations for the distribution of deficit products between the complexes go into effect, based on a scale of priorities. Specifically, the complexes are broken up into two groups. In the first group the orders are completely filled, and the remaining part of the resources is divided proportionately among the orders placed by complexes in the second group. If there is a systematic shortage of capital-producing products, it is evidently expedient to class the complexes manufacturing these products in the first group.

Intermediate production is also distributed according to a scale of priorities, with the complexes being broken up into three groups. The first group consists of complexes manufacturing intermediate production. Their orders are completely filled to avoid multiplicative effect and increased shortage. The second group includes complexes manufacturing products for capital-forming sectors. Finally, the third group consists of complexes manufacturing products of non-productive function (PNN).

After defining the non-correspondence between the complex's demand for products in the capital-forming sectors and intermediate products and the available resources and distribution of deficit products, the plans for capital construction and current production are clarified in accordance with the actual available capacities. As a result, the actual indicators are determined.

Under conditions of incomplete satisfaction of demand for production in capital-forming sectors, the complexes are forced to cut back their plans for capital construction. This gives rise to the problem of determining priorities in the distribution of limited resources between facilities which

are at varying degrees of readiness. The IS provides two approaches to the solution of this problem. In the first case all the facilities are considered to be of equal importance. The deficit products of capital-forming sectors are placed in order according to the degree of their relative shortage (in regard to supply of plan demands). The volume of construction of all the facilities making significant use of this product in the current year is curtailed by the same percentage, after which the needs for other products are redefined, and the process continues.

In the second variant the facilities which are at a higher degree of readiness have a priority on deliveries. Provision is first made for start-up facilities, and then those of the next degree of readiness, etc. The construction of facilities which have not received the appropriate resources is frozen. The degree of readiness of the latter is presumed to be unchanged in the course of time. The plan for capital construction which is ultimately corrected by this method is considered to be realizable.

Clarification of the current plans of complexes manufacturing means of production is implemented in the realized version of the IS at the stage of distribution. As concerns the complexes manufacturing products of non-productive function, there are two variants provided. In the first the plan structure for output is retained, while the total volume is reduced by the same amount as the reduction in deliveries as compared with the planned volume.

If the intermediate products delivered to the complex are absolutely non-interchangeable, the reduction in production is determined by the ones in shortest supply. At the stage of realization, the IS provides for the possibility of substituting some intermediate products with others, with the provision that a unit of some product may be replaced by a certain quantity (greater than or equal to the unit) of other products. In the computations, incomplete interchangeability was studied approximately by the method presented below.

A downward deviation in the actual indicators for output of goods for personal consumption from the plan indicators gives rise to forced savings in the system, in addition to the planned savings. And, on the contrary, an overfulfillment of tasks on the production of consumer goods leads to a reduction in savings.

In completing our description of the system, we may state that the level of abstraction adopted in its formulation has given rise to a number of difficulties associated with the problem of information provision. By their economic content, a number of variables present in the IS do not have any prototypes in the operational system of accounting and plan indicators. Most of the coefficients in the IS may be obtained only in the form of rather approximate evaluations. All this makes a certain degree of conditionality of the initial information inevitable, and consequently leads to conditionality of results of the computations performed according to the model.

As one might imagine, a comparative analysis of the different variants of the economic mechanism based on simulation experiments must first of all bear a qualitative character. Therefore, there is no need to demand from such a model the precision of quantitative results which would be acceptable for planning or predicting the development of the economy. For our purposes it is quite sufficient that the combined indicators utilized in the model approximately correspond to reality. This task is fully realizable.

It follows from what we have said that a certain part of the information necessary for the model will inevitably require "adjustment". (As an example we may point out the initial volumes and available stockpiles of unfinished construction, which can hardly be obtained in the nomenclature of products adopted in the model). Appropriate adaptation procedures have been worked out.[4]

The nomenclature of products within the system (31 titles) was compiled on the basis of data from the accounting intersectorial balance for 1972 published in [4]. The corresponding indicators of gross output are reduced to 31 positions in this balance. By means og aggregating the obtained values, the factors for direct expenditures and labor consumption were computed. The intersectorial balance of fixed production capital, also for 1972, was used to find the coefficients of output-capital ratio. A large portion of the remaining information was taken from the statistical manuals "Narodnoye khozyaystvo SSR" [USSR National Economy] for various years. In some cases, conditional figures were used.

The initial information was prepared in two variants. In the first, initial, variant, the production of each product was provided by only one method, and in the second -- by three: a "labor consumptive", "average" and "capital consumptive." Computations according to the second variant have still not been performed to the present time.

The initial variant should be related to macro-level models. Therefore, it is hardly expedient to use it for experiments with various principles of price formation, crediting, etc. However, with the presence of several production methods for each product, the lower level in the system takes on certain traits of a micro-level, since it reflects possibilities of replacing labor with capital and certain intermediate products with others. In this situation, experimenting with variants of the economic management mechanism presents considerable interest.

In the variant which has been realized at the present time, each product is produced by a single method, the rate of change in labor consumption norms is exogenic and identical for all products, and the process of its formulation under the effect of various factors is not examined. The studies performed within the framework of a given variant primarily dealt with the effect of dynamics of labor productivity and quality of its prediction on the basic economic indicators. As we know, growth in labor productivity serves as a key factor in increasing production effectiveness. Specifically, in the 11th Five-Year Plan it is to account for no less than 85-90 percent of the growth in the national income [Materials of the 26th CPSU Congress. Moscow: Politizdat, 1981, p 108]. Therefore, our study of this problem is quite relevant.

Before the assignments for growth in labor productivity are made at all the levels of the economic management hierarchy, computations of the necessary number of those engaged in the productive sphere are made and various factors of this growth are considered. At present, the following unified classification of factors for dynamics of labor productivity has been established (see [5]): 1) structural shifts in production; 2) increase in the technical level of production; 3) improvement of management, organization of production and labor; 4) change in volume of production; 5) sectorial factors. It is easy to see that the actual basis for computation of each factor is provided by the predictive values of labor consumption norms for individual types of production. This is clearly evident in regard to p 1). As concerns pp 2)-5), here consideration is given to the productivity of machines and equipment, servicing norms, norms on the number of workers, i.e., the initial data for determining the same labor consumption norms. Thus, the quality of prediction of the latter is manifested in the degree of substantiation of plan assignments for the overall growth of labor productivity, since in aggregation the errors which have been allowed are transferred to higher levels of the economic management hierarchy. We must note that along with repetition of the errors at lower levels, each subsequent level of the IS is not guaranteed to be free of its own errors. Thus, in the process of going to higher degrees of consolidation, errors in prediction may be accumulated. As practical experience has shown, the indicators of expenditures at the higher levels of the hierarchy depend significantly on the structure of the economic management mechanism, as well as on how effectively the evaluative descriptions of enterprise activity direct them toward economic application of resources.

The goal of the performed studies was to evaluate to some degree the consequences for the national economy caused by the presence of errors in the prediction of labor consumption norms. This was done by means of simplified simulation of the appropriate situations. It was proposed that within the framework of the current (annual) planning, the prognosis is precise, while for average term planning which operates with consolidated indicators, the errors in prognosis, if they are present at all, are identical for all products (and consequently all complexes), as well as for all the years of the plan period.

