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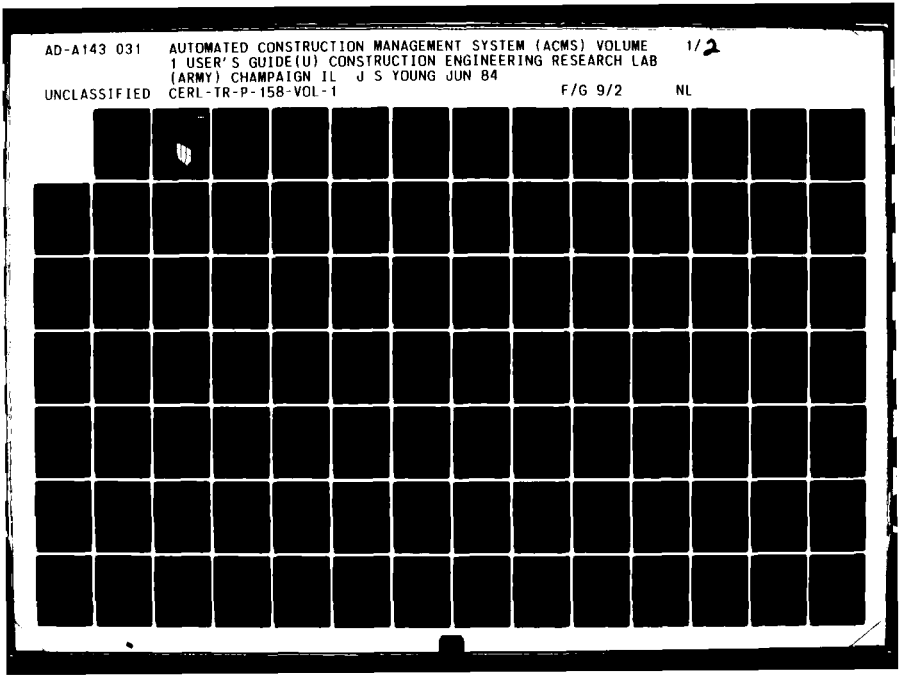

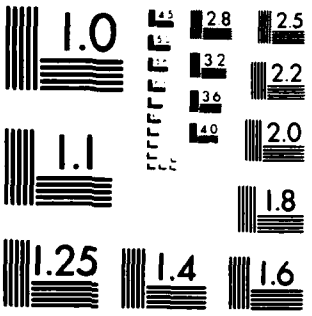

US Army Corps
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Construction Engineering
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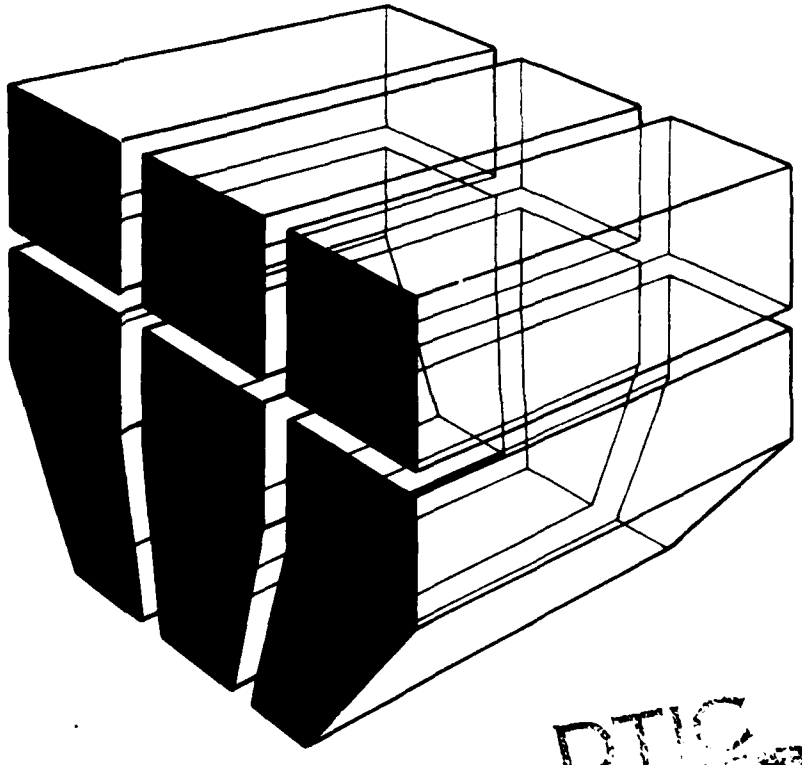
TECHNICAL REPORT P-158
June 1984

AUTOMATED CONSTRUCTION MANAGEMENT SYSTEM (ACMS), VOLUME I: USER'S GUIDE

by
Jennifer S. Young



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The Automated Construction Management System (ACMS) has been developed to manage the construction projects of Army Engineer units. It is a full-feature project management system implemented on a multiuser microcomputer.

The approach taken to develop the system was to exploit commercially available software programs and hardware to minimize programming requirements and allow researchers to devote their resources to application of the system.

(Continued on next page)

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In FY83 the ACMS was fielded as a pilot system at the 18th Engineer Brigade in the Federal Republic of Germany. The pilot system was used to manage more than 100 construction tasks during the 1983 construction season.

Volume I of this technical report is a complete user's guide describing ACMS version 84.0 and the hardware and software fielded in the 18th Engineer Brigade. It gives detailed examples of the modules, use, input requirements, and output reports. Volume II of this technical report contains the data base documentation for ACMS version 84.0, including system requirements, installation instructions, and program listings.

ACMS version 84.0 is available from the Command and Control Microcomputer User's Group (C^2MUG). Contact: Chief, CECOM SDSD, ATTN: DRSEL-FL-SDSD (C^2MUG), Fort Leavenworth, KS 66027. Telephone (913) 684-7550 (COMM), or 552-7550 (AUTOVON).

FOREWORD

This investigation was conducted for the Assistant Chief of Engineers, Office of the Chief of Engineers (OCE), under Project 4A762731AT41, "Design Construction, and Ope ition and Maintenance Technology for Military Facilities"; Task E, "Military Engineering"; Work Unit 038, "Engineer Unit Microcomputer Applications." The applicable STO is 81-5.1:19. The OCE technical monitor was Dr. Clemens Meyer, DAEN-ZCM.

This work was performed by the Facility Systems (FS) Division of the U.S. Army Construction Engineering Research Laboratory (USA-CERL). Charles E. Herring, Jr., was Principal Investigator. Jane-Ping Chiu made significant contributions to the project as a programmer. E. A. Lotz is Chief of USA-CERL-FS.

U.S. Army 18th Engineer Brigade personnel directly involved in fielding the ACMS were COL Charles Williams, Commander; LTC Melwin Lynch, S-3; LTC Larry Izzo, S-3; MAJ Russell Baldwin, S-3, Operations; MAJ David Phillips, S-3, Plans; 1LT Lordes Goodnight, S-3, Operations; Ms. Julie Osborn, S-3, Operations; and SP4 Vicky McDaniels, S-3, Operations.

COL Paul J. Theuer is Commander and Director of USA-CERL, and Dr. L. R. Shaffer is Technical Director.

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AUTOMATED CONSTRUCTION MANAGEMENT SYSTEM (ACMS),
VOLUME I: USER'S GUIDE

1 INTRODUCTION

Background

During FY83 the 18th U.S. Army Engineer Brigade at Grafenwoehr, Federal Republic of Germany, was engaged in a massive construction effort to upgrade training ranges there for use by M1 tanks. With an estimated cost of $40 to $60 million and involvement of 4000 soldiers plus a civilian support group, the project was in need of a rapid, accurate construction management system.

The U.S. Army Construction Engineering Research Laboratory (USA-CERL) was asked to develop a pilot microcomputer-based Automated Construction Management System (ACMS) for the 18th Engineer Brigade Project. The pilot system was fielded at 18th Engineer Brigade Headquarters in January 1983. The system's initial capability consisted of a Network Analysis Module and a General Applications Module with electronic spreadsheet and word processing applications. In April 1983, a Data Base Management Module, a Weekly Progress Report Module, and a Reports Generation Module were added.

Version 84.0 of the ACMS described in this user's manual was designed to meet the needs of the 18th Engineer Brigade. It provides for computerized management of equipment and personnel resources by individual tasks.

Purpose

This volume serves as a user's manual for the ACMS Version 84.0 which is used by the 18th Engineer Brigade to manage the Grafenwoehr Training Range Upgrade. This report explains how to use the General Applications Module, the Data Base Management Module, the Network Analysis Module, the Weekly Progress Report Module, and the Reports Generation Module.

Approach

To develop the ACMS, "off-the-shelf" hardware and software were exploited to minimize programming requirements and to enable researchers to focus more of their resources on the system's applications.

Mode of Technology Transfer

The ACMS has been given to the 2nd Engineer Group in Korea and the 20th Engineer Brigade at Fort Bragg. The software programs written in dBASE II are

2 SYSTEM DESCRIPTION

ACMS Version 84.0

The ACMS version 84.0 includes only the dBASE II programs written by USA-CERL--the Project Control Module, the Weekly Progress Reporting Module, and the Reports Generation Module. The only commercial software required to run ACMS version 84.0 is dBASE II. A detailed description of system requirements, installation instructions, and other information, for the ACMS version 84.0 is in Volume II of this technical report. ACMS version 84.0 has a menu system written in dBASE II.

The system described in this manual also includes two enhancements made to ACMS version 84.0 for the 18th Engineer Brigade--the Network Analysis Module and the General Applications Module. The Network Analysis Module described requires PMS-II, a critical path method program, and all software required to support PMS-II. The General Applications Module contains hardware-dependent options (in other words, that depends on the computer with which the software is used) and off-the-shelf programs that can be used in many applications, not just construction management. The menu system for the 18th Engineer Brigade is not the one included with ACMS version 84.0, but is driven by the program SUPERVYZ. This menu system is described to better explain ACMS and the type of enhancement that might be added to ACMS using off-the-shelf programs.

System Capabilities--18th Engineer Brigade

The ACMS has been designed to be "user friendly," that is, easy to use with minimum training. All functions are accessed through a menu system. The user does not need to learn the details of the CP/M 2.2 operating system. "On-line" help is available for all functions.

The ACMS provides for construction planning. The system uses a powerful "activity-on-arrow" Critical Path Method program interfaced to a relational data base that comprises the project tracking and updating system.

The system also provides for construction progress reporting. Once the equipment cost data base, customer data, project data, and Critical Path Method (CPM) network have been established and weekly progress reports have been entered, the system compiles the information and outputs various user-defined construction status reports and customer billing and payment reports.

System Hardware--18th Engineer Brigade

The hardware components supplied by USA-CERL to the 18th Engineer Brigade are:

1. One Televideo TS806 multiuser microcomputer.

2. Two Televideo TS800A user stations.

3. One Okidata ML-84 dot matrix printer.

4. One Okidata ML-83 dot matrix printer.

5. Cabling, connectors, and incidental items needed to operate the TS806, both TS800As, the ML-83, and the ML-84 together as a multiple-user system in a 220 V/50 Hz environment.

System Software--18th Engineer Brigade

The software programs supplied by USA-CERL to the 18th Engineer Brigade are:

1. CP/M version 2.2™--control program/microcomputer operating system for the TS800A.*

2. Mmmost™--Televideo multiuser operating system for the TS806.

3. dBASE-II™--a relational data base management system programmed by USA-CERL.

4. PMS-II™--a CPM project management system.

5. CBasic™--runtime module necessary for PMS-II.

6. SUPERVYZ™--a menu system program.

7. Wordstar™--a word processing program.

8. SuperCalc™--an electronic spreadsheet program.

9. USA-CERL developed programs that use the above off-the-shelf software to automate the critical path schedule generation function and the progress reporting functions.

