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CONSTRUCTION SPECIFICATION PREPARATION WITHIN THE EDITSPEC SYST--ETC(U)
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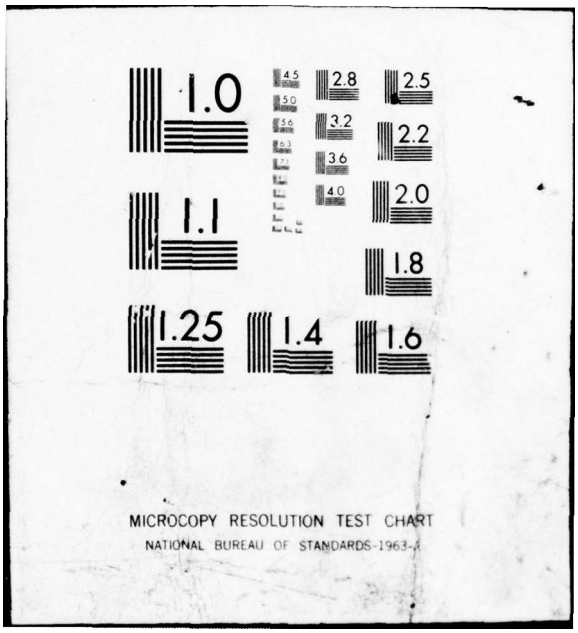
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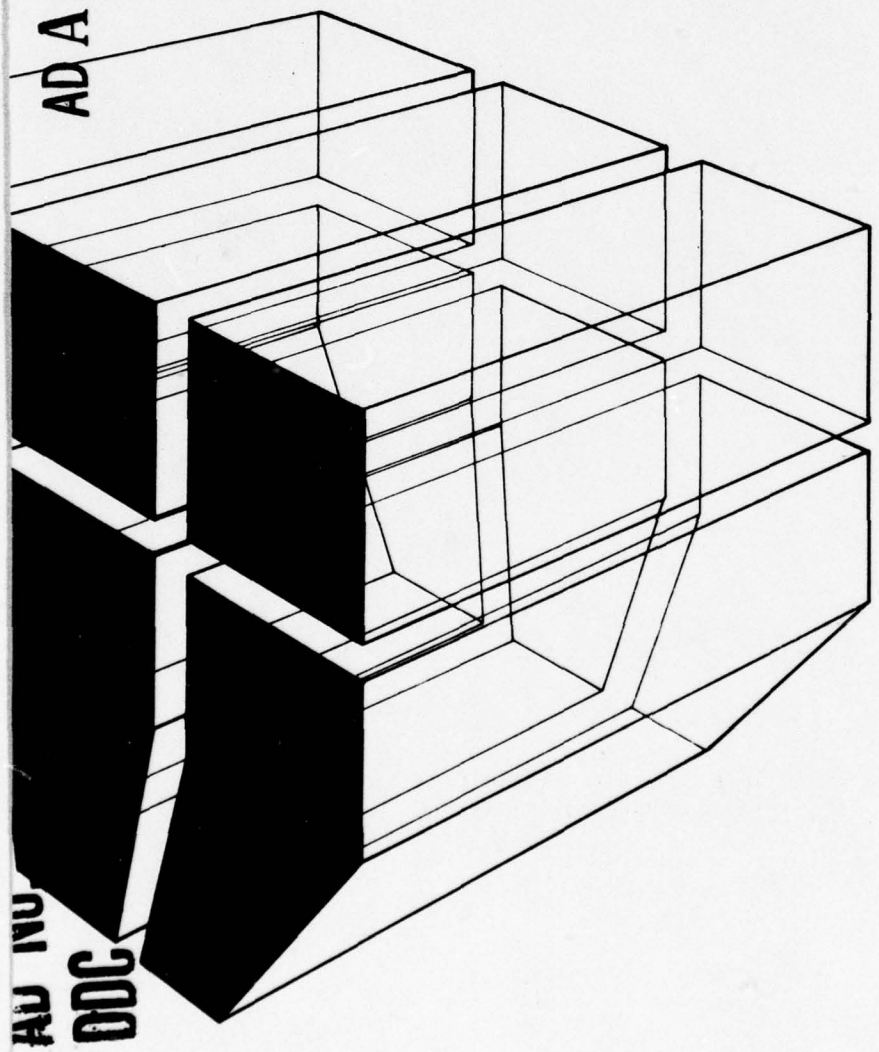
INTERIM REPORT P-84
September 1977
Computer-Based Specifications

AD A045183

CONSTRUCTION SPECIFICATION PREPARATION WITHIN THE EDITSPEC SYSTEM



by
Edgar S. Neely, Jr.

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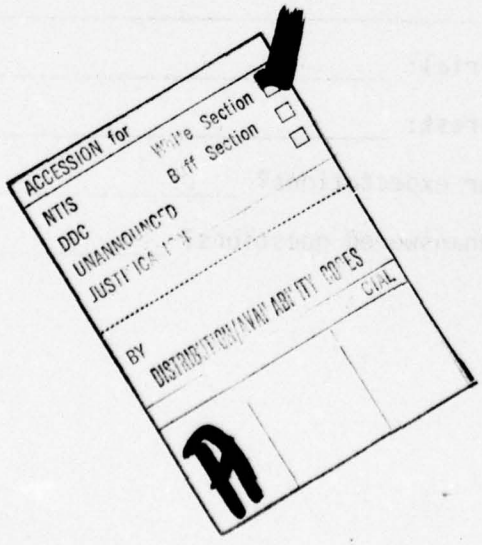

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report provides management personnel with a brief description of the computer-aided construction specification preparation system known as EDITSPEC. The Corps of Engineers' current construction specification preparation process is described, as are the basic capabilities of the EDITSPEC system. Application of the EDITSPEC system within the current preparation process is presented along with procedures for implementing the system in a Corps District specification preparation section.

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FOREWORD

This investigation was performed for the Directorate of Military Construction, Office of the Chief of Engineers (OCE), under Project 4A762731AT41, "Design, Construction, and Operation and Maintenance Technology for Military Facilities"; Task T1, "Development of Automated Procedures for Military Construction"; Work Unit 009, "Computer-Based Specifications." The applicable QCR is 1.10.001. The OCE Technical Monitor was William Darnell.

The study was performed by the Management Systems Branch (Dr. O. E. Rood, Jr., Chief), Facility Acquisition and Construction Division (Mr. E. A. Lotz, Chief), U.S. Army Construction Engineering Research Laboratory (CERL).

COL J. E. Hays is Commander and Director of CERL and Dr. L. R. Shaffer is Technical Director.

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FIGURES

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CONSTRUCTION SPECIFICATION PREPARATION WITHIN THE EDITSPEC SYSTEM

1 INTRODUCTION

Background

Although progress has been made in automating the preparation of U.S. Army Corps of Engineers construction specifications by the use of magnetic card and magnetic tape typewriters, automation has not reached the level possible with the current state of the art. To obtain further benefits from automation, the Office of the Chief of Engineers (OCE) requested that the U.S. Army Construction Engineering Research Laboratory (CERL) examine the Corps' current specification preparation process to determine the optimum automation procedures which should be used and, if necessary, to develop the methodology for those automation procedures found to be advantageous.