As we have already stated, the average term plan is corrected (re-compiled) in the IS once every three years. Although the level of labor productivity achieved at the moment of plan compilation is precisely known, it was assumed that the error in its prediction for the period of simulation is unchanged. Of course, in reality such a situation is hardly realistic, since the system of planning undoubtedly has the capacity for self-education based on accumulated experience. Nevertheless, errors in prediction are possible here as well. Thus, in the course of several recent five-year plans, a constant change in the growth rate of labor productivity has been noted. Under these conditions, a constant error in the prediction of rates is probable if education takes place with a delay. Within the framework of the developed IS, there is no difficulty in performing computations by variants which presume more complete forms of considering past experience. However, adopting the assumption of "untrainability" is beneficial, since it makes it possible to most vividly present the entire picture of corresponding consequences. Here, of course, it is the qualitative dependences which are significant, and not the specific quantitative indicators which may change with different forms of training.

One (base) variant was selected as the basis for comparing the variants corresponding to the various hypotheses. In this variant, the norms of labor consumption by all products are reduced by 4 percent per year in actuality as well as by prognosis (variant No 1 with code "4-4"). Based on this specific value, the volumes of unfinished construction ensuring balanced development of the economy in the simulated period were determined. The computations were performed by years for the 11 year period.

With the aid of this variant, two other predictions with errors were studied: the "optimistic", when the prognosis of the rate in reduction of labor consumption norms comprised 5 percent per year (No 2, code "6-4"), and the "pessimistic", in which the predicted rate is equal to 2 percent (No 4, code "2-4"). Aside from this, computations were performed for variants in which the actual rate of reduction in labor consumption comprised 2 percent per year, while the predicted rate either corresponded with it (No 5, code "2-2") or comprised 4 percent per year (No 7, code "4-2").

In all these variants the values of volumes of output of products of non-productive function were computed on the basis of the assumption that the intermediate products consumed in the production of PNN were fully interchangeable.

Since the hypothesis of full interchangeability bears an overly artificial character, variants were also examined in which the intermediate products consumed in PNN production were partially interchangeable. Computations were performed for five such variants which were "parallel" to those described above. Retaining the same principle of coding, their codes may be recorded in the form of 4-4*, 6-4*, 2-4*, 2-2*, and 4-2*, where * indicates the assumption of partial interchangeability. The analysis of these variants has shown that only three of them (6-4*, 2-2* and 4-2*, which received the respective numbers 3, 6 and 8) were studied in detail. For the other cases the authors felt that they could limit themselves to individual comments.

Let us now discuss the question of the specific form of reflection of full and partial interchangeability of intermediate products. In the former case there are no problems. As concerns the computation of partial interchangeability of intermediate products with acceptable accuracy, it would require the enlistment of a large amount of additional information, as well as expert evaluations. However, since the proposed IS must be used for reaching conclusions of a primarily qualitative character, at the given stage of the experiment only the following conditional form of such computation was examined. Let the demand of the complex producint PNN for intermediate production be given by vector $Д=(Д_1, \ldots, Д_k)$, while the actual deliveries are equal to $S = (S_1, \ldots, S_k)$. With demand $Д$ the PNN output planned by the complex is given by vector $Z_{пл} = (Z_1, \ldots, Z_t)$. We are speaking of full interchangeability if the actual output of the complex is

equal to $Z_ф = Z_{пл} K_п$, where $K_п = \min\left[1, \sum_{i=1}^{k} S_i \Big/ \sum_{i=1}^{k} Д_i\right]$.

Partial interchangeability occurs if $Z_ф = Z_{пл} K_r$, where K_r is determined with the aid of the following procedure: let the intermediate products be ordered so that $S_1/Д_1 \leqslant \ldots \leqslant S_k/Д_k$. Then $K_r = \min[S_2/Д_2, K_0]$ if $S_2/Д_2 < 1$ and $K_r = K_0$ in the opposite case, where $K_0 = \min[1, S_1/Д_1]$ is the value of the transition factor

from $Z_{п.т}$ to $Z_{ср}$, which answers the assumption on full absence of interchangeability. Therefore, inequality $K_0 \leqslant K_r \leqslant K_п$ is always carried out.

Table 1. Dynamics of national income in the IS, in percentage of base year

(1) Вариант	(2) Шифр варианта	(3) Годы 1	2	3	4	5	6	7	8	9	10	11
1	4–4	103,6	109,2	115,0	120,8	126,8	133,3	139,9	146,9	154,1	161,3	169,2
2	6–4	103,8	108,8	113,5	118,4	124,1	131,0	139,1	147,2	154,9	162,9	171,9
3	6–4*	102,5	105,1	107,7	110,4	113,2	116,1	119,0	122,0	131,2	141,0	148,1
4	2–4	103,2	108,4	111,8	115,4	118,5	121,4	125,2	128,6	133,2	135,9	142,1
5	2–2	102,5	105,6	108,6	111,6	114,7	117,9	120,9	124,4	127,8	131,1	134,8
6	2–2*	101,8	102,5	103,8	109,9	111,4	113,3	117,7	119,3	123,0	127,6	130,6
7	4–2	102,5	105,6	108,5	111,8	115,1	118,0	121,1	124,0	127,0	129,5	132,8
8	4–2*	101,4	102,9	104,4	109,1	112,0	113,3	115,7	118,1	120,6	123,1	125,7

Key: 1 - Variant
2 - Code of variant
3 - Years

Table 2. Dynamics of output of products of non-productive function in the IS, in percentage of the base year

(1) Вариант	(2) Шифр варианта	(3) Годы 1	2	3	4	5	6	7	8	9	10	11
1	4–4	103,1	108,5	114,9	120,7	126,8	133,9	140,7	147,9	155,4	162,7	170,9
2	6–4	103,3	108,6	112,2	116,2	119,7	126,3	132,8	140,2	146,4	153,5	162,1
3	6–4*	101,7	104,1	105,2	106,6	106,7	108,2	108,5	109,7	117,9	127,0	133,3
4	2–4	102,3	108,6	112,1	115,6	118,6	123,2	125,8	130,4	133,9	135,2	145,1
5	2–2	102,1	106,2	109,6	112,3	115,2	118,8	123,5	127,6	131,2	135,4	139,4
6	2–2*	101,2	102,4	103,8	110,3	111,2	113,2	119,6	121,4	125,5	131,2	134,2
7	4–2	102,2	106,3	109,4	112,7	116,5	120,1	123,2	125,1	128,8	128,0	131,5
8	4–2*	100,8	103,0	104,8	109,4	112,7	114,4	116,7	118,0	121,1	120,3	122,9

Key: 1 - Variant
2 - Code of variant
3 - Years

Table 3. Coefficients of labor resource application in the IS (percentage)

(1) Вариант	(2) Шифр варианта	(3) Годы 1—5 (4) в целом по производственной сфере	(5) по производству ПНН	6—10 (6) в целом по производственной сфере	(7) по производству ПНН
1	4–4	99,4	99,0	99,6	99,7
2	6–4	98,3	98,9	98,9	97,8
3	6–4*	95,9	91,7	93,5	80,0
4	2–4	96.6	95,5	88,9	87,5
5	2–2	99,5	98,5	99,8	99,4
6	2–2*	98,3	95,6	98,5	96,0
7	4–2	99,4	98,0	99,0	97,2
8	4–2*	98,7	95,1	97,6	91,9

Key: 1 - Variant
2 - Code of variant
3 - Years
4 - on the whole throughout the productive sphere
5 - by production of PNN
6 - on the whole throughout the productive sphere
7 - by production of PNN

Table 4. Description of production capital construction in the IS (percentage)