Organizational Support Recommendations

The key persons with respect to the operation of the ACMS are the Data Base Administrators (DBA). It is recommended that there be at least two DBAs on each battalion staff and two on the brigade staff--one DBA with primary responsibility and a second DBA as a backup. The DBAs should be fully trained to access and use the system, and should be responsible for (1) keeping "back-up copies" of the battalion data, (2) inputting critical path networks and progress report data for the project officers in their respective battalions,

*CP/M™ is a trademark of Digital Research; Mmmost™ is a trademark of Televideo; dBase-II™ is a trademark of Ashton Tate; PMS-II™ is a trademark of North American Mica, Inc; CBasic™ is a trademark of Digital Research; SUPERVYZ™ is a trademark of Epic Software; Wordstar™ is a trademark of Micropro; SuperCalc™ is a trademark of SORCIM.

(3) generating output (feedback) reports for project officers and for battalion managers, and (4) coordinating their access to the system with the brigade DBA.

The brigade DBA would be essentially a full-time job. That person will set up the initial task essential data files, supervise and coordinate the use of the system by the battalion DBAs, run special reports, insure backups to the system are made periodically, maintain the catalog of tasks (by construction schedule number) that belong to certain "project groups" such as Range XX" tasks, "XXX Battalion" tasks, or "FE Baumholder" tasks. The brigade DBA will also maintain the catalog of construction schedule numbers assigned to each task and collect system usage statistics required in support of the research at USA-CERL.

3 MODULE CONFIGURATION

The ACMS consists of "modules" integrated to form one system. Many of the modules are interrelated and dependent on one another--for example, no reports can be generated until necessary information is entered into the system and processed. The ACMS uses a menu system to connect the modules and to make the system user friendly.

Menu System

Microcomputers are usually controlled through an operating system. An operating system is a computer program that allows the user to communicate with the computer using operating system commands.

The 18th Engineer Brigade's ACMS uses the CP/M 2.2 operating system. Users control the system with menus (provided by the computer program SUPERVYZ) that give the actual CP/M operating system commands to the computer. Each menu is a list of options that may be chosen; the user merely enters the number of the option into the computer. Therefore, no knowledge of the operating system is required. An option may call a program or another menu with more options, or may carry out a procedure.

The menu system forms a "tree structure"; one menu calls another menu, and that menu calls other menus. The tree structure for the ACMS is shown in Figure 1.

An example menu screen is shown in Figure 2. This is the main menu of the 18th Engineer Brigade System and is the screen that appears on the computer terminal when the system is first turned on. The menu screen is divided into three parts. The upper part of the screen contains the menu title and the list of options. The center part of the menu screen is for "conversation." This is where the computer displays questions and other statements. The lower part of the menu screen is called the "Volume Table of Contents," which is a list of file names relevant to the menu.

On the menu screen is the statement, "FUNCTION [0] SELECTS HIGHER MENU AND [?] PROVIDES HELP." This statement describes the two options available. The first option causes a higher or previous menu to be displayed. If the highest or main menu is being viewed, the computer will do nothing if this option is selected. If the second option is selected by entering a question mark, on-line help is provided. Any of the menu options can be chosen by entering the option number into the computer.

An option is entered into the computer by pressing the option number or symbol and pressing the "RETURN" key. The computer reads no information until the "RETURN" key is pressed; therefore, errors can be corrected before the "RETURN" key is pressed by backspacing and retyping the correct information.

Note: A different menu system accompanies the dBASE II software available from C^2MUG. The menu system is a dBASE II program which gives the user the same options for the Project Control Module, the Weekly Progress Report Module, and the Reports Generation Module as the SUPERVYZ menu.

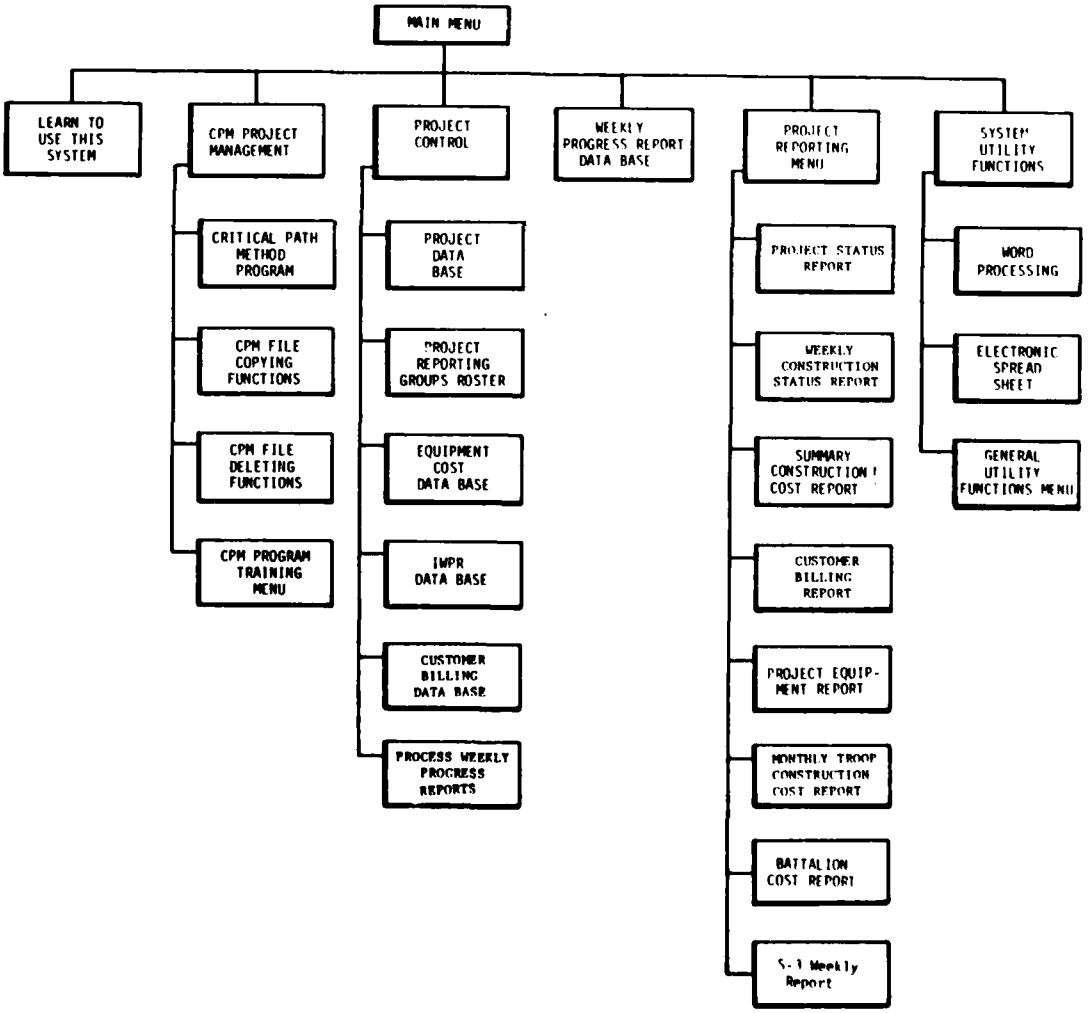


Figure 1. ACMS menu system flow diagram.

```
[1] Learn How To Use This System        [6] Weekly Progress Report Data Base
[2]                                     [7]
[3] Project Control Menu                [8] Project Report Generation Menu
[4]                                     [9]
[5] CPM Project Management Menu        [10] System Utility Functions Menu
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]      [  ]
```

```
  Current Drive = A          List of Pertinent Files          Current User =  0
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
```

Figure 2. 18th Engineer Brigade ACMS main menu.

Help Files

The on-line help files are accessed by entering a question mark as the menu option. The help files supply information on the menu options. The help files can be printed by pressing the letter "P" key while holding down the "CONTROL" key if a hard copy is desired.

There are two types of help files. The simplest file is one that consists of a single information section. The contents of the file are viewed by "stepping" through frames, or screens, of text. The other type of help file is an indexed multiple-section file. All of a file may be viewed or just selected sections. Each section of text can be divided into screens of text. In a multiple-section help file, one of the index options may in itself be an indexed multiple-section file. This sub-indexing allows the formation of tree structures of help files.

A help file lists several options or commands.

1. If a question mark is entered while a help file is being used, a summary of all help commands is displayed on the screen. Then when any other key is pressed, the computer displays whatever was on the screen before the command was given.

2. If the "ESCAPE" key is pressed, the computer leaves the help file and returns to the menu being used before the help option was selected.

3. Commands available while an index is being displayed consist of the following:

(a) If a number is entered, the computer displays the information section specified by that number.

(b) If an "*" is entered, the computer enters the "all sections" mode and displays all sections of the help file.

4. Commands available while viewing text are as follows:

(a) The "RETURN" key should be pressed when you desire the next screen of text to be displayed. After the last frame of the help file is viewed, the computer returns to the menu being used before the help option was selected if the help file is a single-section file, or it returns to the current index if the help file is a multiple-section file.

(b) If the letter "I" is entered, the computer returns to the current index unless the help file is a single-section file, in which case the computer returns to the menu being viewed before the help option was selected.

(c) If the letter "P" is entered, the computer displays the previous frame (if any) within the current information section.

(d) If the letter "B" is entered, the computer displays the first frame of the current information section.

(e) If the letter "N" is entered while in the all sections mode, the computer skips to display the start of the next section.

5. Commands available when using a subindex file are as follows:

(a) If a " " is entered, the computer returns to the index from which the current index was selected.

(b) If a "." is entered, the computer returns to the first index displayed by the help file.

4 NETWORK ANALYSIS MODULE

This module analyzes and calculates the critical path for the network. The module is used most effectively during the planning stage of construction. The main component of the Network Analysis Module is the PMS-II software program.

Concept of Operations--Planning

During the task planning period, the Brigade Plans Office sends the task information to the battalion for development of a Construction Work Estimate (CWE) and a Construction Work Schedule (CWS). Previously, these requirements were derived manually. With the ACMS, the project officer uses the capabilities of the Network Analysis Module to help meet these requirements. The project officer develops a draft plan for accomplishing the work and estimates the subtask duration and manhours of effort to complete each subtask in the task. He or she then describes this plan of action using the CPM in TM 5-333.[2] Using the CPM Data Input Form (Figure 3), the project officer prepares a form that describes the network to be followed. This form is given to the battalion DBA, who enters the data describing the project officer's network into the network analysis module of the ACMS. PMS-II then provides a series of output reports to the DBA, who returns them to the respective project officer.

After examining the PMS-II output, the project officer may decide to revise the plan to be more realistic or to meet certain time or dollar constraints. The plan would be revised by designating the changes to be made on a CPM input form. If the original plan needed major revisions, the project officer might even start over. The intent is to let the automated system "crunch the numbers," and let the project officer use the system output as a guide to modifying the network. The idea is not that the project officer will have a "nearly perfect" network before submitting the first network to the battalion DBA; such a concept would make the system a reporting burden, not a planning tool. By "cycling through" the PMS-II program (via the battalion DBA), the project officer can rapidly "home-in" on the best construction work schedule for that particular situation. After deciding on a final version, the project officer submits the final changes to the battalion DBA who, in turn, enters the network into the system and advises the brigade DBA that the final version is now in the system.

The brigade DBA assigns a unique construction schedule number to each task sent to the battalions. The brigade DBA keeps a catalog of the schedule numbers assigned to projects; the brigade DBA must keep track of which ones have been submitted as "finals," which "finals" have been approved by the brigade, and which schedules have not been completed or approved.

It should take no more than 2 hours for a DBA to enter a 100 subtask (or activity) net, compute the critical path, and produce the normal output

[2] TM 5-333, Construction Management (U.S. Department of the Army, February 1972).

date_____ page_____of_____

[1] Schedule Number:_____(6 char) [2] Task Title:_____(25 char max)

[3] Start Date:_____(mmddyy) [4] Bn/Co/Plt:_____(20 char max)

[5] Workdays/Week:_____(1-7) [6] Desired Completion Date:_____(mmddyy)

A-ADD D-DELETE C-CHANGE [7]	START NODE I [8]	END NODE J [9]	TASK DESCRIPTION (30 characters max) [10]	DURATION (workdays) [11]	H-Hori. V-Vert. [12]	MAN HOURS OF EFFORT [13]	ARTEP TASK [14]

Figure 3. CPM data input form.

reports. Assuming about 20 tasks are in each battalion and that each task has 100 subtasks, a man-week of effort would be required to enter all the battalion tasks into the system once. However, the payoff in terms of what the project officer gets back and in terms of project officer time saved is enormous.