The result of this effort was development of EDITSPEC—an automated text editing system designed to produce construction specifications from guide specifications and to edit, format, and print such documents.

Objective

The objective of this research is to develop a computer-aided process and procedures for construction specifications preparation.

This report provides management personnel with an executive summary of the EDITSPEC system and its application within the Corps of Engineers' current specification preparation process.

Organization of Report

The last section in this chapter details the steps taken in determining the need for a new system. Chapter 2 describes the Corps of Engineers' current construction specification preparation process. The basic capabilities of the automated construction specification system known as EDITSPEC are presented in Chapter 3. Chapter 4 describes application of the EDITSPEC system within the current construction specification preparation process, and Chapter 5 outlines the procedure for implementing the EDITSPEC system in a specification preparation section.

Mode of Technology Transfer

The technology transfer will be accomplished in accordance with techniques for computer-assisted systems as defined in appropriate Army regulations.

Determination of Need for System

In studying use of automation in the preparation of construction specifications, CERL was required to consider such factors as the Corps' work sequences, processing operations, location of processing units, text updating intervals, and personnel requirements. In addition, the following constraints were imposed:

1. The system must be consistent with all Army regulations and policies. It must advance the science of automation of construction specifications and be coordinated with both industry and other Government agencies.

2. The system must be suitable for Corps-wide application and must be fully compatible with the concept of the Computer-Aided Engineering and Architectural Design System (CAEADS).

3. Systems for automated construction specifications being used by the National Aeronautics and Space Administration (NASA), the American Institute of Architects (AIA), the Construction Specifications Institute (CSI), and others outside the Corps of Engineers were to be considered to determine whether they provide the features required in Corps of Engineers operations.

CERL initially examined the operation of each Corps District and operating Division that prepares construction specifications for military projects. This examination was performed with full cooperation and evaluation by the chief and assistant chief of each specification section.[1]

In a cooperative effort, the CSI national organization, individual CSI members, and CERL determined the state of the art and future needs of the construction specification preparation community.[2]

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[1] E. J. Worrell III and E. S. Neely, Jr., *General Functional System Requirements for Computer Based Specification Preparation System—Version I* (U.S. Army Construction Engineering Research Laboratory [CERL], July 1973).

[2] E. S. Neely, Jr., *Specification Preparation Methods—State of the Art*, Technical Report P-46/ADA016919 (CERL, September 1975).

Huntsville Division performed a detailed cost analysis which compared the actual costs of preparing the same project specifications by electric typewriter, magnetic tape typewriter, and Word One computer methods.[3,4]

Several existing computer systems applied to produce construction specifications were examined and compared in detail.

Based on these studies, several alternative solutions were proposed and evaluated. The alternatives included using existing systems, modifying existing systems to meet Corps requirements, and developing and implementing a new system to perform Corps functions.

To determine the most cost-effective method of obtaining the Corps requirements, the proposed alternatives were submitted for competitive bidding to firms having prior experience in developing computerized construction specifications. The most cost-effective method was found to be development of a new system to meet the Corps requirements. EDITSPEC was developed in response to that determination.

2 THE CORPS' CURRENT PREPARATION METHOD

Management

Introduction

Four basic categories of resources must be managed throughout the specification preparation process: (1) personnel, (2) construction specification documents, (3) finances, and (4) equipment. The interrelationships among these resource categories must also be managed. The following sections describe the current management of each of these resources and their interrelationships.

Personnel Management

Several organizational elements may be involved in the specification preparation process. Such organizational elements may include OCE, a Division, a District, and an architect/engineer firm. These elements are linked by a chain of command: the architect/engineer firm is responsible to the District office, which is responsible to the Division office; the Division office is in turn responsible to OCE.

Each organizational element is subdivided for effective personnel management. For example, one subdivision of a District could be a military construction office. A subdivision of the military construction office might be a design division, which could have the specifications and estimating branch as one of its elements. This branch might be divided into the specifications section and the estimating section. The specifications section could have project teams, each composed of several individuals. Figure 1 shows this chain of command.

Personnel are defined as either management supervisors of other personnel or nonsupervisors. The chief of each element is responsible for the activities of the element, but he/she may delegate authority to others in the chain. The chief of an element directly supervises the personnel directly beneath him/her in the chain of command, but exercises no control over personnel in other portions of the organization. For example, the chief of the project team has no control over personnel in the estimating section.

Document Management

A construction specification is normally composed of a number of divisions. Each division is further divided into sections, as shown in Figure 2.

Financial Management

Financial management is usually performed on an account basis. Each account may be subdivided into smaller accounts as shown in Figure 3.

Equipment Management

Mechanical equipment required to produce construction specifications must be managed so that it is used as efficiently as possible within the office.

Personnel–Document Access Management

Certain personnel are assigned the responsibility of writing a specific portion of a project specification. Other personnel are assigned the responsibility for reviewing that portion, as shown in Figure 4.

The writers prepare the section. The reviewers then review it and give their comments to the writers, who

[3] E. J. Worrel III, *Computer Based Specification Cost Analysis Study Procedures* (CERL, February 1973).

[4] U. R. Poskus, *Computer Based Specifications: Cost Analysis Study*, Technical Report P-25/AD786551 (CERL, August 1974).

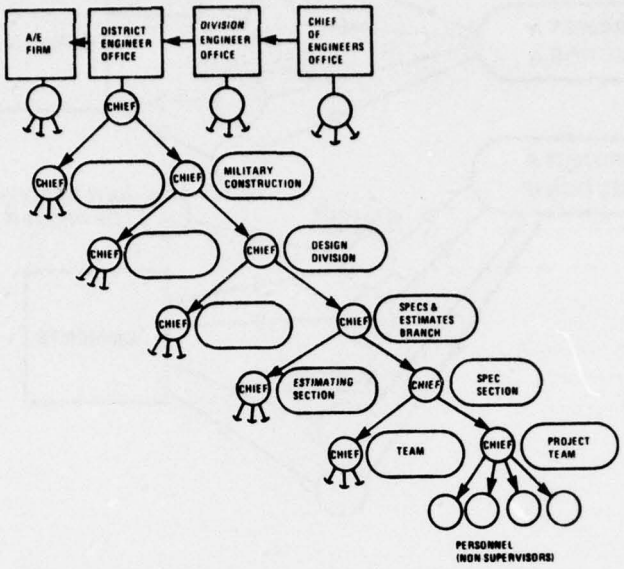


Figure 1. Personnel management.

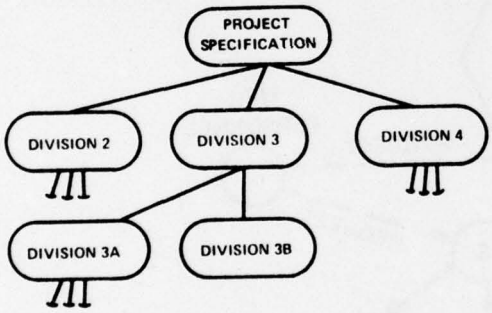


Figure 2. Project specification management.