(1) Вариант	(2) Шифр вариантов	(3) Годы 1—5 (4) доля производственных капитальных вложений в национальном доходе	(5) ввод основных фондов по отношению к капитальным вложениям	(6) объем замороженного строительства по отношению ко всему незавершенному строительству	6—10 (7) доля производственных капитальных вложений в национальном доходе	(8) ввод основных фондов по отношению к капитальным вложениям	(9) объем замороженного строительства по отношению ко всему незавершенному строительству
1	4–4	16,4	95,2	1,8	15.7	94.5	2,0
2	6–4	16,8	86,7	19,9	19,8	90,9	10,7
3	6–4*	17,7	–	–	23.1	–	–
5	2–2	7,5	119,8	32,8	8,8	95,4	50,9
6	2–2*	7,7	–	–	9,1	–	–
7	4–2	14,1	61,6	19.8	10,6	88,3	41,3
8	4–2*	14,4	–	–	11,2	–	–

Key: 1 - Variant
2 - Code of variants
3 - Years
4 - portion of productive capital investments in the national income
5 - introduction of fixed capital in relation to capital investments
6 - volume of frozen construction in relation to all unfinished construction
7 - portion of productive capital investments in the national income
8 - introduction of fixed capital in relation to capital investments
9 - volume of frozen construction in relation to all unfinished construction

Table 5. Coefficients of capacities application in IS (percentages)

(1) Вариант	(2) Шифр варианта	(3) Годы 1—5 (4) в целом по производственной сфере	(3) Годы 1—5 (5) по производству ПНН	(3) Годы 6—10 (6) в целом по производственной сфере	(3) Годы 6—10 (7) по производству ПНН
1	4–4	100,0	100,0	100,0	100,0
2	6–4	99,5	98,6	98,5	97,6
3	6–4*	97,2	92,3	92,5	79,8
4	2–4	99,4	99,0	99,3	99,0
5	2–2	97,4	97,2	98,7	98,2
6	2–2*	96,3	94,7	97,2	94,3
7	4–2	95,7	95,5	90,4	89,4
8	4–2*	94,6	92,7	88,6	84,5

Key: 1 - Variant
2 - Code of variant
3 - Years
4 - on the whole throughout the productive sphere
5 - by production of PNN
6 - on the whole throughout the productive sphere
7 - by production of PNN

Table 6. Structure of PNN output by five-year plans in the IS (percentages)

(1) Продукт	(2) План	(3) 1 вариант (4—4) (8) Годы 1—5	(3) 1 вариант (4—4) (8) Годы 6—10	(4) 2 вариант (6—4) (8) Годы 1—5	(4) 2 вариант (6—4) (8) Годы 6—10	(5) 4 вариант (2—4) (8) Годы 1—5	(5) 4 вариант (2—4) (8) Годы 6—10	(6) 5 вариант (2—2) (8) Годы 1—5	(6) 5 вариант (2—2) (8) Годы 6—10	(7) 7 вариант (4—2) (8) Годы 1—5	(7) 7 вариант (4—2) (8) Годы 6—10
1	36,7	36,5	36,6	36,7	36,7	36,7	36,5	37,0	37,1	37,4	38,6
2	18,4	18,5	18,4	18,4	18,5	18,4	18,4	18,5	18,4	18,7	18,9
3	5,6	5,6	5,6	5,6	5,6	5,6	5,7	5,5	5,6	5,4	5,0
4	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,8	23,6	23,9	23,8
5	2,1	2,1	2,2	2,1	2,0	2,1	2,2	1,9	2,0	1,4	1,0
6	6,9	7,0	6,9	6,9	6,9	6,9	6,9	6,9	6,9	6,8	6,6
7	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,4	6,4	6,4	6,1
(9) Отклонения структуры от плановой (в долях от 100)	0	0,4	0,2	0	0,2	0	0,4	0,8	0,8	2,3	4,8

Key: 1 - Product
2 - Plan
3 - 1 variant (4-4)
4 - 2 variant (6-4)
5 - 4 variant (2-4)
6 - 5 variant (2-2)
7 - 7 variant (4-2)
8 - Years
9 - Deviation of structure from the plan (in portions from 100)

Results of numerical experiments on the basis of the IS are presented in Tables 1-6.

Let us deal first of all with the first line of Table 1. In the base variant with an actual rate of reduction in labor consumption equal to 4 percent per year, the annual output of production provides for the planned needs of capital construction and the current productive needs of the complexes. There are no deficit intermediate products and products of capital forming sectors in the system. Therefore the indicators on the first line relate to the case of full interchangeability as well as to the situation where it is absent altogether. As we might expect, with a 4 percent reduction in labor consumption and approximately a 1 percent growth in employment in the productive sphere, the national income grows by approximately 5 percent per year.

The second and third lines correspond to the case where the actual annual reduction in labor consumption is equal to 4 percent as before, while its prognosis comprises 6 percent. With full interchangeability, the error in the prognosis leads to a certain reduction in the national income during the 2nd-7th years as compared with the base variant. This drop is caused by the emergence of the transitional process and by the shortage of intermediate products. Then there is an adaptation of the system, and the overall level of shortage is reduced, while the interchangeability of products makes it possible to achieve even somewhat better indicators of national income than in the base variant. This occurs due to the excessive growth in the accumulated part of the national income[5] to the detriment of its consumed portion. The picture is entirely different in the situation when full interchangeability is absent. Then the shortage of certain products cannot be covered at the expense of excesses in other products due to imbalance of the plans, and there is a noticeable decrease in the growth rate of the national income (148.1 instead of 169.2 in the 11th year, i.e. the reduction comprises 12.5 percent).

The fourth line presents the data for the case of pessimistic prognosis and full interchangeability. Here we can see that interchangeability, unlike the optimistic prognosis, does not prevent a significant drop in the growth rate of the national income (by 16 percent as compared with the base variant in the 11th year). This fact is easy to explain by comparing the dynamics of the fixed production capital in the first three variants. If in the base variant the funds have increased by 72.4 percent in 11 years, and in the second — by 98 percent, then with a pessimistic prognosis they have increased by only 43 percent. Thus, excessive optimism in the prediction of the growth in labor productivity leads to an over-accumulation and excess of capacities. However, with the pessimistic prognosis there are not enough capacities, the coefficient for application of the work force drops sharply (Table 3), and as a result the rate of economic development slows down. From this we may conclude that with full interchangeability of the intermediate products, an optimistic prognosis leads to significantly less severe consequences for the economic development than does the pessimistic. With partial interchangeability, the losses from errors in prediction are brought closer together, even though by growth in national income the pessimistic prognosis as before yields to the optimistic (in the 11th year[6] — 148.1 percent for the optimistic and 137.6 percent for the pessimistic).