Also, the resulting network should be of much higher quality than networks generated manually. Moreover, since the network is developed during the planning season, the battalion DBA's workload--and that of the system itself--should be reasonably dispersed over several weeks. The DBA should be able to make changes to existing networks, reflow the net, and run new critical path reports in less than 30 minutes (per task).

The battalion DBA can use the PMS-II program to create a "supernet" of all battalion tasks. Each task can be represented as a subtask in a "supernet" and would be updated by the battalion DBA each time a task level network is updated. A battalion funding schedule can also be generated to show the monthly bill for all battalion tasks.

Output

The PMS-II program has many different reports that can be generated for the project officer. Generally, the battalion DBA will produce one or all of the following reports:

- An *edit listing* (Appendix A) contains the input parameters. This report is used to check the information actually entered into the PMS-II program.

- The *Detailed Activity (Subtask) Report* (Appendix A) lists all input and gives the critical path, early and late event times, and float times for each subtask.

- A *logic or "activity-on-arrow" ("subtask-on-arrow") diagram* (Appendix A), which is a graphical representation of the network, can be produced for each task.

- The PMS-II program can produce a *Gantt bar chart* (Appendix A) of the network.

- PMS-II can also produce many other special or tailored reports not required by the 18th Engineer Brigade.

Revision of CPM Schedule

During the construction season, it is certain that some tasks will start to deviate from the approved schedule. Guidelines should be set so that as soon as a task is, say, 10 to 20 days off schedule, the project officer would have to submit an updated network. Another possibility would be to reduce traffic on the system by allowing only one battalion per week to update schedules on a cyclical basis. For example, on a 6-week cycle, each project officer (by battalion) could be required to report actual start and completion dates as of that time. This can be done very simply by the project officer marking up the latest copy of the Detailed Activity (Subtask) Report (Appendix

A) or by using a CPM Input Form as a change sheet (Appendix A) and submitting it to the battalion DBA for input to PMS-II. In return, the project officer would get an updated set of output reports (Appendix A)--including a new network diagram and Gantt charts. The battalion DBA, not the project officers, would do the actual input to the system.

Accessing the Network Analysis Module

The Network Analysis Module is easily accessed from the main menu by selecting Option 5, the CPM Project Management Menu, which is shown in Figure 4. This menu has four options that give the user all the capabilities in the Network Analysis Module.

Network Analysis Module Capabilities

The Network Analysis Module has several features other than the PMS-II program. The module has CPM file copying and deleting functions to help make the system user friendly. It also has help files to train the DBAs in using the PMS-II program and to explain the features of the program.

The files created when using the PMS-II program are called CPM files. To avoid using too much memory space, the DBA makes backup copies of the files and erases the original copies from the hard disk. The backup copies are stored on floppy diskettes.

CPM File Copying Functions

The CPM File Copying Functions Menu (Figure 5) is accessed by selecting Option 2 on the CPM Project Management Menu. There are 10 CPM file copying functions on the menu.

Option 1--DISPLAY CPM FILES ON B DRIVE. This option displays on the computer screen the names of all CPM files stored on the computer hard disk.

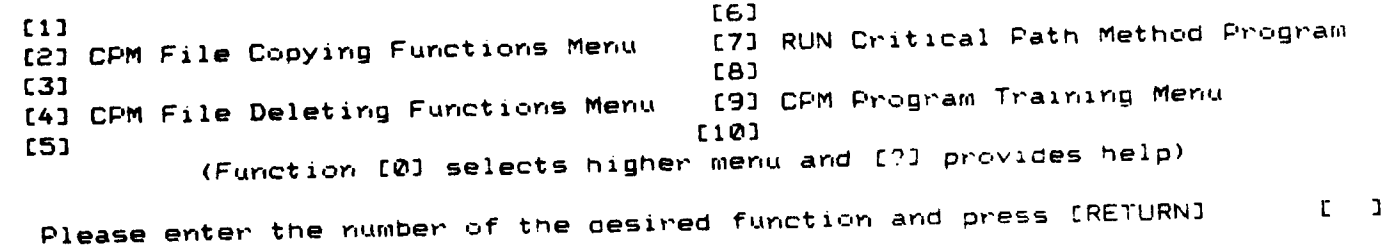
Option 2--PRINT LIST OF FILES ON B DRIVE. This option causes the printer to print a list of the names of all CPM files stored on the hard disk.

Option 3--DISPLAY CPM FILES ON DISKETTE. This option displays on the screen the names of all CPM files stored on the floppy diskette. The option will remind the user to insert a diskette into the floppy disk drive before the computer executes the option.

Option 4--PRINT LIST OF FILES ON DISKETTE. This option prints a list of the names of all CPM files stored on the floppy diskette.

Option 5--COPY CPM FILE FROM DISKETTE. This option copies a CPM file from a diskette and stores the file on the hard disk. A copy of the file will remain on the diskette.

Option 6--CHECK SPACE LEFT ON DISKETTE. This option checks to see how much memory space is left on the diskette. If the user attempts to copy a



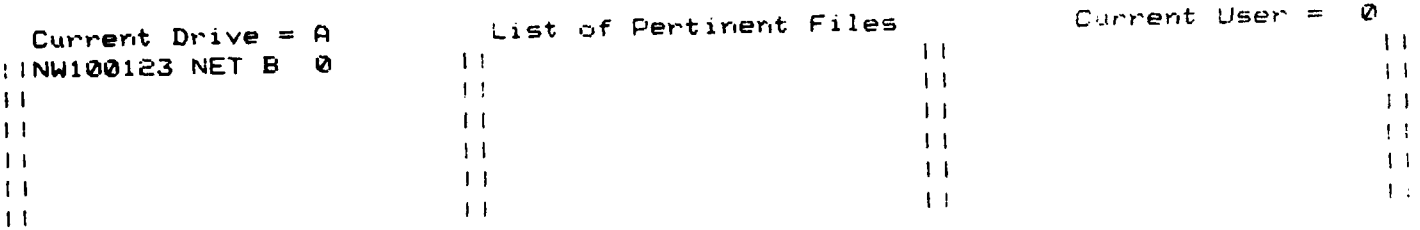


Figure 4. Project management menu.

```
[1] DISPLAY CPM Files On B Drive          [6] CHECK Space Left On Diskette
[2] PRINT List Of Files On B Drive        [7] COPY TO Disk/ERASE FROM B Drive
[3] DISPLAY CPM Files On Diskette         [8] COPY TO Disk/LEAVE ON B Drive
[4] PRINT List Of Files On Diskette       [9] MAKE BACKUP Copy Of A Diskette
[5] COPY CPM File FROM Diskette          [10]
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]       [  ]
```



```
  Current Drive = B          List of Pertinent Files          Current User =  0
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
```

Figure 5. CPM file copying functions menu.

file that occupies more space than is available on the diskette, errors will occur and data stored on the diskette will be damaged or lost.

Option 7--COPY TO DISK/ERASE FROM B DRIVE. This option copies a CPM file from the computer's hard disk to a floppy diskette. This option also erases the file from the hard disk after the copy has been made; therefore, if the copy on the diskette is lost or has an error in it, the data may be lost unless another diskette contains a copy of the file.

Option 8--COPY TO DISK/LEAVE ON DRIVE. This option copies a CPM file from the hard disk to a floppy diskette, but leaves a copy of the file on the hard disk.

Option 9--MAKE BACKUP COPY OF A DISKETTE. This option makes another copy of a diskette. This is useful in case one of the diskettes is damaged; the data stored on the diskette would not be lost since there is another copy. The computer will tell the user when to remove the diskette being copied from the floppy disk drive and insert a blank diskette.

CPM File Deleting Functions

The CPM File Deleting Functions Menu (Figure 6) is accessed by selecting Option 4 on the CPM project Management Menu. This menu has five file deleting functions.

Option 1--RENAME A CPM FILE. This option allows the user to rename a CPM file. This is useful in case a mistake was made when the file was first named.

Option 2--ERASE A CPM FILE FROM B DRIVE. This option erases a CPM file from the computer's hard disk. If this file will be needed later, the user should make sure a backup copy has been made.

Option 4--ERASE A CPM FILE FROM DISKETTE. This option erases a CPM file from a floppy diskette. If the file will be needed later, the user should make sure it is stored on the hard disk or another floppy diskette before erasing.

Option 7--ERASE ALL CPM FILES FROM B DRIVE. This option erases all of the CPM files stored on the hard disk. The user must make sure backup copies have been made of all files that will be needed later or the files will be lost.

Option 9--ERASE ALL FILES FROM DISKETTE. This option erases all of the CPM files from a floppy diskette.

Running the CPM Program

Option 7 on the CPM Project Management Menu allows the user to access the PMS-II program. This program is well documented in the user's manual, PMS-II,

```
[1] RENAME A CPM File                          [6]
[2] ERASE A CPM File From B Drive              [7] ERASE ALL CPM Files From B Drive
[3]                                            [8]
[4] ERASE A CPM File From Diskette             [9] ERASE ALL Files From Diskette
[5]                                           [10]
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]       [  ]
```



```
  Current Drive = B          List of Pertinent Files          Current User =  0
||NW100123 NET B  0      ||                          ||                        ||
||                       ||                          ||                        ||
||                       ||                          ||                        ||
||                       ||                          ||                        ||
||                       ||                          ||                        ||
||                       ||                          ||                        ||
```

Figure 6. CPM file deleting functions menu.

A Critical Path Project Management System, by North American Mica.[3] Users should refer to this manual when using the PMS-II program, or they can use the program training option of the Network Analysis Module.

Note: The PMS-II program refers to tasks as "projects" or "schedule numbers" and subtasks as "activities."

CPM Program Training

The CPM Program Training Menu (Figure 7) is accessed by selecting Option 9 on the CPM Project Management Menu. The options on this menu allow users to access help files that explain how to use the PMS-II program. Users merely select the option describing the area of the PMS-II program with which they would like help and the computer displays the help file.

[3] PMS-II, A Critical Path Project Management System (North American Mica, Inc., 1982).

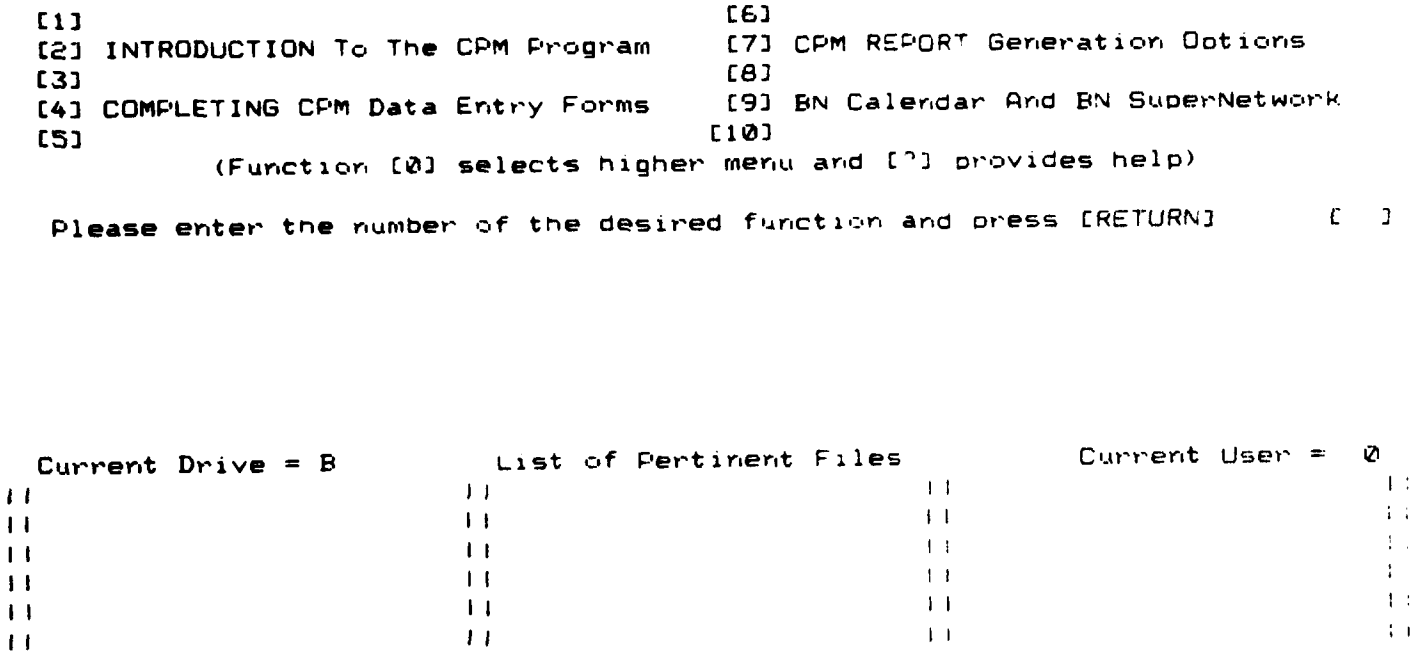


Figure 7. CPM program training menu.