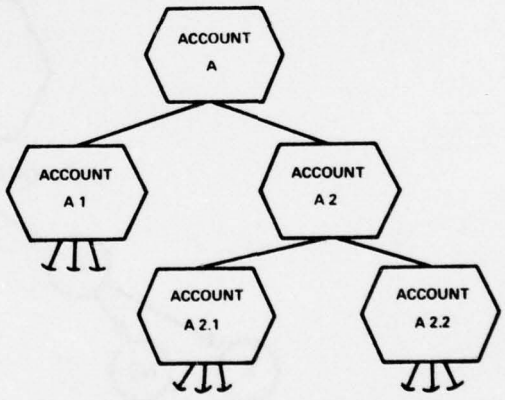


Figure 3. Financial management.

revise the section based on the comments. This process continues until both the writers and reviewers are in agreement.

Personnel–Financial Management

Specific personnel are assigned the responsibility of managing the finances of an account. Other personnel are given permission to charge work activities against the account, as shown in Figure 5.

A supervisor may delegate charging authority to other personnel under his/her supervision. Access by new personnel must be obtained from a supervisor having account access.

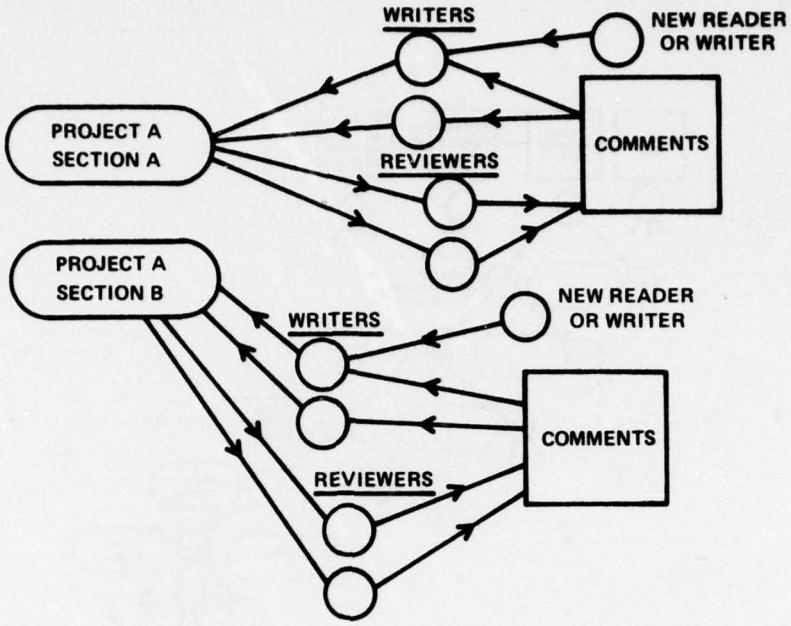
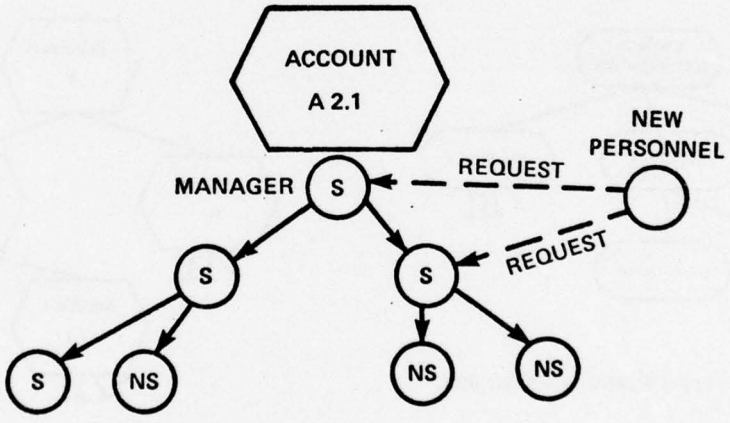


Figure 4. Personnel–document access management.



S = SUPERVISOR
NS = NON-SUPERVISOR

Figure 5. Personnel–financial management.

Document–Financial Management

Preparation of a project specification may be charged against one account number, or portions may be charged against several account numbers, as shown in Figure 6.

Specification Format

Parts of the Specification

A construction specification normally includes two major items: (1) tables of contents and (2) body of the specification. It does not normally contain index tables.

Each specification has at least one table of contents, which contains division and section headings with their associated paragraph and page numbers. Lists of figures, lists of tables, etc., may also be present. All of the tables of contents are in the same basic format: titles and page numbers given in the order of increasing page number.

Construction specifications prepared by Corps offices currently have several different formats. For example, the OCE guide specifications, Federal Construction Council (FCC) guide specifications, and construction specifications for family housing all have different formats. (OCE is in the process of converting its guide specification format to the FCC format.)

It is impossible to show the maximum complexity of all construction specification formats in one example, but a page from the Armed Services Procurement Regulation (Figure 7) is used as an example in the following discussion.

Page Format

Pages are usually numbered in the same fashion within a given document. The page number may appear as the first or last printed line of the page and may be left-, right-, center-, or outside-justified on the printed line. Outside justification refers to the practice of alternating page numbers so that they are right-justified on odd-numbered pages and left-justified on even-numbered pages. In the example in Figure 7, the page number is outside-justified at the top of the page. The page number may be composed of any combination of Arabic, Roman upper case, Roman lower case, alphabetic upper case, or alphabetic lower case fields, separated in some cases by special characters.

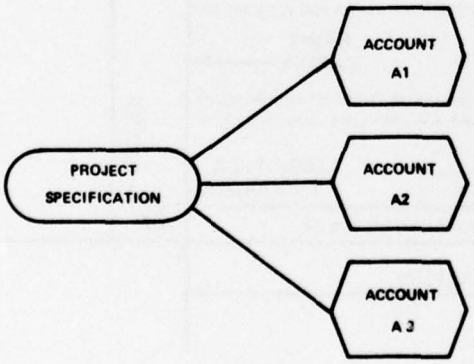


Figure 6. Document–financial management.

The page may contain a header at the top of the page below the page number and/or a footer at the bottom of the page above the page number. The number of lines in the header or footer may vary. The text of the header or footer may be the same on all pages and/or may vary depending on the paragraph title. The header and footer may be outside-justified also. In this case, outside justification refers to the practice of placing a portion of the header or footer on the outside of the page while a second portion is placed at the binding side of the page. The page number may be incorporated into the header or footer by placing it on the same line.

The example in Figure 7 shows a header composed of two portions: (1) a fixed string of characters that appears on the inside of each page, and (2) a variable portion that gives the section title and therefore varies from page to page. The page number has been incorporated into the header.

The footer in the example is fixed and centered on the line. The number of the last paragraph appearing on the page is printed above the footer and centered on the line. The example shows that the first three subfields (15-205.6) of the total paragraph-numbering format (15-205.6(a)(1)) are required to be printed.

Footnotes may appear on the page above the footer and/or at the end of the document. Such footnotes must be appropriately shown in the text. No examples of the footnote application are shown, but the format is the same as that for the table footnotes discussed in the next section.