The picture of dynamics of PNN output (Table 2) for these variants on the whole duplicates the character of movement of the indicators in Table 1. There are interesting differences in that the optimistic prognosis, even with full interchangeability (see variant 2),beginning from the 3rd year leads to worse results than a precise prognosis (reduction of the volume of consumption by 5 percent in the 11th year). With a pessimistic prognosis the consumption drops even more greatly -- by 15 percent, and with partial interchangeability it even gives somewhat better results than the optimistic prognosis (137.8 as compared with 133.3, respectively).[6]

Let us now compare the application of fixed production factors in the first four variants. The corresponding data in Tables 3 and 5 are presented by five-year plans. First of all we must note that in the base variant with full (100 percent) load on the capacities, the labor resources are utilized by 99.4-99.6 percent on the whole throughout the national economy. This is evidently explained by the fact that the relations of labor consumption and output-capital ratio in the aggregated and detailed nomenclature vary somewhat (with de-aggregation the relative labor consumption turns out to be lower). With any errors in prognosis, the indicators for the application of both factors are steadily reduced. In variant 2 with an optimistic prognosis the coefficient of load on capacities in the first five-year period is rather high (99.5 percent), which is associated with the inhibiting effect of construction stockpiles available at the beginning of the period. Over-accumulation begins to be evident in the following five-year period, when this coefficient drops to 98.5 percent. If we compare this variant with variant 3, the imbalance in the plans is very clearly manifested. The use of capacities as well as of labor resources is significantly reduced. This tendency progresses through time (for variant 3 the examined coefficient in the second five-year period comprises 92.5 percent, and for labor resources -- 93.5 percent). An analysis of Table 3 shows the inadmissibility of a pessimistic prognosis, which leads to a 96.6 and 88.9 percent utilization of the labor resources respectively by five-year periods on the whole throughout the production sphere.

Let us now turn to an analysis of variants 5-8, in which the actual reduction in the labor consumption norms comprises 2 percent. First of all, it is necessary in this case to individually study two variants without any error in prognosis: those with full and with partial interchangeability of the intermediate products consumed in the production of PNN, since only the initial information for the base variant was balanced. The low number of coordination iterations does not allow us to achieve balance in the plan with imbalance of the initial data. The shortage of products leads to a reduction in the indicators for variant 6 as compared with the previous one. The drop in the actual rate of reduction in labor consumption leads to a 34.4 point reduction in the level of national income over the ten year period for variant 5 as compared with the base variant and a 38.6 point reduction in variant 6, i.e., the growth in the national income is only about half for the ten year period. The character of dynamics of PNN output is analogous. An optimistic error in the prognosis (variants 7 and 8) leads to further worsening of the economic indicators.

The transition from the base variant to variants with a 2 percent actual rate of reduction in labor consumption leads to a reduction in the capacities use factor as a result of increased intensity of the balance of labor resources. While in variants 5 and 7 the application of labor resources in the productive

sphere does not drop below 99 percent, the application of capacities with an optimistic prognosis drops to 90.4 percent in the second five-year period, which is evidence of significant over-accumulation.

From an analysis of Table 4 we can see that the portion of productive capital investments in the national income depends primarily on the prognosis of dynamics of labor consumption. This is most clearly manifested in the second five-year period, since in the first there are expressed limitations conditioned by the existing volumes of unfinished construction. In the second five-year period this portion comprises 19.8-23.1 percent with a 6 percent prognosis, 10.6-15.7 percent with a 4 percent prognosis, and 8.8-9.1 percent with a 2 percent prognosis. The introduction of fixed capital in relation to the capital investments is significantly higher when there is no error in the prognosis. The relation of the volume of frozen construction to the entire volume of unfinished construction is associated primarily with the actual rate of reduction of labor consumption and varies from 1.8-2 percent to 32.8-50.9 percent from the 1st to the 5th variants.[7]

Table 6 presents the structure of PNN production output in percentages. As we have noted, in the realized version of the model this structure was invariant and was defined by the plan.

The indicator for deviation in the structure of the output from the plan is given in the last line for each variant and five-year period. The sum of deviation moduli for individual products has been selected to yerve as this indicator. It is evident from Table 6 that the deviations are significant only for variant 7.

Based on an analysis of results of the first series of experiments on the proposed IS, we may draw the basic conclusion that it is necessary to increase the requirements for the quality of prognosis of the initial plan compilation point. Under these conditions, even rather significant expenditures which contribute to an increase in the accuracy of the prognosis are justified if they lead to an improvement in the quality of the plans and ultimately -- to a growth in the effectiveness of the functioning of the socialist economy. However, we believe that such an expansion in expenditures for prediction must be accompanied by the creation of a system of incentives and responsibility for the accuracy of the predictions.

FOOTNOTES

1. For more details see [3].

2. The IS also provides for computations of the average-term plan on the basis of a detailed dynamic intersectorial balance. Their result is examined as a standard condition, deviation from which is caused by incomplete information, errors in predictions of dynamics of macroeconomic indicators, insufficiently effective management mechanisms, etc.

3. The presence of only short-term (annual) credit in the IS does not signify the absence of other terms of crediting. Long-term credit is examined as a sequential series of annual credit extension.

4. The volumes of unfinished construction may be coordinated, for example, with the capacities for the beginning of the simulated period and by the given growth in labor productivity. In other words, first the problem of average-term planning is solved with limitations only in terms of labor and with known growth of its productivity. Then the volumes of unfinished construction are computed in accordance with the obtained decision.

5. Reference is made to production stockpiling.

6. This variant is not included in the table.

7. Computations were not performed according to variant 4, since it was clear that a pessimistic prognosis gives very low indicators of production capital construction.

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BETTER MANAGEMENT OF NORTH, FAR EAST DEVELOPMENT URGED

'Far East' Program

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 9

[Article by Academician N. A. Shilo, chairman of the Presidium of the Far Eastern Scientific Center of the USSR Academy of Sciences: "Let's Assure the Complete Development of the Far East"]

[Text] With each new five-year plan the Far East has been playing a larger and larger role in the development of our country's single national-economic complex. The Far East is the most extensive of all our country's economic regions and occupies more than one-fourth of the territory of the USSR. It includes Maritime and Khabarovsk krays, Amur, Kamchatka, Magadan, and Sakhalin oblasts, and Yakutsk ASSR.

The direction of the development of the productive forces, to a considerable degree, is determined by the needs that the other regions of the country have for output the production of which is unique in the Far East or which is distinguished by high technical-economic indicators. The basic national-economic specialization of the Far East is for shipments of raw materials for nonferrous metallurgy -- for individual types, from 14 to 100 percent; output of the fishing industry -- more than 40 percent; and the timber industry -- approximately 9 percent. The percentage of these branches in the region's industry is more than twice their share in the industry of the USSR as a whole. Approximately 13 percent of the cargo turnover in oceangoing transport is provided for here.

In conformity with our party's economic strategy, which was defined by the 25th and 26th congresses and the subsequent Plenums of the CPSU Central Committee, the Far East has been called upon to play in the future a significant role in the nationwide division of labor.

"Far East" Program

The economic potential of the Far East has been growing at high rates. During the time that has elapsed since the adoption of the decree of the CPSU Central Committee and the USSR Council of Ministers concerning the measures for developing the productive forces of the Far Eastern Economic Region and Chita

Oblast in 1967, the volume of industrial output and the production of agricultural products have increased by a factor of 2-3. The growth was provided chiefly by means of increasing the labor productivity. Something that served as a powerful impetus for economic progress was the Baykal-Amur Mainline.

In order to determine the long-range prospects for the development of the Far Eastern Region, the "Far East" comprehensive target program for economic and social development was developed. That program provides for a considerable increase in the region's role in the country's national-economic complex. In this regard the program is aimed at eliminating a number of negative factors that hinder the accelerated development of the economy of the Far East. In the structure of the economic complex they are: the lagging behind of a number of very important infrastructural branches, capital construction, transport, and the fuel and energy complex, especially in the areas where Pioneers are assimilating the land. There is still a large lack of conformity between the products list in the output being produced and the region's needs in the branches of the subsidiary and service complex, machine-building, and ferrous metallurgy.

In the area of the use of the region's resource potential, one sees the effect of the lag in the development of the processing production entities, and this has been leading to considerable losses of beneficial components of ore-type raw materials.