5 PROJECT CONTROL MODULE

The Project Control Module records general information such as equipment cost and task data. The dBASE-II program uses information stored in this module to generate customer billing and construction status reports. This module processes the Weekly Progress Reports (WPR) once they have been entered into the WPR Module.

The dBASE-II program is the essential component of the ACMS Project Control Module. This module does all the required computations automatically, stores cumulative data, and other functions. It is also the basis for generating status reports, billing reports, and consolidated progress reports. The module itself is composed of many data bases which are computer programs written using dBASE-II. Each data base stores specific information and uses that information for computations and reports.

Several functions are available to control cursor movement while the user is entering information into any of the data bases. These functions are displayed on the screen when they can be used. When exiting most of the data bases, the system asks the user if a backup copy is needed of the data base on the hard disk. If the user has modified the data base, a backup copy should be made; however, if no modifications were made to the data, a new backup copy would not be needed.

Accessing the Project Control Module

The Project Control Module is accessed by selecting Option 3 on the main menu. This causes the Project Control Menu (Figure 8) to be displayed.

Project Data Base

The Project Data Base stores data such as general information, estimated costs, allocated funds, and actual expense funds. The information should be entered into the data base as soon as a schedule number has been assigned to the task and the funds have been allocated. The actual expended funds in the project data output are updated when Weekly Progress Reports are processed.

The task data are taken from the Project Data Form (Figure 9). The task data information must be entered into the computer only once for each task. However, since entering the task data is the first step in monitoring the task, the information must be entered before any other task data can be entered into the computer.

The Project Data Base is Option 1 on the Project Control Menu. When this option is selected, the Project Data Base Menu (Figure 10) appears on the terminal screen. Six options are on the menu.

Option 1--ENTER/CHANGE TASK DATA. This option is used to enter task data or to change data already stored in the Project Data Base.

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Option 1--ENTER/CHANGE TASK DATA. This option is used to enter task data or to change data already stored in the Project Data Base.

```
[1] Project Data Base                    [6] Initial WPR Data Base
[2]                                      [7]
[3] Customer Billing Data Base           [8] Process Weekly Progress Reports
[4]                                      [9]
[5] Project Reporting Group Rosters      [10] Hourly Rates of Equipment Costs
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]        [  ]
```



```
  Current Drive = A          List of Pertinent Files          Current User =  0
||                          ||                          ||
||                          ||                          ||
||                          ||                          ||
||                          ||                          ||
||                          ||                          ||
||                          ||                          ||
```

Figure 8. Project control menu.

[1] PN Number:_____ [2] Schedule Number:_____

[3] Title:_____ [4] Location:_____

[5] BN/CO/PLT:_____ [6] Project Type:_____

[7] Estimated Contractor Cost:_____

[8] Estimated Troop Construction Cost:_____

[9] Desired Start Date:_____(mmddyy)

[10] Desired Completion Date:_____(mmddyy)

[11] Customer:_____

TYPE OF FUNDS	[12] ESTIMATED COST	[13] ALLOCATED FUNDS
US TDY		
US EQUIP		
CSG TDY		
CSG EQUIP		
CSG LABOR		
TOTAL		

COMMENTS:

Figure 9. Task data form.

```
**************************************************************
*                  PROJECT DATA BASE MENU                    *
**************************************************************
*                                                            *
*   1) Enter/Change Task Data                                *
*                                                            *
*   2) Delete A Task                                         *
*                                                            *
*   3) Display/Print Schedule No.'s For All Tasks            *
*                                                            *
*   4) Display/Print Data For Selected Tasks                 *
*                                                            *
*   5) Set Graf TDY Rates OFF:_____ NCO:_____ EM:_____       *
*                                                            *
*   6) Exit                                                  *
*                                                            *
**************************************************************
```

Figure 10. Project data base menu.

Option 2--DELETE A TASK. This option deletes the task data for a specific task. Caution should be used if this option is selected because the data cannot be recovered once it has been deleted.

Option 3--DISPLAYED/PRINT SCHEDULE NUMBERS FOR ALL TASKS. This option displays on the terminal screen or causes the printer to produce a hard copy listing all schedule numbers that have project data stored in the data base. An example of this list is shown in Figure 11. After this option is selected, the computer asks "Do you want a printout?" The user responds with a "Y" for yes or an "N" for no.

Option 4--DISPLAY/PRINT DATA FOR SELECTED TASKS. This option causes a second menu (Figure 12) to be displayed on the terminal screen. The user should select the option number that would display the appropriate task data on the terminal screen or that would cause the printer to produce a hard copy. An example of a hard-copy report is shown in Figure 13. After the option has been selected, the computer will ask if the user wants a printout, and the user should respond as with Option 3.

Option 5--SET GRAF TDY RATES. This option allows the user to set temporary duty (TDY) rates for the location where the unit does most of its construction. The data base will allow the TDY rates to be set while entering project data for locations other than the primary one. For example, Grafenwoehr (GRAF) is where the 18th Engineer Brigade does most of its work; therefore, the TDY rates for GRAF could be set as a default and would not have to be entered each time task data are entered.

Sch. No.	Battalion	Title	Location
390172	79	BILLET II	RANGE 39
390173	79	BILLET I	RANGE 39
390271	79	TARGET SECTION 2	RANGE 39
420130	293	TANK PARK EARTH	RANGE 42
420230	293	DEFILADE POSITION 1	RANGE 42
420330	293	HARDSTAND 1	RANGE 42

Figure 11. Example project data base output--all schedule numbers in project data base.

```
**************************************************************
*     DISPLAY/PRINT DATA FOR SELECTED TASKS                  *
**************************************************************
*                                                            *
*                                                            *
*  1) All Tasks of a PNO Number                              *
*                                                            *
*  2) All Tasks of a Funding Type                            *
*                                                            *
*  3) All Tasks of a Battalion                               *
*                                                            *
*  4) For a Schedule Number                                  *
*                                                            *
*  5) Return to Main Menu                                    *
*                                                            *
*                                                            *
**************************************************************
```

Figure 12. Project data base menu 2.

```
                    ***  P R O J E C T  D A T A  ***
PN  Number: 3093-79-E20060                  Schedule Number: 39027
Title: TARGET SECTION 2                     Loc.: RANGE 39
Battalion: 79                               Project Type:  MCA
Esti. Contractor Cost  :     25000.00
Esti. Troop Const. Cost:     24555.00
Start Date     : 27 FEB 84
Compl. Date    : 30 JUN 84
Customer: 7ATC

+---------------+---------------+---------------+---------------+
| TYPES OF      | ESTIMATED     | ALLOCATED     | ACTUAL        |
| FUNDS         | COST          | FUNDS         | EXPENDED      |
+---------------+---------------+---------------+---------------+
| OS TDY        |      21055.00 |      21055.00 |         16.00 |
+---------------+---------------+---------------+---------------+
| US EQUIP      |       3500.00 |       3500.00 |         72.50 |
+---------------+---------------+---------------+---------------+
| CSG TDY       |          0.00 |          0.00 |          0.00 |
+---------------+---------------+---------------+---------------+
| CSG EQUIP     |          0.00 |          0.00 |          0.00 |
+---------------+---------------+---------------+---------------+
| CSG LABOR     |          0.00 |          0.00 |          0.00 |
+---------------+---------------+---------------+---------------+
| TOTAL         |      24555.00 |      24555.00 |         88.50 |
+---------------+---------------+---------------+---------------+

COMMENTS:
```

Figure 13. Example project data base output--task data for a schedule number.

Option 6--EXIT. This option returns the user to the Project Control Menu.

Customer Billing Data Base

The system uses the Customer Billing Data Base to produce the dollar amount of work placed on all tasks funded under one project number (PN). A PN is a number associated with a construction directive. The data base stores header information for each PN number that will be used to produce the bills. The header information includes the title, DA Form 2544 information, responsible unit, and date for each PN number.

This information must be entered only once for each construction PN number during the construction season. At least one task under the PN number must be entered into the Project Data Base before the customer can be entered.

The Customer Billing Data Base is accessed by selecting Option 3 on the Project Control Menu. When this option is selected, the screen in Figure 14 is displayed. The customer billing information is entered on this screen. The date is the day on which the information is entered into the data base.

PN NO:

BILLING NUMBER:

DA FORM 2544: DATE:

TITLE: UNIT:

Schedules included:

Figure 14. Customer billing screen.

Project Groups Data Base

The Project Groups Data Base stores the project clusters and project groups. The system uses this information to produce reports on the status of these different clusters and groups. The project Group Data Input Form is shown in Figure 15. This information must be entered before any reports are processed. A schedule number must be entered in the Project Data Base before it can become part of a project group.

The Project Groups Data Base is accessed by selecting Option 5 on the Project Control Menu. When this option is selected, the screen in Figure 16 is displayed on the terminal. The user may enter up to nine clusters and all commands are listed on the screen. After the user has entered the project cluster, the screen in Figure 17 appears on the terminal. The user enters the project groups for the cluster on this screen. The user can enter up to 12 project groups for each project cluster. After the user has entered the first project group, the screen in Figure 18 appears on the terminal. The user should then enter the schedule numbers of the tasks that belong to the project group; however, the schedule numbers must already have been entered into the Project Data Base to be considered valid tasks by the Project Groups Data Base. A project group can have up to 99 tasks. Once the Project Groups Data Base has been initialized, it may be modified at any time by using the options listed on the screens.

Project Group Name:

Project Group Manager:

Schedule Number	Comments

Figure 15. Project group data input form.

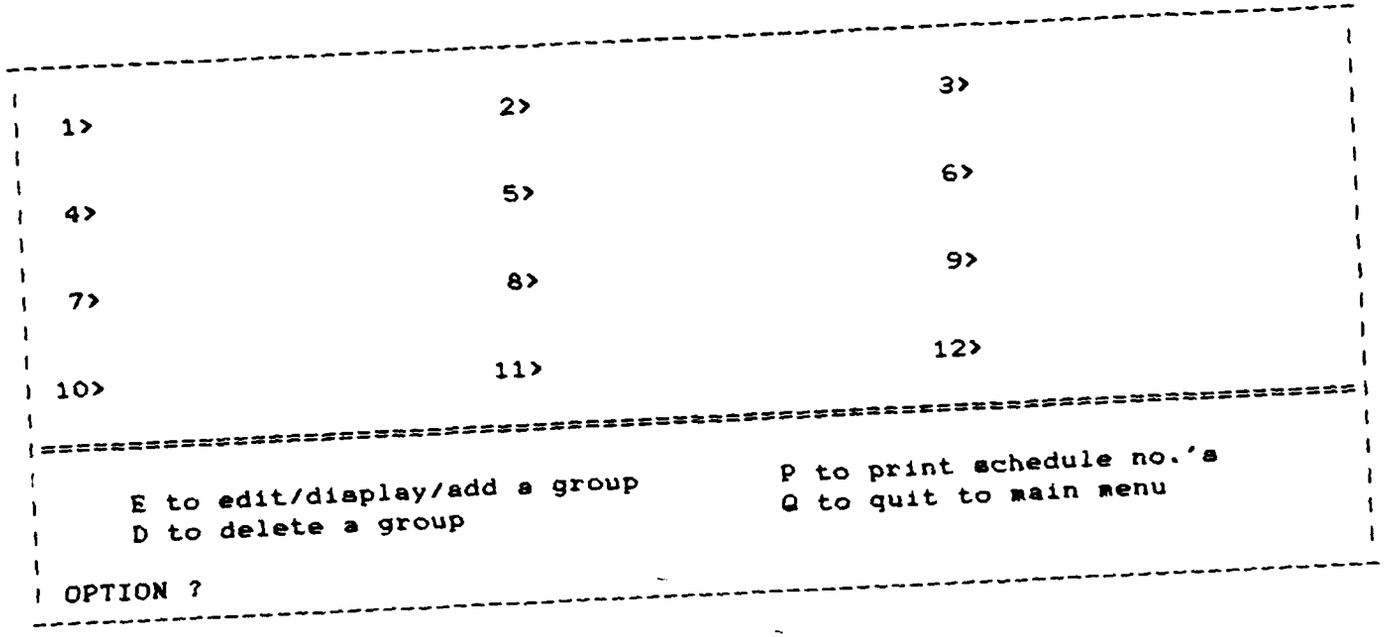

Figure 16. Project cluster menu.