Text Format

Paragraph numbers are used to identify segments of text. The paragraph number can be composed of any combination of Arabic, Roman upper case, Roman lower case, alphabetic upper case, or alphabetic lower case fields, each separated by special characters. The

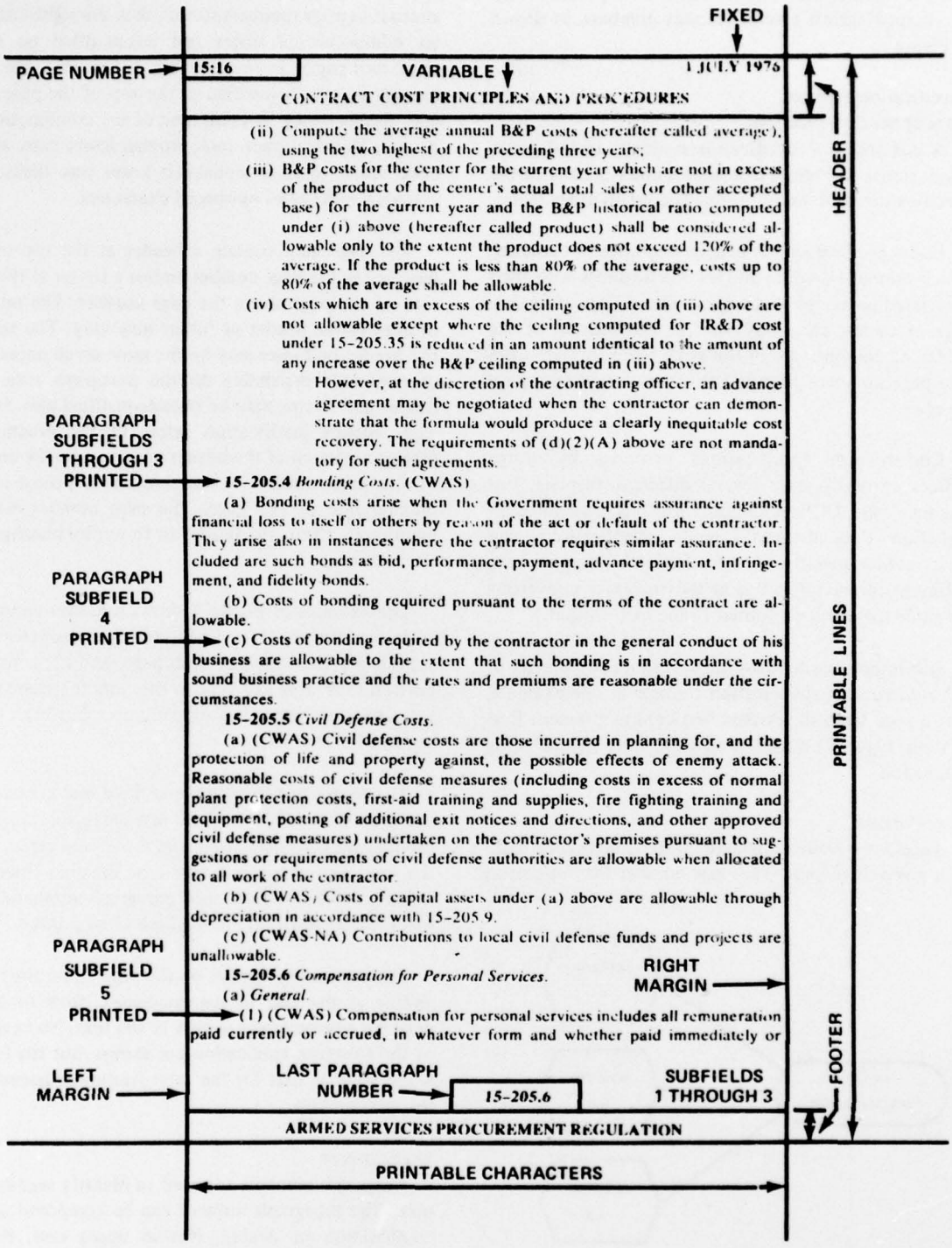


Figure 7. Illustrated example page of text.

example shows several portions of the total paragraph-numbering system: Arabic-Arabic. Arabic (alphabetic lower case) (Arabic).

Paragraph formatting is standard. Each paragraph has its own left and right margins within the printed page. The second through last lines always start at the paragraph's left and cannot exceed the paragraph's right margin. The first line may be indented from the paragraph's left margin. Different left and right margins can be used for various text segments and paragraphs to help distinguish the importance and order given to each segment.

Figure 8 shows two types of text: (1) contract text applying a decimal paragraph-numbering system, and (2) technical notes applying an alphabetic paragraph-numbering system. The text may have several different sets of notes (e.g., notes to the cost estimator, notes to the contracting officer, and notes to the facility engineer), each with its own paragraph-numbering format. OCE guide specifications are currently published with the text types separated. The text types are given in the following order: (1) contract text, (2) general notes, (3) technical notes. The EDITSPEC system allows the user to insert the notes within the contract text to keep them separated.

The text may also contain phrases that the specification writer must modify for a specific project. For example, "(insulation) (or) (underlayment)" is such a phrase; the note informs the writer of the expected action. The text may also require underlining.

The text may contain tables such as the one shown in Figure 9. The standard table has a variable-length header that appears on the first page. A standard column header may appear below the header on the first page and on every continuation page.

The body of the table contains information ordered by rows and columns. To avoid duplication of the same column 3 entry for rows 1, 2, and 3, the column 3 entry has been blocked in the example. The body of the table may also contain footnotes, as shown in the example.

Variable Formats

Printing of the same specification text in several different formats may be required. The Federal Construction Council may require one format; the OCE guide specifications a second; an office guide specification a third; a family housing project a fourth; a military construction project a fifth; and so on.

Specification Generation and Updating

Generation of a project specification begins with a detailed review of the project drawings. After this review, the pertinent sections of the guide specifications are reviewed to determine what text must be pulled from the guides and placed into the project specification.

The appropriate text is then pulled from the guides and marked for entry into the project specification. Items in the design that are not covered by a guide require that new text be written for inclusion in the project specification.

Updating a project specification may be necessitated by a change to a guide specification and/or a change to the project design. Changes to the guide specification requiring project specification updating are frequently changes to the referenced publications. Such changes may require the specification writer to reread the body of the project specification text to insure that it does not reference material that is not in the updated publication. Changes to the body of the guide specification may or may not affect the project specification, depending on whether the materials changed were to be included in the project specification.

A change to the project design will require review of the specification to insure that the text reflects the changed design.

3 EDITSPEC SYSTEM CAPABILITIES

System Overview

EDITSPEC is a text editing system designed to produce project construction specifications from guide specifications and to edit, format, and print such documents. The system was developed by CERL in cooperation with specification writers in Corps of Engineers District and Division offices, individual members of CSI, and the companies vending computer-based text editing systems designed to produce construction specifications. The EDITSPEC system extends the current state of the art in computerized specification generation systems to meet the expressed needs of the construction specification community.

The system has been designed to permit future addition and extension of commands and to be integrated into the larger Computer-Aided Engineering and Architectural Design System (CAEADS) currently under design. The system will be implemented as a stand-alone

2.3.5 Insulation work shall be coordinated with roofing and sheet metalwork so that all material applied each day is waterproofed the same day with the complete roofing system and sheetmetal flashings.