Power engineering is one of the most important branches in the Far East. The overall consumption of fuel and energy resources and the products resulting from their processing increased during the past ten-year period by a factor of 1.5; the production of electrical energy, a factor of 2.2; and the production of heat, by a factor of almost 2. As a result of the intensive growth in the consumption of energy resources, the existing capacity reserves have been exhausted. It is planned to carry out the accelerated development of the branch by completing the construction of thermal electric-power plants in Khabarovsk, Komsomolsk-na-Amure, Blagoveshchensk, and Petropavlovsk-Kamchatskiy, and the Kolymskaya GES. It is also planned to achieve the maximum acceleration of the activation of the first units at the cascade of the Bureyskaya GES's, to extend the construction of new TETs [heat and power plants], the second phase of the Neryungrinskaya GRES, Vilyuyskaya GES-3, and Yakutskaya GRES-2 operating on gas. The energy potential will be increased by the expansion and remodeling of a number of existing electric power plants.

The rapid growth of the productive forces requires not only the intensified development of the coal industry, but also the search for new energy sources. In this regard, measures that appear to be effective are the development of an oceangoing petroleum-gas complex; the active use of the energy in small rivers; the creation of hydroelectric-storage plants; and the broad use of nontraditional renewable sources of energy -- geothermal, wind, and tide.

The remoteness of the region from the center of the country, the territorial dispersion of the industrial complexes and the inhabited points, and the increasing role of the Far East in foreign-economic ties predetermine the special importance of all types of transport. However, during the past three

five-year plans that branch had lower rates of development than the other branches of the region's national economy. For example, the total tonnage of the river fleet quadrupled, but the total length of the berth lines and the extent of their provision with technical means increased by a factor of only 1.5. The total length of railroads in the region increased by 20 percent, but the freight turnover, by a factor of 2.5.

For purposes of the accelerated development of the transport complex, the program plans, in particular, the conversion of the Northern Sea Route on its eastern sector into a year-round transport artery, and the carrying out of measures for the optimal interaction among individual types of transport, especially at the terminals in Khabarovsk, Vladivostok, Nakhodka, and Sovetskaya Gavan.

A Thrifty Approach to Natural Resources

A problem that deserves the most careful attention is the problem of the accelerated development of the branches of nationwide specialization, especially the mining industry in combination with the processing enterprises for the most complete extraction of nonferrous metals. It is high time to accelerate the remodeling of the Iul'tinskiy Mining and Concentration Combine and the construction of a mine in Svetl'yy in Magadan Oblast, to activate more rapidly the Lermontovskoye prospecting and operational enterprise in Maritime Kray, to carry out the construction of new capacities at the Solnechnyy Mining and Concentration Combine in Khabarovsk Kray, and to exploit the promising deposits in Yakutia.

An important step in the reinforcement of the raw-materials base is the assimilation of the resources of the BAM [Baykal-Amur Mainline]. During recent years there has been extended assimilation of the timber resources in the BAM zone, and the activation of the existing capacities for the production of woodpulp, cardboard, lumber, technological chips, and furniture.

At the same time, for the development of the timber complex on a qualitatively new basis, only the first steps have been taken so far. On those areas where timbering operations are under way, more than one-third the volume of the wood raw materials that have been felled remains standing. The waste products at the timber camps and timber processing plants are almost unused.

The further development of the timber industry of the Far East requires the improvement of the branch structure, the correct computations of the productivity of the timber areas to be felled, and the accelerated development of the chemical and chemical-mechanical processing of the wood. It is necessary to reorient timber processing toward technological schemes that allow the broad use of deciduous species, low-grade wood, and waste products.

A question that continues to be a vitally important one is the question of improving the placement of the enterprises in the timber industry. At the present time the basic production is carried out in the southern and central parts of Amur Oblast and Khabarovsk Kray, while the very rich resources in the northern territories are practically unused.

Developing the Far East's Own Base

A factor of very great importance for the technical re-equipping of production and the resolution of strategic tasks in the economy is machine-building. The orientation of the branch toward the satisfying of the country's needs, and the placement of production which has occurred, frequently cause inefficient shipments. There is a high share of shipments of individual types of articles outside of the region, whereas the region's own needs for the output of machine-building are not being completely satisfied.

To a large extent this situation developed because of the fact that the metallurgical base so far can satisfy less than one-fourth of the region's annual needs for rolled metal. More than 2.1 million tons of metal output are shipped into the Far East from other parts of the country. This leads to considerable transportation expenses -- as much as 32-35 million rubles a year.

The existing computations attest to the high national-economic effectiveness of the development of a ferrous-metallurgy base in the Far East on the basis of the local raw-materials resources. However, even the remodeling of the Amurstal' Plant and the construction of a new plant in Komsomolsk-na-Amure will be able to guarantee no more than 50-60 percent of the region's needs. It would seem that the development of ferrous metallurgy in the Far East should be carried out on a fundamentally new basis -- with the use of the method of continuous casting and the stamping of a broad variety of parts by using the schemes which were developed by VNIImetmash [All-Union Scientific-Research and Planning-and-Design Institute of Metallurgical Machine-Building] and USSR Academy of Sciences and which are already being partially employed at the Chelyabinsk, Tula, and other plants. The construction of such enterprises with low capacity and high effectiveness will fundamentally change the existing situation in machine-building and will make it possible to save billions of rubles and as much as 40 percent of the metal, and will lead to a large economizing of labor resources.

Complicated problems will have to be resolved in the area of the agroindustrial complex, which includes 22,000 enterprises. At the present time its basic link -- agriculture -- is poorly developed. At the beginning of the current five-year plan, the production of vegetables and potatoes in the Far East per inhabitant was two-thirds of the average for the RSFSR; meat, 62.5 percent; and milk, two-fifths. Therefore, within the very near future we shall face the task of expanding the Far East's own production base.

Scientific Potential

The harmonious development of the productive forces of the Far Eastern Economic Region according to the optimal scheme planned by the "Far East" program requires a special approach to the development of science. With the creation of the Far Eastern Scientific Center of the USSR Academy of Sciences, this process took on a purposeful systems-type nature. At the present time the region has 127 scientific-research institutions and planning-and-design organizations, including 39 scientific-research institutes -- 21 under the Academy of Sciences and 18 branch institutes.

The forthcoming stage in the complete assimilation of the region requires the development of science on a qualitatively new level, and the increasing of the national-economic effectiveness of the research being carried out. This cannot be achieved without the reinforcement of the scientific-technical potential and the considerable increase in the percentage of the capital investments for computer and research technology and for experimental production.

For the rapid continuance of the target-program planning of research and development, it is necessary to resolve the question of granting to the Far Eastern Scientific Center of USSR Academy of Sciences the legal right to coordinate and monitor the development of comprehensive target programs.

All the mentioned problems were dictated by the requirement of the day. They cannot be overlooked if one wishes to take into consideration the multilevel nature and complexity of administering such a large-scale national-economic complex as the Far East.

Baykal-Amur Zone

Moscow SOVETSKAYA ROSSIYA in Russian 5 Jul 84 p 2

[Article by V. Chichkanov, corresponding member of the USSR Academy of Sciences, director of the Institute of Economic Research, Khabarovsk, under rubric "BAM [Baykal-Amur Mainline]: Problems of Assimilation": "Take the Wealth of the Taiga Territory"]

[Text] It is well known that the BAM [Baykal-Amur Mainline] is not only a new mainline. It is a new stage in the development of the economy of our country's eastern regions. Already one sees growing alongside the railroad large-scale inhabited points for lumbermen, miners, and hydraulic power plant builders. Those places are becoming the base points for the broad assimilation of the rich land areas in the mainline zone.