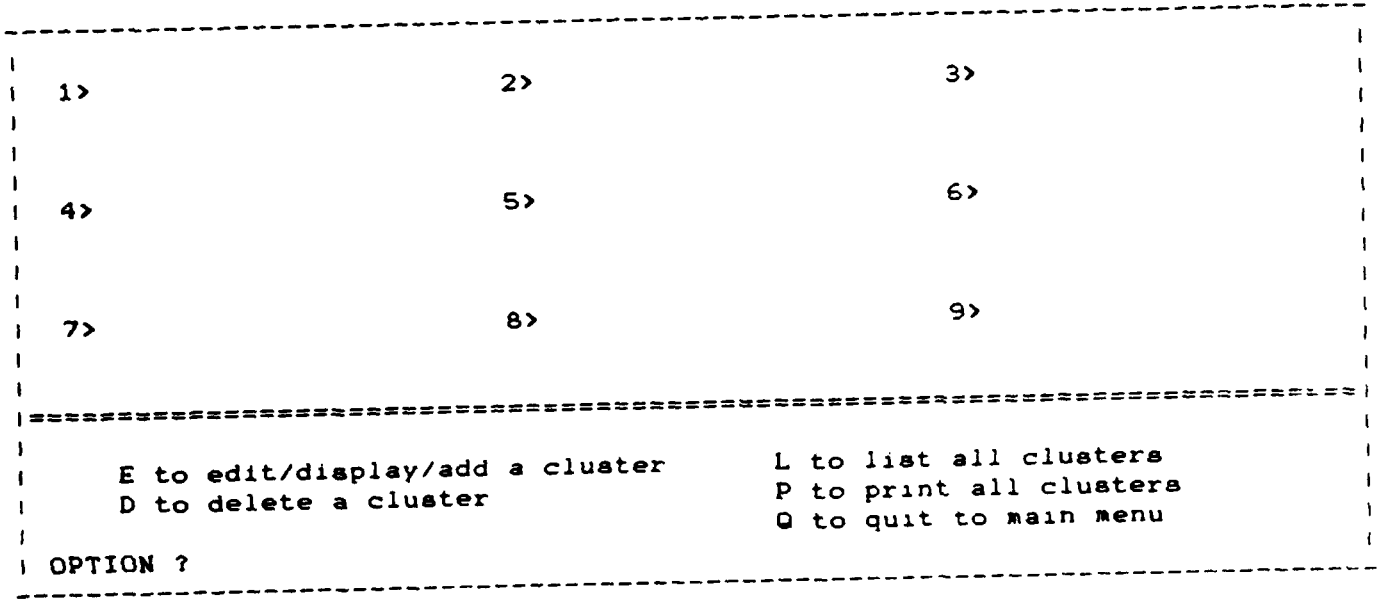

Figure 17. Project group menu.

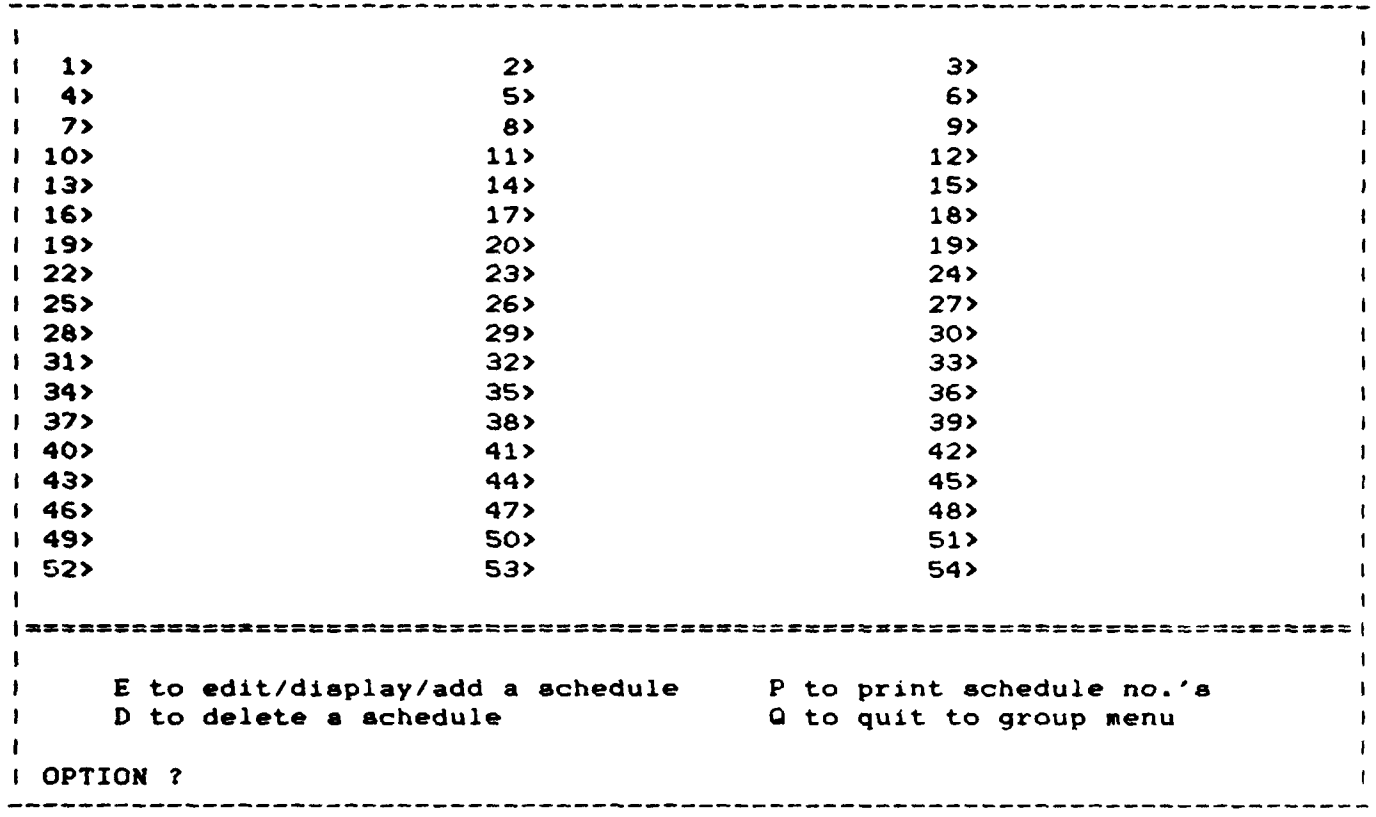

Figure 18. Project schedule number menu.

Initial Weekly Progress Report Data Base

The Initial Weekly Progress Report (IWPR) Data Base stores the critical path network for each task. This information would be taken from a Weekly Progress Report completed before the task is started with all subtasks for the task listed in the subtask section. Since the work will not have begun on the task, there should be no costs or mandays charged to the task. The form and instructions are in Appendix C.

The Initial Weekly Progress Report output for a task lists general information for the task and detailed information for each subtask in the task. For each subtask, the output lists the I-J node, description, scheduled manhours, the actual manhours, percent weight, and percent complete. The computer calculates the subtask's percent weight by dividing the scheduled manhours of the subtask by the total scheduled manhours of the task and multiplying by 100. Normally, the percent complete and actual manhours of the subtask will be taken from the Weekly Progress Report data when the WPRs are processed. However, corrections to the percent complete and actual manhours can be made by entering the figures directly into the IWPR data base; then, when the WPRs are processed the data from the IWPR data base will update all other data bases, including that of the Weekly Progress Report.

The Initial Weekly Progress Report Data Base is accessed by selecting Option 6 on the Project Control Menu. When this option is selected, the Initial Weekly Progress Report Data Base Menu (Figure 19) is displayed on the screen. Six options are available to the user.

Option 1--INPUT IWPR DATA. This option allows the user to enter the IWPR data into the data base.

Option 2--CHANGE IWPR DATA. This option allows the user to change IWPR data previously entered into the data base.

Option 3--DELETE IWPR DATA. This option allows the user to delete either all IWPR data or only certain subtasks for a task.

Option 4--DISPLAY/PRINT IWPR DATA FOR A TASK. This option either displays or prints the IWPR data for a given schedule number. Figure 20 is an example of the printout.

Option 5--DISPLAY/PRINT TASKS THAT HAVE IWPR DATA. This option either displays or prints the schedule numbers of tasks that have IWPR data. Figure 21 is an example of the printout.

Option 6--DISPLAY/PRINT TASKS THAT HAVE NO IWPR DATA. This option either displays or prints the schedule numbers of tasks that have no IWPR data entered into the data base.

Option 7--EXIT. This option returns the user to the Project Control Menu.

```
**********************************************************
*                                                        *
*                                                        *
*                                                        *
**********************************************************
*                                                        *
*   (1)   Input IWPR data                                *
*                                                        *
*   (2)   Change IWPR data                               *
*                                                        *
*   (3)   Delete IWPR data                               *
*                                                        *
*   (4)   Display/Print IWPR data for a task             *
*                                                        *
*   (5)   Display/Print tasks that have IWPR data        *
*                                                        *
*   (6)   Display/Print tasks that have no IWPR data     *
*                                                        *
*   (7)   Exit                                           *
*                                                        *
**********************************************************
```

Figure 19. Initial WPR data base menu.

Process Weekly Progress Reports Option

This option processes the Weekly Progress Reports for a reporting period. After the WPR's are processed, several reports can be generated. These reports will be discussed in Chapter 7.

This option is accessed by selecting Option 8 on the Project Control Module. The system asks the user for which reporting period should the WPRs be processed. The user should respond with the date the period ended, which must always be a Friday. The computer will then make all computations necessary to generate the project status report.

Equipment Cost Data Base

The Equipment Cost Data Base stores the Equipment Cost Catalog. The information included in the catalog is the item number, nomenclature, Federal stock number (FSN), hourly depreciation cost, and hourly operation and maintenance costs for each piece of equipment and each attachment the brigade used. A sample page of a catalog is shown in Figure 22.

Schedule No. : 370279 Title : BARRACKS
Battalion : 37 Location : RANGE 79
Start Date : 022784 Compl Date: 053084

I	J	Description	SCH Mhours	ACT Mhours	%WT	% Comp
1	5	START	20	0	1.5	0.0
5	20	ORDER MATERIALS	36	0	2.7	0.0
5	30	EXCAVATE	36	0	2.7	0.0
20	30	BUILD FORMS	36	0	2.7	0.0
30	50	POUR CONCRETE	50	0	3.7	0.0
30	60	STRIP FORMS	100	0	7.5	0.0
30	300	WALLS	120	0	9.0	0.0
50	60	FINISH CONCRETE	40	0	3.0	0.0
60	90	ROOF	130	0	9.7	0.0
90	130	ELECTRICAL	120	0	9.0	0.0
130	180	PAINT WALLS	90	0	6.7	0.0
130	190	INTERIOR WALLS	80	0	6.0	0.0
180	190	PLUMBING	120	0	9.0	0.0
190	250	PAINT EXTERIOR	100	0	7.5	0.0
250	300	FLOORS	150	0	11.2	0.0
300	370	LANDSCAPE	100	0	7.5	0.0
		TOTALS:	1,328	0		0.0

Figure 20. IWPR data base output--IWPR data for a schedule number.