2.3.6 Uninsulated steel decks shall have insulation applied as an underlayment to span the steel deck flutes. Minimum thickness of the insulation shall be in accordance with the insulation manufacturer's published literature.

3. SUBMITTALS: Computations used for determining insulation thickness shall be submitted for approval. The Contractor shall submit proof that adhesives for application of insulation on steel decks, and composite board insulation for use on any roof deck, meets the requirements of Underwriters' Laboratories, Inc., or Factory Mutual Research Corporation. (Samples of each bitumen used on the project shall be furnished to the Contracting Officer in approved quantities and containers.) (D)

A. The requirement for bitumen samples may be included when deemed necessary.

4. MATERIALS shall conform to the following requirements: (C, E)

B. Where roof slopes are greater than 1/2-inch per foot, the use of coal-tar bitumen will not be permitted and nailing will be required. Minimum roof slopes for Army projects will be 1/4-inch per foot. Roof slopes for Air Force construction will be in accordance with AFM 88-15.

C. Except for steel roof decks, vapor barrier will be specified for heated buildings where the average January temperature is below 40 degrees F. Vapor barrier will also be specified for heated buildings where a high humidity condition is expected, such as an indoor swimming pool or laundry. Vapor barrier will not be specified for steel roof decks.

4.1 Adhesive:

4.1.1 Adhesive for application of insulation to steel decks shall meet the requirements of the Underwriters' Laboratories, Inc., for metal roof-deck construction or Factory Mutual Research Corporation for Class I steel deck construction.

Figure 8. Example page with notes inserted.

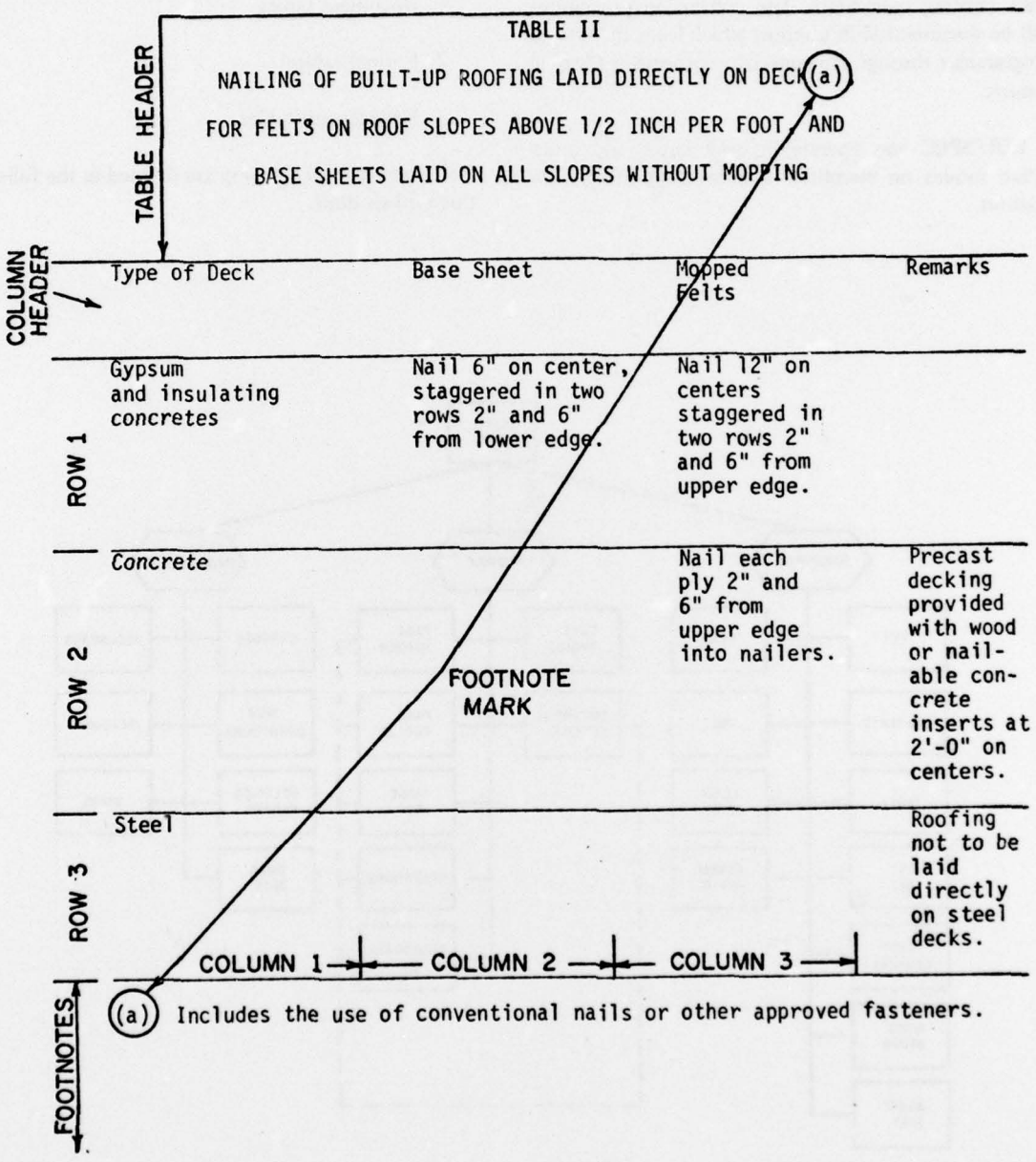


Figure 9. Example text table.

module so that the Corps can achieve the maximum anticipated benefits. It will be integrated with other programs as the CAEADS system becomes ready for field application.

The EDITSPEC programs are written almost entirely in a subset of the machine-independent American National Standard Institute (ANSI) FORTRAN. The EDITSPEC system has been designed to operate on most existing computers. The conversion procedures will be documented in a report which leads the system programmer through the conversion process in a logical manner.

EDITSPEC can operate in both batch and interactive modes on computer systems supporting both features.

The following sections describe the system design and its capabilities with respect to text processing and specification preparation.

System Design

The system's basic unit is the table. There are three categories of tables (Figure 10):

1. Document tables
2. Format tables
3. Management tables.

The tables in each category are defined in the following three subsections.