Far Eastern geologists have prepared a map of the mineral resources in the Eastern part of the BAM. That map is literally covered with conventional symbols. A total of more than 20 different types of mineral raw materials have been located here. The deposits that are especially numerous are the iron-ore deposits -- there are approximately one hundred of them with total geological reserves of more than 60 billion tons -- as well as deposits of stone and brown coal, the reserves of which have been estimated at 64 billion tons. The region has large quantities of nonferrous and noble metals, phosphate raw materials, and building materials. And it is as though Mother Nature herself worried about the convenience of their complete assimilation, so she situated most of the deposits like "bouquets" alongside the mainline.

On our planet one can rarely encounter such a unique combination of mineral resources as have been prospected in South Yakutia, especially for creating a ferrous-metallurgy base. The Aldan Gold-Bearing Province is also situated here.

The Selpgdarskoye apatites deposit is a very large one with regard to reserves and has the highest content of phosphorus pentoxide. Each of the deposits in Kholdomi Valley in the mining Komsomol'skiy Rayon represents an entire galaxy of valuable minerals -- tin, copper, lead, zinc, tungsten, bismuth, molybdenum, etc. And with regard to the extent, for example, of the tin reserves that have been established and its geological prospects, this region is on a par with the most important worldwide deposits. Right alongside of it the geologists recently discovered yet another deposit of tin -- the Badzhal'skoye deposit. The rails of the BAM run along its northern border. That considerably facilitates access to the subterranean treasure houses.

The comprehensive and complete study of the resources near the BAM, essentially speaking, is only beginning, inasmuch as there had previously been no realistic prospects for their industrial development. The taiga village of Ust-Nyukzha, since the arrival of the mainline here, is being converted into a large-scale populated point. A very large deposit of iron ore has been prospected nearby. In the future it is possible that it can serve as the base for the creation of large-scale metallurgical production.

In the near future the BAM will open the way to the wealth of yet another important Far Eastern region -- the Okhotsk area, to which there are not yet any reliable or permanent transportation approaches. Reserves of iron ore have also been located here, as well as phosphorites, nonferrous metals, ore-type chemical raw materials, semiprecious stones, and stone for various construction uses.

The words of a certain song state that, for every person living here, there are 100,000 trees. I shall make no attempt to judge the accuracy of that figure, but the zone that is adjacent to the mainline is truly a boundless ocean of taiga. The Eastern Sector of the BAM alone has one-fifth of the total timber resources of the Soviet Union. That comes to 4 billion cubic meters of wood. Of that amount, more than half the trees are conifers, that is, the most valuable species of trees.

Our institute has already prepared a comprehensive program for assimilating the Eastern Part of the BAM for the period until the year 2000. In its most general form, its purpose can be formulated as follows: the creation in the Far East of a new industrial belt. In particular, it is planned to increase by 35 million tons the production of stone coal, by building new mines and cuts, to create a large-scale metallurgical base with a complete technological cycle, and to establish 14 additional lumber camps.

Increased interest in the natural wealth of the BAM has been shown by foreign countries, particularly the countries in the Pacific basin, which are known on the international market as large-scale consumers of mineral and timber commodities. Already the territory that is adjacent to the mainline provides for a considerable part of the export of logs, technological chips, solid fuel. . . The completion of the building of the mainline will open up broader opportunities for the participation of the economy of the Far East in the foreign-economic ties of the Soviet Union. Speaking in figurative terms, the steel threads of the mainline, like outstretched hands, will carry the natural wealth of the region to the ports of the Pacific Ocean coast.

For Japan, the United States, Canada, and certain other countries the BAM is of great importance as a convenient and profitable route for shipping large-capacity containers over the territory of the USSR to Europe and back. By concluding an agreement governing shipments over the mainline, those countries will reduce by several days the amount of time needed for their shipments and will receive a substantial cost saving as compared with oceangoing freight costs.

The construction of the BAM has not yet been completed, but it has already begun to pay for itself. More than 20 lumber camps are operating in the Eastern Part of the mainline. A large-scale woodpulp and cardboard combine is operating here, and coal pits are producing more than 4 million tons of fuel. More than 30 million tons of freight have been shipped already over the existing sectors of the route.

The BAM zone, we have been convinced, has a large future. However, for the successful assimilation of this region it is necessary to resolve several urgent problems. As everyone knows, it is planned to create here territorial-production complexes (TPK) and industrial centers. Seven such structural units are supposed to spring up in the Eastern Sector of the BAM. Scientists will have to work out the forecast directions for the development of the territorial-production complexes, and prepare a scheme for supplying electricity to this zone. Among the group of questions, probably the most important place is occupied by the geological and economical evaluation of the resources of minerals and other raw materials, and the substantiation of the methods of producing and concentrating them. Because the mining industry is one of the most labor-intensive branches. Special attention has to be paid to the reduction of the losses of mineral resources that remain deep within the bowels of the earth or that are thrown on the waste heaps. It is also important to use not only the ores, but also the minerals that are associated with them. The assimilation of the rayons adjacent to the mainline would be inconceivable without the creation of a construction complex. But its appearance, in turn, must be preceded by the resolution of many urgent tasks. They include the development and introduction of technology made in models for use under northern conditions, the share of which is very small here. It is important to reject the simple copying of schemes that were developed in the more assimilated regions of the country; the construction processes must be carried out with the maximum degree of industrialization and with the application of prefabricated plant-produced elements.

The economic assimilation of the Eastern Zone of the BAM largely depends upon the existence of the necessary number of working hands. But where are they to be found? The number of permanent residents here is extremely small. Consequently, it is already urgent to resolve the questions of attracting and keeping skilled specialists: it is necessary to build well-made, comfortable housing, to create a well-developed network of everyday services, and enterprises to meet cultural needs. It is also necessary to strive for a situation in which all this is a class higher than in the well-populated areas of the country.

Obviously, with the activation of the new mainline many of the transportation questions will be removed from the agenda. Nevertheless the creation of permanent highways alongside the mainline track will remain one of the most vital tasks. It is well known that a considerable amount of the freight in the northern areas is shipped by trucks. At the present time unimproved and temporary winter roads are used for this purpose and this speeds up the wear and tear on the equipment by a factor of 3 to 5.

When resolving the large-scale economic problems, we must also remember the protection of the environment in this region. The territory through which the mainline runs is very vulnerable in the ecological sense. When choosing the technological processes, it is necessary to evaluate them first of all from this point of view. Practical life shows us that it is more profitable to spend money not to combat the consequences of the pollution of the natural environment, but rather to invest that money in the development of new, ecologically clean technological schemes.

I would like to direct attention to yet another important circumstance. When assimilating the new territories it is necessary to think a bit about how to avoid the disproportion that has arisen in the Far East between the development of branches and the entire economy in the region. In practice, this ends in the naturalization of the economy. Every branch attempts to concentrate everything that it needs -- from repair shops to the production of electrical energy. Unfortunately, this tendency is also noted on the BAM. . .

Recently I happened to make another visit to the Eastern Sector of the mainline. It is already carrying ore, timber, coal. A lot has been produced in the areas that are adjacent to the railroad. But this is only the beginning. The consistent and thrifty resolution of the tasks that were mentioned here will make it possible to make complete use of all the opportunities offered by this very promising region.