Sch. No.	Battalion	Title	Location
390172	79	BILLET II	RANGE 39
390173	79	BILLET I	RANGE 39
390271	79	TARGET SECTION 2	RANGE 39
420130	293	TANK PARK EARTH	RANGE 42
420230	293	DEFILADE POSITION 1	RANGE 42
420330	293	HARDSTAND 1	RANGE 42

Figure 21. IWPR data base output--schedule numbers of tasks with IWPR data.

This information must be entered into the computer only once during the construction season; this would be done as soon as the catalog is produced. Modifications and additions to the catalog can be made at any time.

The Equipment Cost Data Base is accessed by selecting Option 10 on the Project Control Menu. This option displays the Equipment Cost Data Base Menu (Figure 23) on the screen. This menu has five options.

Option 1--ADD NEW EQUIPMENT. This option is used to add new equipment to the catalog.

Option 2--CHANGE EQUIPMENT COST DATA. This option is used to change information pertaining to a certain item number. The computer asks the user which equipment item should be changed and then allows the information to be changed or attachments to be added.

Option 3--DELETE EQUIPMENT OR ATTACHMENTS. This option allows the user to delete equipment items or attachments from the catalog. The computer asks which item the user wishes to delete and then deletes it.

Option 4--PRINT EQUIPMENT COST CATALOG. This option causes the printer to produce a copy of the Equipment Cost Catalog.

Option 0--EXIT. This option allows the user to leave the Equipment Cost Data Base and return to the Project Control Menu.

Concept of Operations--Project Control

The DBA must enter information into the Project Control Module in a specific sequence to avoid errors. After the required information has been entered into the Project Control Module, the weekly progress reports can be

ITEM NO.	NOMENCLATURE & FSN	ACQUISITION COST	DEPRECIATION COST (Unfunded)	OPERATION & MAINTENANCE COST (Funded)
1.0	Auger, Earth, Skid-Mounted, Gas Driven, 9ft Bore Depth, 3820-00-931-4509	$ 14,635.00	$ 1.59	$ 2.90
2.0	Auger, skid mounted, Texoma 3820-00-301-8293	$ 67,840.00	$ 6.03	$12.26
3.0	Batching Plant, Aggregate, Portable, 100 ton 3895-00-779-9123	$ 5,039.00	$ 0.68	$ 1.38
4.0	Bin Storage, Aggregate, Portable, 60 ton 3895-00-828-1136	$ 1,967.00	$ 0.32	$ 0.86
5.0	Blast Cleaning Machine, u/w Day Abrasive, Lin B73410 4940-00-277-2999	$ 540.00	$ 0.18	$ 0.69
6.0	Catwalk Pine Driver D76085 3815-00-190-3308	$ 325.00	(NOT REPORTABLE)	
7.0	Cleaner, steam Press Jet: Whl Mtd, 125 PSI, Oil HTD E32466 4940-00-186-0027	$ 1,899.00	$ 0.32	$ 0.86
9.0	Comdressor RCP, PWR DRVN: TRK 2 Wheel Pneu Tires, Gas Driven, 5 C 4310-00-733-2210	$ 1,555.00	$ 0.32	$ 0.86
8.0	Comoressor 5 CFM 4310-00-630-7969	$ 1,555.00	$ 0.32	$ 0.86
10.0	Comoressor RCP, PWR DRVN: TRK 2 Wheel Pneu Tires, Gas Driven, 5 C 4311-00-843-8885	$ 1,555.00	$ 0.00	$ 0.00
11.0	Comoressor RCP, PWR DRVN: AIR REC, Gas Driven 15 CFM 175 PSI, HGR5-8 4310-00-880-0186	$ 1,814.00	$ 0.32	$ 0.86

Figure 22. Equipment cost catalog (hourly rates).

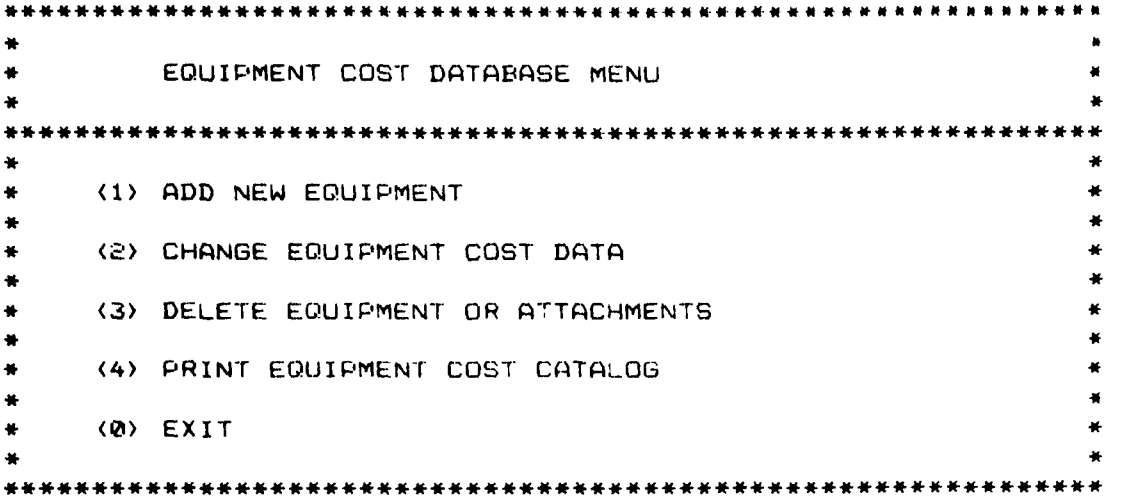

Figure 23. Equipment cost data base menu.

entered into the WPR Input Module. Once the WPRs have been entered, they can be processed using the Project Control Module and, finally, reports can be generated using the Reports Generation Module. The specific sequence is as follows:

1. The Equipment Cost Catalog should be entered into the Equipment Cost Data Base as soon as it is available; however, it does not need to be entered until just before any WPRs are entered into the Weekly Progress Report Module. This must be done only once during the construction season, and modifications should be made promptly.

2. The task data for each task should be entered into the Project Data Base as soon as it is available. This information is used by other data bases in the Project Control Module for error checking.

3. The customer billing information should be entered into the Customer Billing Data Base before any WPRs for tasks under the PN number are entered into the system. If the information is not entered for a PN number before the Customer Billing Report is generated, the system will not produce a customer bill for the PN number. The information for a PN number cannot be entered into the data base until at least one task under the PN number has been entered into the Project Data Base. Once the customer billing data are entered for a PN number, the computer will find all tasks under that PN number and include them in the customer billing report. Additional PN numbers can be added to the data base at any time; however, the WPRs for tasks under new PN numbers should not be entered into the system until the PN number has been added to the Customer Billing Data Base. Other modifications can be made to the data base at any time.

4. The Initial Weekly Progress Report of each task should be entered into the IWPR Data Base after the task data has been entered into the Project Data Base. This information must be entered for a task before any WPRs for that task can be entered into the system. If this is not done, the Weekly Progress Report Module will consider any subtask entered into the module invalid.

5. The Project Groups Data Base must be filled with the correct information before any reports other than the project status report can be generated. Most of the reports use the Project Groups Data Base to compile information and produce reports, and if the data base is not complete, some reports may be missing, incomplete, or incorrect. The project clusters and project groups can be entered into the data base at any time before report generation; however, schedule numbers of tasks within project groups cannot be entered until the task data for that task has been entered into the project data base. Each time a schedule number is added to the project data base, it should be added to the project group's data base to prevent the omission of the schedule number's data from reports.

6 WEEKLY PROGRESS REPORTING (WPR) MODULE

The WPR Module is used to enter Weekly Progress Reports into the system. Information from WPRs is processed in the Project Control Module and reports are generated in the Reports Generation Module.

Accessing the WPR Module

The WPR Module is accessed by selecting Option 6 on the main menu. With this option, the computer uses a dBASE-II program that allows the user to enter WPRs for the tasks. Since both the WPR Module and the Project Control Module use dBASE-II programs, data entry is the same for both.

Concept of Operations--Progress Reporting

The progress report data stored in the data bases provide the brigade with information necessary for project tracking and customer billing. Each week the project officers submit a WPR (Figure 24) on each of their tasks to the battalion DBA who, in turn, enters the data on that input form into the automated system. If the system should become nonoperational, the project officer would also complete the computational blocks on the WPR on which the project officer would record certain key items of information that the automated system would normally compute. This provides a manual backup system.

Each project officer receives a Project Status Report (Figure D4 in Appendix D) that shows cumulative manpower investments to date, physical progress, fiscal progress for that task, and an updated IWPR report for the task. This report also provides the OIC with certain key pieces of information to help in filling out computation blocks on the WPR sheets, should the automated system become nonoperational.

The DBA should take less than 5 minutes to input the data from a single task WPR. Assuming 20 tasks per battalion, it should take about 3 hours to input all the data for the battalion. However, the battalion will no longer be required to prepare weekly or monthly consolidated project status and billing reports, because the system will produce this information. An analysis of the new WPR form indicates an 80+ percent reduction in entries and processing required versus the old form. If the automated system should become nonoperational, project officer time is still saved because there is a 60+ percent reduction in entries and processing required for the manual WPR form versus the old form. Instructions for filling out the WPR sheets are in Appendix C.

Section I: Task Identification

(1) Task Number _____
(3) Title: _____
(5) Start Date: _____
(7) Number of days ahead (+) or behind (-) critical path: _____
(8) Percent scheduled complete from CWS: _____

PERIOD END: _____
(2) Bn/Co/Plt: _____
(4) Location: _____
(6) Completion Date: _____

Section II: PERSONNEL USE THIS PERIOD

US TDY RATE	SUPPORT (9) TDY MANDAYS NOT CHARGED TO JOB		DIRECT CONSTRUCTION (10) TDY MANDAYS CHARGED TO JOB		(11) MANDAYS WORKED ON SITE		(12) MANDAYS LOST DUE TO		
	Period	To Date	Period	To Date	Period	To Date		Period	To Date
OFF							Weather		
NCO							Maint		
EM							Other		

Section III: EQUIPMENT USED THIS PERIOD

(13) CODE	(14) DESCRIPTION	(15) HR RATE	(16) US EQUIP HRS		(17) CSC EQUIP HRS	
			Period	To Date	Period	To Date

Section IV: Other Cost(s) this period

(18) CSC Labor: _____
(19) CSC TDY: _____
(20) CSC Equip: _____
(21) Rental Fees: _____
(22) Transportation: _____
(23) Other US TDY: _____

Figure 24. Weekly progress report form.

Section V: Construction Work by Subtask (Activity)

(24) TASK WT	TASK

(25) I-J	(26) SUBTASKS	(27) SCH MHRS	(28) ACT MHRS Period	(28) ACT MHRS To Date	(29) WT	(30) PHY % COMP	(31) PROGRESS

Section VI: (32) Remarks

(33) CSC Additional Expenses		(34) Period	(35) To Date	(36) Period	(37) To Date	(38)) Period	(39) To Date
	Mandays	A		B		C	
	Cost ($)	A		B		C	

DISTRIBUTION:

_____TCU
_____18th ENGR BDE
_____CUSTOMER
_____USAEDE

AUTHENTICATION:

_____OIC/NCOIC
_____CO CDR
_____BN S-3

Figure 24. (Cont'd).

7 REPORTS GENERATION MODULE

This module produces the construction status reports and customer billing reports from the WPRs. This can be done only after the WPRs have been processed.

Accessing the Reports Generation Module

The Reports Generation Module is accessed by selecting Option 3 on the main menu. This option displays the menu in Figure 25 on the terminal screen. Each menu option causes a specific report to be generated once the user provides the reporting period for the report desired. However, this module produces only the most current report; reports for past reporting periods cannot be produced.

Weekly Construction Status Report

A Weekly Construction Status Report (Appendix D) is produced for each project group in a cluster. The user has the option of producing the reports for one or all clusters. The report lists the physical progress for each task in the reporting group. All figures are taken directly from the Weekly Progress Report except the percent actual complete which is calculated by summing the progress of each subtask in the task. The progress of the activity is computed by multiplying the percent weight of the subtask by the percent complete of the subtask and dividing that figure by 100.