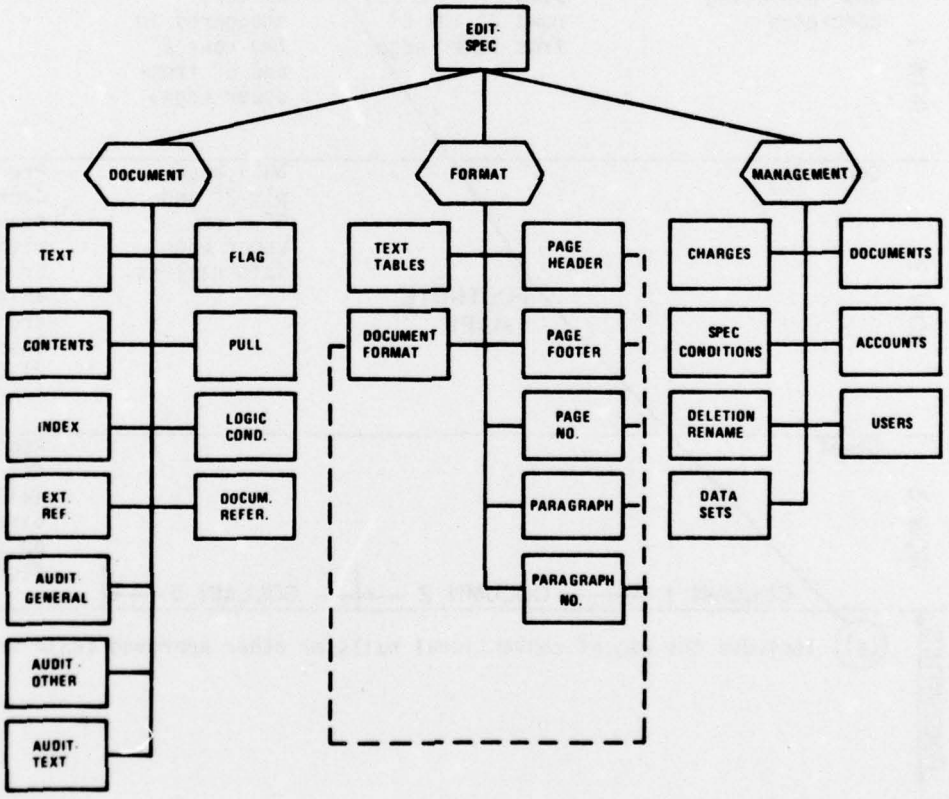


Figure 10. EDITSPEC tables.

Document Tables

The basic unit for text storage is the document. Each document is identified by a unique document name and is composed of 11 tables, as shown in Figure 10. The purpose of each table is described below.

Text. All text related to the document is stored within the text table in an unformatted mode by line number. A text table line, which is not the same as a printed line, may contain up to 480 characters. The length of a printed line is controlled by the user and specified only when a print request is given. All text characters are stored in the text table in EDITSPEC notation. EDITSPEC character notation is the same as typewritten character notation except that in EDITSPEC (1) two characters–the cent sign and the lower case letter–are required to represent every capital letter (e.g., on a typewriter: Go to CERL; EDITSPEC: ¢go to ¢c¢e¢r¢l), and (2) a string of asterisks to be printed is entered as two; four asterisks to be printed are entered as five).

Each text line can contain a maximum of 480 EDITSPEC characters. Each document can contain a maximum of 99,999,999 lines, which is equivalent to approximately 12,000,000 pages of single-spaced text.

Flag. The text often contains sections where a choice between several small phrases must be made. Such sections are marked with a flag within the text. The phrase options and phrase selected are defined in the flag table.

Pull. The EDITSPEC system has the capability of creating a new document from an existing document. The instructions for pulling text lines from the old document and placing them into a new document are stored in the pull table.

Logic Condition. The description of an item is often dispersed throughout several documents. To insure that the complete definition of the item will be contained in the documents and to insure that the line containing the definition will not be inadvertently removed, the text may be logically connected by listing the appropriate document names and line numbers. Such logical conditions are stored in the logic condition table.

Contents. Most documents require several types of contents tables, such as the standard table of contents, list of tables, list of figures, etc. The entries for all types are stored in the contents table.

Index. Documents often require different types of index tables. The entries for all types are stored in the index table.

External Reference. When the writer plans for one document to copy text from a second document during printing, or when one document has defined a logic condition involving a second document, the name of the first document and the type and number of applications are stored within the appropriate external reference table of the second document. If this document is to be deleted, there can be no external references within these tables.

Audit–General. This table contains a record of all editing performed on the document, including the user's identification, date, and time.

Audit–Text. A complete history of all changes made to the text of the document can be maintained in this table.

Audit–Other. A complete history of all changes made to the other information within the document can be maintained in this table.

Document Reference. This table contains a list of all documents referenced by a user-entered copy command.

Format Tables

The user is required to enter the definition of a format only once within the EDITSPEC system. Each format is given a unique format identification code, which may be applied within any document.

Page Header. The definitions of all page headings are stored within this table.

Page Footer. The definitions of all page footers are stored within this table.

Page Number. All page-numbering systems are located in this table.

Paragraph. The formats of all paragraphs are defined herein.

Paragraph Number. All paragraph-numbering systems are stored in this table.

Document Format. The complete print format for a document can be defined within the EDITSPEC system. This document format is assigned a unique

identification code which can be applied in the print command.

Text Tables. Standard row and column printing formats for tables within the text can be defined in this table. The formats can be applied within the text tables of each document.

Management Tables

The EDITSPEC system provides both management and security control to all users of the system. These controls are provided by the tables described below.

Documents. EDITSPEC maintains an up-to-date directory of all documents within the system. A user may request a listing of all of his/her documents, but cannot request such a list for another user. Access to documents can only be obtained from the creator of the document. Users can be granted access to simply read the document; to read and edit; or to read, edit, and delete.

Accounts. Supervisors may enter and assign access to account numbers. A supervisor may request a listing of his/her account numbers but cannot request such a list for another supervisor's accounts. Access to an account number can only be obtained from the supervisor who entered the account number.

Users. A user is a person who has permission to enter the EDITSPEC system. A list of all users of the system is contained in this table. The documents and accounts accessible to each user are listed with the user's code. The user's code identification is stored within this table if the user is defined as a supervisor, i.e., a person who controls or manages others.

Charges. This table maintains a list of all charges made to each account number.

Specification Conditions. The project conditions that must be known before a project specification can be generated are stored in this table.

Deletion–Rename. This management table contains the names of all documents that have been deleted and/or renamed within the system.

Data Sets. A complete list of all data sets to be applied by the user is located in this table.

Text Processing Capabilities

To Enter Text

EDITSPEC provides two functions for entering new text into a document. A single line of text can be entered through the ENTER command, while larger volumes of text can be entered through the INPUT command. The text to be entered can reside on paper or magnetic tape, disk, punched cards, or cassettes, or can be entered from a remote terminal. The new text can be placed in any location within the document.

To Locate, Change, Erase Phrases

The locate, change, and erase functions within EDITSPEC are similar in command structure. The user specifies the exact areas of the document to be searched, whether one line, several lines, or the entire document. The time required to enter character strings for location, change, and deletion has been minimized by requiring the user to enter only the first three or more and the last three or more unique characters. EDITSPEC will also inform the user of the location of character strings within the text that match the given string except for the number of blanks before the string and/or the number of blanks after the string. For example, a search to locate "CERL" will inform the user that "USA-CERL," "USA-CERL-FAM," and "CERL-FM" may be important also. EDITSPEC will locate and replace all occurrences of a word regardless of its capitalization. For example, if the word "aggregate" is to be replaced by "gravel," EDITSPEC will change:
"AGGREGATE" to "GRAVEL"
"Aggregate" to "Gravel"
"aggreggate" to "gravel"
"*Aggregate*" to "*Gravel*"

When abbreviations are to be used during input and are to be replaced by the full phrase during printing, a flag can be defined for the abbreviation. When the flag is encountered during printing, the correct phrase will be inserted, thus avoiding a costly search of the complete text. For example, if the phrase "poured-in-place insulating concrete" appears often in a document, the flag "*FL1*" can be used to indicate this phrase during input. When a print is requested, "*FL1*" will be replaced by "poured-in-place insulating concrete."