Far North Development

Moscow SOVETSKAYA ROSSIYA in Russian 24 Aug 84 p 3

[Article: "Complete Development for the North: At the Commission for Science and Technology, RSFSR Supreme Soviet"]

[Text] Recently the Commission for Science and Technology, RSFSR Supreme Soviet, held a meeting at which there was a discussion of the questions of the further economic and social development of the rayons in the North of the RSFSR, the intensification of the scientific research on the problems of that region, and their coordination. The basis of that discussion was provided by materials from a polar expedition carried out by the SOVETSKAYA ROSSIYA newspaper from November 1982 through July 1983. Reports were given by commission chairman, Academician S. V. Vonsovskiy and the expedition leader, Associate of the Institute of Economics, Urals Scientific Center of the USSR Academy of Sciences, S. A. Solov'yev. The participants in the discussion of the question being discussed included deputies -- scientific, party, Soviet, and economic workers.

In the decision that was adopted, it is noted that, in conformity with the documents of the 26th Party Congress and the subsequent Plenums of the CPSU

Central Committee, in the 11th Five-Year Plan one continues to observe in the rayons of the North the development at ever-growing rates of industrial and agricultural production, as well as social and cultural construction. This area produces a large quantity of petroleum, gas, valuable pelts, and fish. The North is already exerting a substantial influence upon the increase in social production in the country and is a strategically important region for the further development of the economy.

At the same time the practical aspects of socialist construction in the rayons of the North, the critical comments and recommendations arriving at the commission during the course of the preparation of the question, and the results of the work performed by the polar expedition of SOVETSKAYA ROSSIYA indicate that the management methods that have become established here do not always take into consideration the specific aspects of the natural-climatic and socioeconomic conditions, and there have been serious shortcomings in the planning, administration, and coordination of the activities of the union and republic ministries and departments. This has been leading to definite disproportions in the development of the national economy, restraining the assimilation of the natural resources and productive forces of the Northern Zone, and causing an overexpenditure of financial, material, and labor resources.

The commission noted that a detrimental effect upon the rates of socioeconomic development of the northern rayons and upon the increase in the effectiveness of production has been exerted by the poor rate of coordination of the branch plans of the ministries and departments, as well as the insufficient attention paid by the soviets of people's deputies and the economic managers to the construction of housing and structures designed for cultural and everyday purposes, or to the provision of medical services. In a number of places the use of the public housing fund, including the development of the water-supply network, the supplying of hot water, plumbing, etc., has been lagging behind.

The local soviets of people's deputies, the economic agencies, and the managers of enterprises are not yet paying the proper attention to questions of protecting the environment. This has been leading to the destruction of forests, rivers, lakes, the soil and vegetation cover, and the fauna, and to the pollution of the air. The North continues to receive equipment that fails to take into consideration the peculiarities of the natural environment, which is typified by excessive vulnerability and easy destructibility.

Despite the considerable number of scientific institutions that engage in problems of the North, there is very poor coordination among them. In a number of instances, research projects duplicate one another, there is a predominance of shallow topics, and the scientific return produced by many of the institutes is insufficient.

The commission established that, taking into consideration the special national importance of the accelerated assimilation of the rayons of the North and the need to take effective steps to change the methods of administering the process of developing the productive forces and the social and cultural construction in this area, it would request the RSFSR Council of Ministers to consider the question of the further economic and social development of the

rayons of the North, the increase in the activity rate of the scientific research on topics pertaining to the North, and the intensification of their coordination.

It has been recommended to the Councils of Ministers of the autonomous republics, and to the executive committees of the kray, oblast, and okrug Soviets of People's Deputies, that they improve the management of economic and social-cultural construction, guaranteeing the comprehensive nature of the economic social development of the rayons, cities, and inhabited points situated in the Northern zone. It has been recommended to the RSFSR ministries and departments that have enterprises and organizations here, and that also produce output for use on this territory, that they intensify their monitoring of the fulfillment of the planned assignments, guaranteeing their prompt fulfillment with a consideration of the recommendations made by the executive committees of the local Soviets.

The commission recommended to RSFSR Ministry of Agriculture, jointly with the presidium of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin] and its branches, and with RSFSR Glavokhota [Main Administration of Hunting and Game Preserves], that they accelerate the elaboration of a scheme for the development of agriculture and of hunting and trapping in rayons of the North for the period until the year 2000, having in mind the guaranteeing of the maximum satisfying of the needs that those rayons have for the difficult to transport agricultural output by relying instead on that which is locally produced.

A request was directed to USSR Gosplan, GKNT [State Committee for Science and Technology], the USSR Academy of Sciences, and RSFSR Gosplan to provide for the expansion of the volume of the research dealing with problems of the North, to reinforce the scientific subdivisions with skilled cadres, and to work out specific steps for intensifying the coordination of the research, primarily that dealing with the most important topics, and to specify the lead organizations that are to be responsible for developing them.

The commission requested the USSR Academy of Sciences, GKNT, and USSR Goskomizdat [State Committee for Publishing Houses, Printing Plants, and the Book Trade] to consider the question of organizing the periodical publication of the scientific-production magazine SOVETSKIY SEVER.

Taking into consideration the work experience of the northern expedition that had been organized by the Urals Scientific Center and the editorial office of SOVETSKAYA ROSSIYA, the commission recommended to USSR Academy of Sciences and GKNT that they organize, within the system of the Urals Scientific Center of the USSR Academy of Sciences, a permanent expedition dealing with research on the socioeconomic problems of the North.

It was recommended to the editorial board of SOVETSKAYA ROSSIYA, jointly with the Siberian Branch and the Urals and Far Eastern Scientific Centers of USSR Academy of Sciences, and other scientific institutions, that they conduct joint expeditions to the European North, the Northern and Polar Urals, Siberia, and the Far East.

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'INTENSIFICATION-90' PROGRAM DETAILED

Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 84 p 6

[Article by I. Glebov, academician, scientific director of "Intensification-90" territorial-branch program, Leningrad: "The 'Intensification-90' Program"]

> [Text] As has already been reported, the CPSU Central Committee has considered and approved the experience gained in the work carried out by the party's Leningrad Oblast Committee to intensify the economy in the 12th Five-Year Plan on the basis of the acceleration of scientific-technical progress. The decree that was enacted mentioned the importance that the territorial-branch program adopted by the Leningraders has as an effective form of implementing the decisions of the party's 26th Congress and the fundamental principles dealing with the basic directions in our country's economic development for the 12th Five-Year Plan and the long-term period, which were advanced by Comrade K. U. Chernenko.

The territorial-branch program for the intensification of the economy of the city of Leningrad and of Leningrad Oblast for 1985 and the 12th Five-Year Plan, which has been given the name "Intensification-90", poses the task of the substantial rise in the rates of economic growth on the basis of the better use of the scientific-technical and production potential that has been created, primarily on the basis of the broad introduction of computer technology.

The program consists of eight sections:

-- fundamental and applied research;

-- industry;

-- urban management;

-- construction;

-- transport;

-- communication;

-- oblast management and agroindustrial complex;

-- training and retraining of cadres.

The primary place in the program has been assigned to the development of the fundamental research and development in the field of the creation of modern technology and technological schemes. The efforts of the organizations in the Academy of Sciences and the institutions of higher learning and the branch and departmental organizations are concentrated in this area. The responsibility of heading and coordinating their activities has been given to the Leningrad Scientific Center of USSR Academy of Sciences.