Weekly Construction Status Summary Report

A Weekly Construction Status Summary Report (Appendix D) is produced for a cluster immediately after the Weekly Construction Status Report is produced. The report lists the physical and financial progress for all project groups in the cluster.

Both the percent scheduled and percent actual complete of the groups are calculated in the same way. For each task in the group the percent scheduled/actual complete is multiplied by the percent weight of the task in the project group (taken from the S-3 report) and divided by 100; those figures are then summed to calculate the total scheduled/actual complete for the project group.

The funding for the project groups is calculated by summing the funds of each task in the project group. Percent financial complete is calculated by dividing the expended funds by the allocated funds for the project group and multiplying by 100.

S-3 Weekly Construction Status Report

The S-3 Weekly Construction Status Report (Appendix D) is produced weekly for every project group in a cluster. The report lists the description,

```
[1] Weekly Const. Status Report          [6] Customer Billing Report
[2]                                      [7] Battalion Cost Report
[3] S-3 Weekly Report                    [8] Summary Construction Cost Report
[4]                                      [9] Project Equipment Report
[5] Project Status Report               [10] Monthly Troop Const. Cost Report
         (Function [Ø] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]      [  ]



 Current Drive = A        List of Pertinent Files        Current User =  Ø
||                       ||                        ||                      ||
||                       ||                        ||                      ||
||                       ||                        ||                      ||
||                       ||                        ||                      ||
||                       ||                        ||                      ||
||                       ||                        ||                      ||
```

Figure 25. Reports generation menu.

scheduled manhours, actual manhours, percent progress, percent scheduled complete, percent actual complete, and percent weight of every task in the project group. All data are taken from the WPR data; however, the computer calculates the following figures from those data.

Percent Weight--The percent weight of the task is the percent work of the project group scheduled for that task. This figure is calculated by dividing the scheduled manhours for the task by the total number of scheduled manhours in the project group and multiplying that figure by 100.

Progress--The progress of the task is the percent of progress contributed by the task to the completion of all construction of the project group. This figure is calculated by multiplying the percent of work completed on the task by the percent weight of the task and dividing that figure by 100.

Percent Actual Complete--The percent of the task actually complete. This figure is computed by summing the progress of each subtask of the task. The progress of the activity is computed by multiplying the percent weight of the subtask by the percent complete of the subtask.

The last line of the S-3 Report gives the totals for the group. The percent weight of the group should be 100 percent. The total progress of the group is the sum of the progress of the tasks in the project group. The scheduled manhours of the group is the total of the scheduled manhours for the projects in the project group. The actual manhours of the group is the total of the actual manhours for the tasks in the project group.

Project Status Report

A Project Status Report (Appendix D) is produced weekly for each task for which a WPR has been entered and processed in a project group. The report gives up-to-date information such as physical progress, cumulative total manpower resource use, equipment resource use, and job financial progress. The user may have a project status report printed for every schedule number in any project group or cluster. When the project status reports are printed, the user has two options: (1) to print Project Status Reports for tasks that have been processed for the current reporting period, or (2) to print the most current Project Status Report for all tasks in the groups or clusters selected. With the second option, if a WPR had not been processed for any task in the current reporting period, the system would print the most current status report for the task.

Most of the data on the Project Status Report are taken from the WPR. Percent actual complete is calculated in the same way as for the Weekly Construction Status Report and the S-3 report. US TDY costs are calculated by multiplying US TDY mandays by cost per day. US equipment costs include any charges for rental fees or transportation (blocks 21 and 22 on the WPR). The equipment cost block itemizes all equipment costs (US and CSG); therefore, the weekly total listed will include both CSG and US equipment costs.

Customer Billing Report

The Customer Billing Report (Appendix D) is produced weekly for each PN number. The report lists the allocated funds, costs to date, previous cumulative billing, billing this period, and current balance for the PN number. It also states which tasks were included in the report.

Battalion Cost Report

A Battalion Cost Report is produced weekly for every battalion. The report summarizes all costs of work placed on tasks which are the responsibility of a given battalion. These costs include allocated funds, cost to date, previous cumulative costs, cost this period, and balance.

Summary Construction Cost Report

The Summary Construction Status Report (Appendix D) is produced weekly for any project cluster. The report lists the physical and financial progress for project groups in the cluster. The report generated by the computer is labeled "Detailed Construction Cost Report."

Task Equipment Cost Report

The Task Equipment Cost Report can be generated for any task for any time span. The time span must begin and end on dates for which a WPR was processed for the task. The report lists all equipment costs charged to the task during the time span requested.

Monthly Troop Construction Report

The Monthly Troop Construction Report (Appendix D) is produced for each battalion. The report lists the actual work done and the financial progress for the month for each task on which the battalion is working. All figures are calculated as for other reports.

8 GENERAL APPLICATIONS (LIBRARY) MODULE

The general applications module provides the user with additional capabilities not necessary to construction management, but essential to the support of the system.

Accessing the General Applications Module

The General Applications Module is accessed by selecting Option 10, the System Utility Functions Menu (Figure 26), on the main menu. From this menu, the user can access any of the utility functions and the programs Wordstar and SuperCalc. The first option on the menu is "Set Printer." This option applies only to the hardware configuration the 18th Engineer Brigade uses and allows the user to print hard copies of reports. The option "Set Date" on this menu allows the user to input a date that will appear on the system's menu; however, no date is necessary to use the system.

Data Base Backup Menu

Option 5 on the System Utility Function Menu is the Data Base Backup Menu (Figure 27). This menu has seven options. The options on this menu are hardware-dependent and may not function on hardware configurations other than the one used by the 18th Engineer Brigade.

Option 1--FAST BACKUP TO B DRIVE. This option backs up all data bases to B drive on the hard disk.

Option 3--AFTER PROCESSING WPR BACKUPS. This option allows the user to back up all data bases to B drive and also make backup copies of all data bases on diskettes.

Option 5--CERL DATA BASE FILE STATUS REPORT. This option generates a report on the status of all data base files. CERL uses this report to correct problems that may occur within the system.

Options 6 through 9--These options allow the user to make backup copies on diskettes of the various data bases. They are important for protecting data in case something should happen to the copies of the data bases stored on the computer's hard disk.

Wordstar

Wordstar is an off-the-shelf word processing program. In effect, the program turns the computer into a typewriter, only with better features. The text appears on the terminal screen and is stored in the computer memory. Corrections can be made easily without retyping the entire text. Copies of the text are produced by the printer when entry is complete. Since the text

```
[1] Set Printer                          [6] WordStar
[2]                                      [7]
[3] Set Date                             [8] SuperCalc
[4]                                      [9]
[5] DataBase BackUp Menu                [10] General Utility Functions Menu
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]      [  ]
```



```
  Current Drive = A          List of Pertinent Files          Current User =  1
||                        ||                        ||                        ||
||                        ||                        ||                        ||
||                        ||                        ||                        ||
||                        ||                        ||                        ||
||                        ||                        ||                        ||
||                        ||                        ||                        ||
```

Figure 26. System utility functions menu.

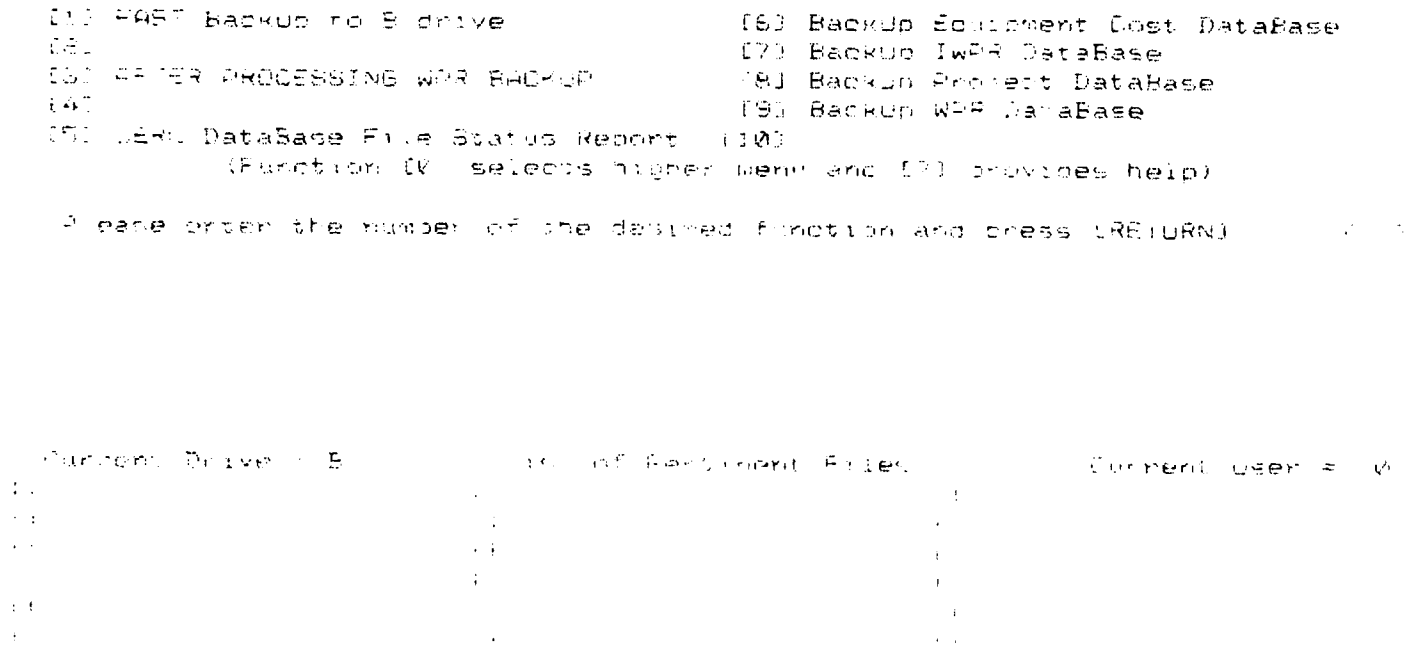

Figure 27. Data base backup menu.

is stored in the computer memory, it can be accessed later and altered or just printed again. Instructions to use the program are available elsewhere.[4]

SuperCalc

This program is an off-the-shelf electronic spreadsheet used to solve financial and business problems. It is an excellent method for establishing a budget. Detailed instructions in the use of the program are available elsewhere.[5]

General Utility Functions Menu

The General Utility Functions Menu is shown in Figure 28. This menu has three options, each of which is another menu. This menu allows the user access to all service and support functions for both the hard disk and diskettes.

File/Hard Disk/Diskette Support Menu

This menu (Figure 29) is accessed by selecting Option 2 on the General Utilities Functions Menu. These options are hardware-dependent and may not function on hardware configurations other than the one used by the 18th Engineer Brigade.

Option1--RENAME A FILE. This option allows the user to rename any file.

Option 2--DISPLAY FILES ON DRIVE. This option allows the user to display a list of the files on any computer drive.

Option 3--PRINT LIST OF FILES ON DRIVE. This option causes the printer to produce a list of the files on any computer drive.

Option 4--CHECK SPACE LEFT ON DRIVE. This option allows the user to find out how much memory space remains on any computer drive.

Option 5--CHECK SIZE OF FILE. This option allows the user to find out how much memory space a file occupies.

Option 6--COPY A FILE. This option allows the user to make a copy of any file and place it on any drive in the system.

Option 7--DUPLICATE A DISKETTE. This option allows the user to make a duplicate of a diskette. It gives all necessary instructions to the user.

---

[4]Arthur Naiman, Introduction to Wordstar (Sybex, Inc., 1982); Wordstar General Information Manual (Micropro International Corp., 1981); Wordstar Reference Manual (Micropro International Corp., 1981).