To Move Text

EDITSPEC provides commands to move and immediately copy text from one location to another. The system also provides a command to copy text only

when a print of the document is requested. This command can be applied to insure that the latest version of the OCE guide specifications is included in a project specification when it is printed.

To Group Logical Text Sections

EDITSPEC allows the user to define sections of text located in different documents that must be logically related. The system will check the documents to insure that the related text lines are present before each printing. If text is missing, the system will inform the user and will not print the documents unless the user desires to print the incomplete documents.

To Recover Old Text

EDITSPEC allows the user to keep an audit trail of all changes made to a document. The user may drop back to a previous version of the text if the document is to be revised as written earlier.

To Identify Text by Purpose or Application

EDITSPEC allows the user to identify the text by its purpose or application for special printing and reference purposes. Each portion is assigned a unique text segment identifier. Text segments can be used to identify notes to the specification writer, notes to cost estimator, contractual text, etc.

To Select Phrases

The EDITSPEC system can automatically perform phrase selection and replacement. Each phrase that requires either modification or selection is indicated by a flag. When a print of the document is requested, the flag is replaced by the correct phrase. For example, the phrase "(insulation) (or) (underlayment)" could be identified as *FL2* within the text; the choices for flag 2 would be:

1. insulation
2. underlayment
3. insulation or underlayment.

The user would state his flag choice before issuing a print command. The flag would be replaced by the selected phrase automatically when the print routine encounters the flag command.

To Select Portions of a Table

The EDITSPEC system can automatically copy specific rows and columns from a table in one document and place them in another document. The copy table command minimizes the work required to produce a project table from a guide table. The system will automatically format the table. Table formats can be changed without editing the table text.

To Format a Document for Printing

All EDITSPEC formatting is performed at the systems level. For example, once a paragraph format is defined in EDITSPEC, it can be used within any document in the system. EDITSPEC is designed to allow all formatting to be identified by one identification number. The system supports all types of alphabetic, Roman, and Arabic page- and paragraph-numbering systems.

To Execute Commands

EDITSPEC commands can be executed as entered by the user or entered into a document and not executed immediately. When the same series of changes is to be performed on several documents, the commands can be entered once into a separate document. This document can be merged with each document requiring the change and the changes can be executed. The commands can be removed as they are executed or can remain within the text at the user's option.

To Print a Document

EDITSPEC allows the user to obtain listings of the text as entered and stored within the computer as well as printouts of a formatted document. The user can specify the text to be printed, e.g., one page, six pages, or the entire document. The format for printing can also be specified. The same document can be printed in several formats if the user desires. The text revision markings, line numbers, flag locations, and text segment identifiers can also be printed at the user's option.

Specification Preparation Capabilities

Identification of a Complete Project Specification

All documents for a project are listed in the document named "MASTERSP" for the project. A command to print the project "MASTERSP" will cause all project documents to be printed in order.

Automatic Generation of a Project Specification

EDITSPEC allows the user to define the project conditions that must be known before a project specification can be generated from the OCE guide specifications. These project conditions are known as "specification conditions" in EDITSPEC. The user can

define when each phrase in the OCE guide specification might be required to be pulled from the guide and placed in the project specification. Such definitions are known as "pull commands." Once the project specification writer has described the project's specification conditions to the computer, EDITSPEC can automatically generate a project specification from another document such as the OCE guide specifications. Copy commands are placed in the proper location in the project specification document. These commands will be executed at print time to insure that the latest copy of the guide specification is included in the project specification.

Automatic Updating of a Project Specification

EDITSPEC will automatically update a project specification when requested by the user. The update may be required by a change in the project design or a change in the guide specification.

Reference Publication Lists

An index of Corps-approved reference publications is stored within EDITSPEC for each national organization. The guide and project specification sections reference this index through the copy command. The applicable publications are automatically copied at print time to insure that the latest Corps-approved publications are in the project specification.

4 USE OF EDITSPEC WITH THE CORPS' CURRENT PREPARATION METHOD

Management

Introduction

This section describes how the three basic categories of resources defined in Chapter 2 and their interrelationships are managed within the EDITSPEC system.

Personnel Management

Every individual given access to the EDITSPEC system is classified as a user. Users that manage or supervise other personnel within the system are known as supervisors. Each user is given a unique identification code which allows him/her to enter the system. For security, a user-defined password must be given with the identification code. This password is known only to the user; other personnel can learn it only by asking the user.

The normal chain-of-command structure is supported within the system. Only a user classified as a supervisor may enter new users and supervisors. All such personnel entered by a supervisor are under the direct control of that supervisor; i.e., only the supervisor who entered a user can change that user's identification code or delete the user from the system.

The chain of command is implemented by the chief supervisor of the higher element entering the user's identification code for the chief supervisor of the lower element. *Example:* The chief supervisor of the District office would enter the chief supervisor for the architect/engineer firm under contract to the District.

Many organizational elements will be applying the EDITSPEC system. All personnel working for an organizational element can be identified through the application of a *standard* user's identification code assignment procedure as shown in Figure 11.

Each organizational element can subdivide its organization into smaller units for effective personnel management. The fourth through twelfth characters of the user's identification code can be applied to identify this subdivision if desired. Figure 11 shows an example.

12 Characters—No Capital Letters
1 2 3 4 5 6 7 8 9 10 11 12

Item	Characters
Organizational Element	1 through 2

THE FOLLOWING IS FOR EXAMPLE PURPOSES ONLY. ACTUAL ALLOCATION OF CHARACTERS 4 THROUGH 12 IS CONTROLLED BY THE ORGANIZATIONAL ELEMENT.

1st subdivision elements, military construction office	3 through 4
2nd subdivision elements, design division	5
3rd subdivision elements, S&E branch	6
4th subdivision elements, spec section	7
5th subdivision elements, teams	8
6th subdivision elements, personnel	9 through 12

Figure 11. User identification code.

Document Management

Sections and subsections of a project specification are stored in documents in the EDITSPEC system. The first and second characters of the document name indicate the organizational element owning the document. The third and fourth characters indicate the project within the organizational element, and the fifth through twelfth characters contain the name of the OCE guide specification on which the document was based.

Financial Management

Financial management can be performed on an account basis. The first and second characters of the account number indicate the organizational element. The third through twelfth characters may be subdivided as required by the organizational element.

Personnel–Document Access Management

The user who creates a document is known as the creator, and is the only person who can grant other users access to the document.

Three types of access can be granted by the creator:

1. "Read only" access allows the user to read the document at will, but does not permit him/her to edit the document.

a. Since the OCE guide specifications must be available to all system users on a read only basis, the creator of an OCE guide specification document can grant "ALL" users access to the document.

b. Since pattern specifications must be available to all users within the office on a read only basis, the creator of such a document can grant "ALL" users within the correct organizational element access to the document.

Thus, as users change within the system, no change to the document's access list is required.