Integrated Production Complexes

The research projects that have been planned have the purpose of resolving the basic questions pertaining to the creation and development of integrated production complexes (IPK), flexible production systems (GPS), automated scientific-research systems (ASNI), systems for the automation of planning (SAPR), automated computer networks, and computer centers designed for collective use, including their apparatus, program, and information support.

In the integrated production complex all the research projects are carried out with the broad use of computer technology. The creation of specific articles, assemblies, and parts is carried out with the aid of systems for the automation of planning. The SAPR makes it possible to carry out a fundamental change in the labor performed by the designer, freeing him from the traditional drafting instruments and putting at his disposal a graphic display and electronic means for inputting and outputting graphic information. The electronic computer gives the construction planner the ability to obtain any of the initial materials, and to carry out all the computational tasks.

The results of the planning are transmitted to another automated system -- the system for the technological preparation of production, which helps the technologist and which largely replaces him. At this stage a determination is made of the equipment and cutting tools, the blanks and billets, and the operational modes for processing them. This information is the initial data for the system of controlling the flexible automatic equipment, which system provides for the transporting of the materials, parts, and cutting tools, their storage, accounting, and control; adjusts, monitors, and controls the basic and auxiliary equipment, and guarantees its even work load and high productivity.

The integrated production complex, as has been indicated by computations, is twice as effective as the disconnected automated systems and means of mechanization. Thus one will be able to reduce the need for industrial-production personnel by almost 100,000 persons.

By relying on the scientific-technical backlog that has been created since the beginning of the 11th Five-Year Plan, it is possible, as early as 1984-1985, to obtain results that make it possible to create and introduce in industry, the urban management, transport, communication, and the agroindustrial complex

effective methods of planning integrated automated systems, and to recommend a number of standard resolutions pertaining to the apparatus, program, and information support of the integrated production complexes, flexible production systems, automated control systems, and computer-information networks. A number of the tasks to be resolved by the program were resolved during the creation and introduction in 1983 of flexible production systems at enterprises in our region.

In 1986-1990 it is planned to carry out a series of projects aimed at the development of integrated production complexes and multilevel automated control systems, the guaranteeing of their effective functioning, and the creation of a scientific-technical backlog for the planning, introduction, and broad application of integrated production complexes during the subsequent ten-year period.

Remodeling and Technical Re-equipping

What manpower and funds are being put into action to implement the program?

There will be an intensification in the use of computer technology through the entire cycle "research to development to preparation of production to production of articles." It is necessary to emphasize that for all its dynamic nature and its direction toward the highest level of scientific-technical progress, the program does not require any stupendous new construction. The reorganization proceeds within the existing production entity, and approximately 80 percent of all the funds will be directed primarily toward remodeling.

At the present time projects are already being carried out in Leningrad to automate production on the basis of the introduction of the latest technological schemes, robot-technology complexes, flexible production systems, and other progressive types of equipment. There is also a considerable pool of industrial robots, machine tools with digital programmed control, and automatic lines.

It is especially necessary to mention the creation at Leningrad enterprises of the first five flexible automated production systems and integrated production complexes, which have made it possible to automate the technological processes of machining, the billet operations, and the production of radio parts. This is a fundamentally new stage in the development of integrated systems for the automation of production, inasmuch as not only the technological processes have been automated, but also the planning and the technological preparation of production.

The implementation of the "Intensification-90" program will make it possible for the Leningraders, by the end of the next five-year plan, to achieve stable average-annual rates of increase in labor productivity in the amount of at least four percent, and in machine-building and metal-working, more than five percent.

Problems of the City and the Oblast

Several basic directions that guarantee the greatest benefit to the national economy and the greatest freeing of labor resources in the urban management have been adopted. We have in mind the development and introduction of robot-technology complexes and flexible production systems at the industrial enterprises of the executive committee of Lensovet, the complex of automated systems for planning and the control of technological processes and production in the city services, and the improvement and development of the scientific-production base of the urban management.

For the purposeful creation and introduction of industrial robots and flexible production systems in the branches of the urban management, the organization of a robot-technology center in Leningrad has been planned.

As for the other sections of the program, they also contain measures for improving the control and automation of operations in the branches.

In particular, provision is made for the development of automated control of the loading and technological processes on all types of transport. In construction production and in the building-materials industry, broad introduction will be made of robots and manipulators that are intended to free people from heavy physical labor and work under hazardous conditions. The creation and introduction of automated systems of planning and control will make it possible to reduce the periods of time, reduce the cost, and improve the quality of construction.

Already the efforts of scientific collectives have been concentrated on the key problems of improving agricultural production which were defined by the Food Program, all the fundamental tasks of which have been taken into consideration in "Intensification-90."

Simply as a result of the preparation of foodstuffs and their sale in packaged form it is planned to free 25,000 persons.

More than 300 enterprises and organizations in 99 ministries and departments, and more than 600,000 persons, have been involved in "Intensification-90." In order to direct and coordinate their efforts, it is necessary to combine skillfully the principles of branch and territorial planning. We already have this kind of experience: all one has to do is to recall the contract signed by the 28 participants in the construction of the Sayano-Shushenskaya GES. and the regional "Energy" program.

Benefit Derived from Joint Actions

As a result of carrying out the "Intensification-90" program, by the end of the next five-year plan it is expected that there will be a reduction in the share of manual labor from 37 to 27 percent; a reduction in the production costs of many types of output by 5-7 percent; and an increase by a factor of 1.8 in the share of articles with the highest category of quality.

By 1990 four large-scale automated production entities will be creased, as well as approximately 300 automated shops, sectors, and lines, more than 1700 units of robot-technology equipment, and 89 systems for automated planning and preparation of production.

The coordinated version of the program was approved by a joint decree of USSR Gosplan, USSR State Committee for Science and Technology, and USSR Academy of Sciences, which decree requires the ministries and departments to stipulate in their plans the assignments of "Intensification-90" as a nationwide program and to provide the necessary resources on a first-priority basis.

The "Intensification-90" program makes it possible to combine the efforts of the party, Soviet, and economic agencies, and of scientists and specialists, for the achievement of high final results. An agency that has been called upon to play an important role is the Council of Economic and Social Development and of the Acceleration of Scientific-Technical Progress, under the CPSU Leningrad Oblast Committee. Similar councils exist under all the party's city and rayon committees. Thus, the entire system of administration represents the organic combination of party and economic leadership and profound scientific analysis, and is constructed on a single basis.

The principle that has been made the basis of the program -- the acceleration of scientific-technical progress, and primarily the development and improvement of electronic-computer means -- makes one of the central problems the training and retraining of skilled cadres. The efforts that have been concentrated in this area are not only those of the institutions of higher learning and the technicums, but also the efforts of the system of vocational and technical training and the secondary school system. The reorganization is already under way: in the institutions of higher learning, for example, certain departments are being shut down and other are being opened, on the recommendation of the city's council of directors of institutions of learning.

The implementation of the program has begun and, on the basis of specific results, one can call it a program of action. By relying on the accumulated experience, the labor collectives are introducing effective forms of the organization of production, and are assimilating the latest technology. But this is only the necessary foundation, the basis for taking the offensive. The program, by providing for the intensification of the economy during the 12th Five-Year Plan, establishes the rates for the even more accelerated growth in the longer view.

The approval by the Politburo of the CPSU Central Committee of the territorial-branch program for the intensification of the economy of Leningrad and of Leningrad Oblast inspires all Leningraders to win new labor victories.

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