2. "Read/write" access allows the user to read and edit the document at will, but not to delete the document from the system.

3. "Delete" access allows the user to read, write, and delete the document at will.

The writers of a document would be granted read/write access to the document, while the reviewers would be granted read only access. The review comments would be placed in a separate document and passed to the writers.

When a person not involved in the writing of the section (document) desires access to the document, he/she must obtain permission from the creator.

Personnel–Financial Management

The supervisor who creates an account number is known as the creator of that account number. Only the creator can delete the account number from the system. Access to the account number is controlled by all supervisors who have been given access to the account number.

When a supervisor gives other personnel access to an account number, that supervisor is the only person who can cancel the access.

Document–Financial Management

The preparation of a project specification document may be charged against any valid account number within the system. Different editing sessions can be charged to different account numbers, also.

Format

Page Format

The EDITSPEC system provides for the application of nine different tables of contents, each of which can be uniquely titled and formatted by the user. The system also provides for up to nine different index tables which can be uniquely titled and formatted.

The EDITSPEC system is capable of producing all the page format variations described in Chapter 2. The border area is defined by stating the number of printable characters on one line and the number of printable lines on one page.

Text Format

The system supports the current text formatting requirements as described in Chapter 2. The system performs phrase substitutions automatically, since the text phrases requiring modification are flagged.

Variable Formats

The control methods of identifying *where* formatting is required are standardized in the EDITSPEC system. Such control codes are embedded within the text of the document.

Identification of *what* format to apply to print the document with embedded control codes is performed

when the user requests a formatted copy of the document text. Thus, the document can be printed under the FCC format, the OCE guide specifications format, family housing project format, military construction project format, etc., with no changes to the specification text. All format definitions are stored within EDITSPEC for use during the printing of *any* document in the system.

Specification Generation and Updating

Generation of a project specification begins with a detailed review of the project drawings. After this review, a list of specification conditions related to the project design is reviewed for each pertinent guide section. The specification conditions contained within the design are marked and entered into the EDITSPEC system. The EDITSPEC system then pulls all pertinent text from the guides and places it into the project specification. The EDITSPEC system always references the current publication in the applicable publications section, and no further review of the publication list is necessary.

Items in the design that are not covered by a guide require the writing of new text.

Changes to the guide specification can be incorporated in the project specification immediately by requesting that the EDITSPEC system update the project specification. Changes to the design that cause text to be pulled from the guides can be incorporated within the project specification immediately by requesting an update by the EDITSPEC system.

5 IMPLEMENTATION OF THE EDITSPEC SYSTEM IN A SPECIFICATION SECTION

Purpose

This chapter presents a systematic method for the evaluation and possible application of the EDITSPEC specification preparation system within a specification section. The following discussion describes in chronological order the activities required to implement the system. These activities are:

1. Obtaining knowledge of the EDITSPEC system capabilities

2. Reviewing the current operation of the specification section

3. Deciding if and/or where the EDITSPEC system can aid in the current operation of the section

4. Defining the standard formats currently applied within the section

5. Reviewing the organizational structure to determine the users of the system

6. Reviewing the accounting structure to determine the accounts that will be available on the system

7. Obtaining the EDITSPEC training courses

8. Coding the existing text, other than the OCE guide specifications

9. Applying the system while learning its capabilities

10. Applying the system during full production.

EDITSPEC Capabilities

The first task is to obtain a general knowledge of the system's capabilities. This can be accomplished through the following activities:

1. Contacts with the offices currently applying the system to determine where they are obtaining useful services from EDITSPEC and what weaknesses they have encountered in the system. OCE (DAEN-MCE-S) can provide a current list of offices using the system.

2. Review of the brief description of the system's capabilities contained in Chapter 3 of this report.

3. Participation in an EDITSPEC training course to gain first-hand experience in the system's application and capabilities. Weaknesses in the system would be apparent through actual use.

4. Review of the user's manual.

Current Section Operations

The section's current operating procedures should be detailed. The volume of work associated with each operation should also be estimated. This work flow and volume analysis will serve as a basis for the analysis to be performed the next step.

Application of EDITSPEC Within Current Operations

The activities that the system might benefit should be determined based on the current work flow and volume analysis and the EDITSPEC capabilities.

Each work activity and category of text should be reviewed separately. For example, preparation of specification text that remains the same from project to project and is always printed in the same format with the same page numbers would not require the services of the EDITSPEC system, nor would the system be useful for editing text that may only require retyping a few lines and is presently performed by the cut-and-paste method.

Areas where EDITSPEC might prove to be useful should be tested by actually using the system on a trial basis. If the system provides the expected service, the use should continue. If the system does not provide the expected service, its use for that area should be reconsidered.

Standard Definitions Format

The OCE construction guide specifications are a collection of specification documents printed in the same format. The specification section may have tailored the OCE guide specifications to form a pattern guide specification in a different format. If so, that format must be defined for EDITSPEC application.

Project specifications produced for different clients may require different formats; these formats must also be defined.

Organizational and Accounting Structure

The chain of command for users of the system and the account numbers for the users must be defined.

EDITSPEC Training Courses

This training is performed through five classes. The first class is a 45-minute presentation that compares the Corps' requirements with both existing text editing systems and the EDITSPEC system, and presents the benefits that can be achieved. This session is designed for all management levels in the organization, as well as the basic users of the system.

The second class is a 2-hour session describing the application of the management system within EDITSPEC. This session is intended for both managers and users.

The third class, which is a 4-hour session describing the application of the internal text commands to text before entry into the system, consists of a series of short lectures and examples on the use of each internal command. It is designed for all users who will be editing documents. Each user will require a 4-hour practicum.

The fourth class, also a series of short lectures and examples, is a 2-day session describing the application of the document and editing commands. It is designed for all users who will be editing documents. Each user will require a 3-day practicum.

The fifth class, a 4-hour session describing the application of the print format commands, is designed for only those few users who are tasked with insuring that the formats are uniform. Each user will require a 4-hour practicum.

A 3-day test of the system under normal operating conditions completes the EDITSPEC training program.

Text Coding

Following the training classes, the current office pattern and project specifications should be coded with internal commands and loaded into the EDITSPEC system.

Learning Curve

During the first 2 months of EDITSPEC use, the users will be learning the system. This is a "trial and error" or "what if" period during which the user is testing the system and building confidence in its results. It is also the best period for creative thinking about extending the system's capabilities. All ideas for possible system extension should be written in a log book. At the close of the learning curve period, the log book should be sent to OCE (DAEN-MCE-S) for review during the next update and extension period.

Full Production

After the first 2 or 3 months, the users should be at full production.

Production Benefit Review

After 6 months of use, the actual benefits should be compared with the anticipated benefits, and conclusions should be drawn regarding EDITSPEC's application in the particular specification section.

6 CONCLUSION

A computer-aided process for construction specifications preparation (EDITSPEC) has been developed. This report has presented management personnel with an overview of EDITSPEC. Included is a discussion of the Corps' current specification preparation process (Chapter 2), a description of EDITSPEC's capabilities (Chapter 3), details on the application of EDITSPEC within the Corps' current process (Chapter 4), and an outline for implementing EDITSPEC.

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Neely, Edgar S
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