[5]SuperCalc User's Guide and Reference Manual (SORCIM, 1981).

```
[1]                                          [6]
[2] File/HardDisk/Diskette Support           [7]
[3]                                          [8]
[4] HardDisk BackUp/Restore Menu             [9] HARD DISK Service/Support Menu
[5]                                         [10]
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]        [  ]
```

```
  Current Drive = A          List of Pertinent Files          Current User =  0
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
```

Figure 28. General utilities functions menu.

```
[1] RENAME A File                          [6] COPY A File
[2] DISPLAY Files On Drive                 [7] DUPLICATE A Diskette
[3] PRINT List OF Files On Drive           [8] ERASE A File
[4] CHECK Space Left On Drive              [9] ERASE A Diskette
[5] CHECK Size Of File                    [10] VALIDATE Medium Of Diskette
        (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]      [  ]

  Current Drive = A          List of Pertinent Files          Current User =  0
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
||                          ||                          ||                  ||
```

Figure 29. File/hard disk/diskette support menu.

Option 8--ERASE A FILE. This option erases a file from a drive. Caution should be used with this option because data cannot be retrieved once it has been erased.

Option 9--ERASE A DISKETTE. This option erases all data from a diskette.

Option 10--VALIDATE MEDIUM OF DISKETTE. This option checks a diskette to make sure files can be read from and copied to the diskette.

Hard Disk Backup/Restore Menu

This menu (Figure 30 is accessed by selecting Option 4 on the General Utility Functions Menu. The two options on the menu may be hardware-dependent. Option 1, Restore Diskette to Hard Disk, copies all data on a diskette to the hard disk. Option 5, Receive CERL Submit Diskette, allows the computer to receive a submit diskette. CERL would make this diskette to correct problems within the ACMS.

Hard Disk Service/Support Menu

This menu (Figure 31) is accessed by selecting Option 9 on the General Utility Functions Menu. The options on this menu are hardware-dependent and may not function on all hardware configurations. The first two options, Inspect Hard Disk Data Blocks and List Files With Bad Data Blocks, help the user and CERL in diagnosing problems within the system. Option 7, Stabilize Hardware Disk for Shipping, allows the user to prepare the computer for transport. When this option is selected, the computer moves the hard disk into a position where it is less likely to be damaged during movement.

```
[1] RESTORE Diskette To HardDisk        [6]
[2]                                     [7]
[3]                                     [8]
[4]                                     [9]
[5] RECEIVE CERL Submit Diskette       [10]
          (Function [0] selects higher menu and [?] provides help)

 Please enter the number of the desired function and press [RETURN]      [  ]
```



```
  Current Drive = A          List of Pertinent Files          Current User =  0
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
||                          ||                          ||                          ||
```

Figure 30. Hard disk backup/restore menu.

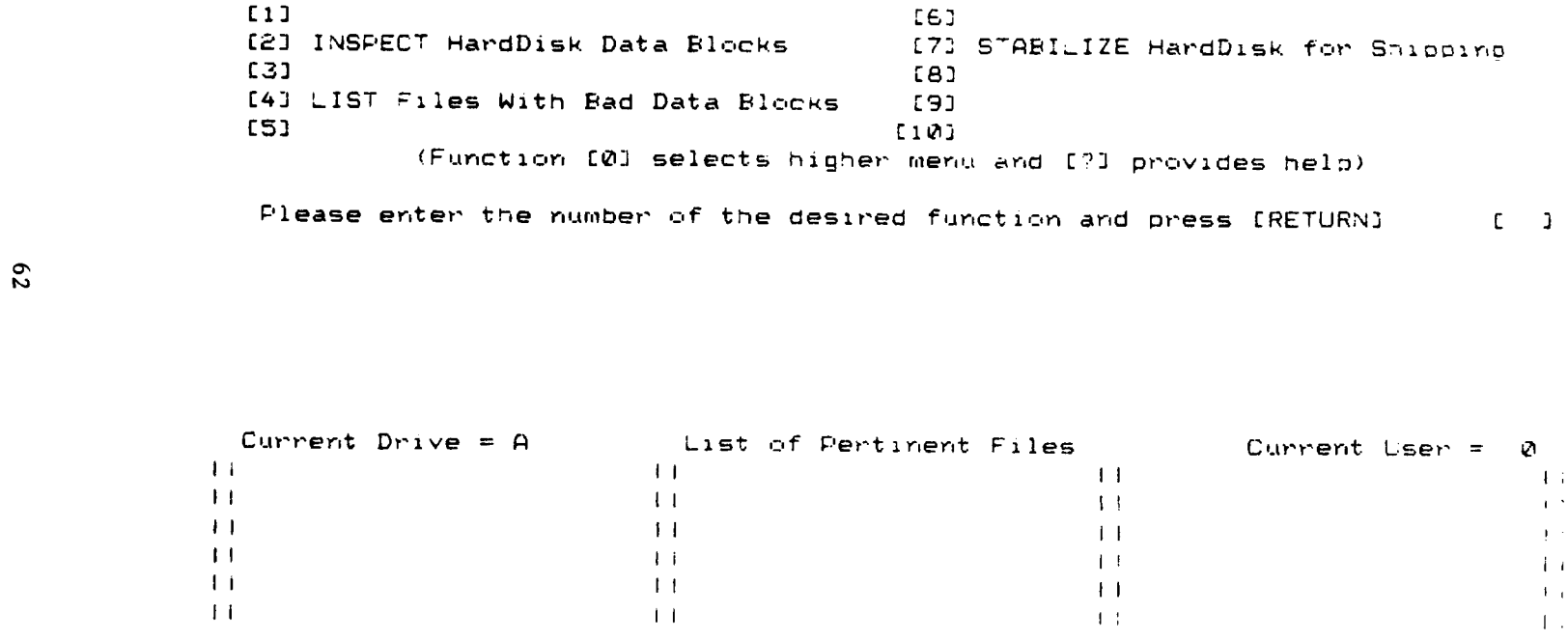

Figure 31. Hard disk/service report.

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06/04/83 ACTIVITY EDIT LISTING - MOVING TARGET SECTION 2 PAGE 1
18TH ENGINEER BRIGADE

SN	EN	DUR	%CP	ACT-ST / ACT-FN	DESCRIPTION	H/V	MANHR	AUX-2	ARTEP	PLANNED MAT	PLANNED LAB	PLANNED BUR	ACTUAL MAT	ACTUAL LAB	ACTUAL BUR
1	5	0	0		SYSTEM REQUIREMENT		0	0		0	0	0	0	0	0
5	20	3	0		CONSTRUCT BOROW PIT (2)	H	36	0	13-7	0	0	0	0	0	0
5	30	2	0		REMOVE EXISTING RAILS (3)	H	36	0		0	0	0	0	0	0
20	30	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
30	50	8	0		CONSTRUCT NEW BERM	H	192	0	13-8	0	0	0	0	0	0
30	60	8	0		REMOVE EXISTING BERM	H	192	0	13-7	0	0	0	0	0	0
30	300	3	0		MTS DRAINAGE	H	36	0	13-20	0	0	0	0	0	0
50	60	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
60	90	3	0		CLEAR AND GRUB MTS	H	36	0	13-3	0	0	0	0	0	0
90	130	4	0		MTS SUBBASE GRADE	H	72	0	13-11	0	0	0	0	0	0
130	180	6	0		MTS CULVERTS	H	126	0	13-22	0	0	0	0	0	0
130	190	3	0		MTS PLACE BASE COURSE	H	72	0	13-11	0	0	0	0	0	0
180	190	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
190	250	4	0		MTS FINAL GRADE	H	72	0	13-8	0	0	0	0	0	0
250	300	2	0		INSTALL SHELTER	H	48	0		0	0	0	0	0	0
300	370	5	0		LANDSCAPE MTS	H	150	0	13-15	0	0	0	0	0	0
										0	0	0	0	0	0

Figure A1. Edit listing.

06/04/83 ACTIVITY REPORT FOR MOVING TARGET SECTION 2 PAGE 1
18TH ENGINEER BRIGADE

SNODE	ENODE	DUR	%CP		START FINISH	STATUS
1	5	0	0%	H/V =	SYSTEM REQUIREMENT	
				MANHR= 0	EARLY - 07/06/83 07/06/83	
				AUX-2= 0	LATE - 07/06/83 07/06/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	20	3	0%	H/V = H	CONSTRUCT BOROW PIT (2)	CRITICAL
				MANHR= 36	EARLY - 07/06/83 07/11/83	
				AUX-2= 0	LATE - 07/06/83 07/11/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	30	2	0%	H/V = H	REMOVE EXISTING RAILS (3)	
				MANHR= 36	EARLY - 07/06/83 07/07/83	
				AUX-2= 0	LATE - 07/07/83 07/11/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 1 / 1	
20	30	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 07/12/83 07/12/83	
				AUX-2= 0	LATE - 07/12/83 07/12/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	50	8	0%	H/V = H	CONSTRUCT NEW BERM	CRITICAL
				MANHR= 192	EARLY - 07/12/83 07/25/83	
				AUX-2= 0	LATE - 07/12/83 07/25/83	
				ARTEP= 13-8	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	60	8	0%	H/V = H	REMOVE EXISTING BERM	CRITICAL
				MANHR= 192	EARLY - 07/12/83 07/25/83	
				AUX-2= 0	LATE - 07/12/83 07/25/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	300	3	0%	H/V = H	MTS DRAINAGE	
				MANHR= 36	EARLY - 07/12/83 07/14/83	
				AUX-2= 0	LATE - 08/23/83 08/25/83	
				ARTEP= 13-20	ACTUAL-	
					TOTAL/FREE FLOAT = 24 / 24	
50	60	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 07/26/83 07/26/83	
				AUX-2= 0	LATE - 07/26/83 07/26/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
60	90	3	0%	H/V = H	CLEAR AND GRUB MTS	CRITICAL
				MANHR= 36	EARLY - 07/26/83 07/28/83	
				AUX-2= 0	LATE - 07/26/83 07/28/83	
				ARTEP= 13-3	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	

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Figure A2. Detailed activity (subtask) report.

SNODE	ENODE	DUR	%CP		START FINISH	STATUS
90	130	4	0%	H/V = H	MTS SUBBASE GRADE	CRITICAL
				MANHR= 72	EARLY - 08/01/83 08/04/83	
				AUX-2= 0	LATE - 08/01/83 08/04/83	
				ARTEP= 13-11	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
130	180	6	0%	H/V = H	MTS CULVERTS	CRITICAL
				MANHR= 126	EARLY - 08/08/83 08/16/83	
				AUX-2= 0	LATE - 08/08/83 08/16/83	
				ARTEP= 13-22	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
130	190	3	0%	H/V = H	MTS PLACE BASE COURSE	
				MANHR= 72	EARLY - 08/08/83 08/10/83	
				AUX-2= 0	LATE - 08/11/83 08/16/83	
				ARTEP= 13-11	ACTUAL-	
					TOTAL/FREE FLOAT = 3 / 3	
180	190	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 08/17/83 08/17/83	
				AUX-2= 0	LATE - 08/17/83 08/17/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
190	250	4	0%	H/V = H	MTS FINAL GRADE	CRITICAL
				MANHR= 72	EARLY - 08/17/83 08/23/83	
				AUX-2= 0	LATE - 08/17/83 08/23/83	
				ARTEP= 13-8	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
250	300	2	0%	H/V = H	INSTALL SHELTER	CRITICAL
				MANHR= 48	EARLY - 08/24/83 08/25/83	
				AUX-2= 0	LATE - 08/24/83 08/25/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
300	370	5	0%	H/V = H	LANDSCAPE MTS	CRITICAL
				MANHR= 150	EARLY - 08/29/83 09/06/83	
				AUX-2= 0	LATE - 08/29/83 09/06/83	
				ARTEP= 13-15	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	

MOVING TARGET SECTION 2

CALCULATIONS BASED ON USING ACTUAL START/FINISH DATE LOGIC

TOTAL ACTUAL COST = 0
TOTAL PAYMENTS = 0
OVER / UNDER = 0

START/END DATES : 07/06/83
CUSTOMER : 7ATC
DAYS PER WEEK : 4
SORT PARAMETERS = / /

PROJECT MGR : 79/B/EM/SWAN
LAST PAYMENT DATE :
BURDEN % : 0

HOLIDAYS OMITTED

STARTS	LENGTH	DESCRIPTION
09/05/83	1	LABOR DAY

Figure A2. (Cont'd).

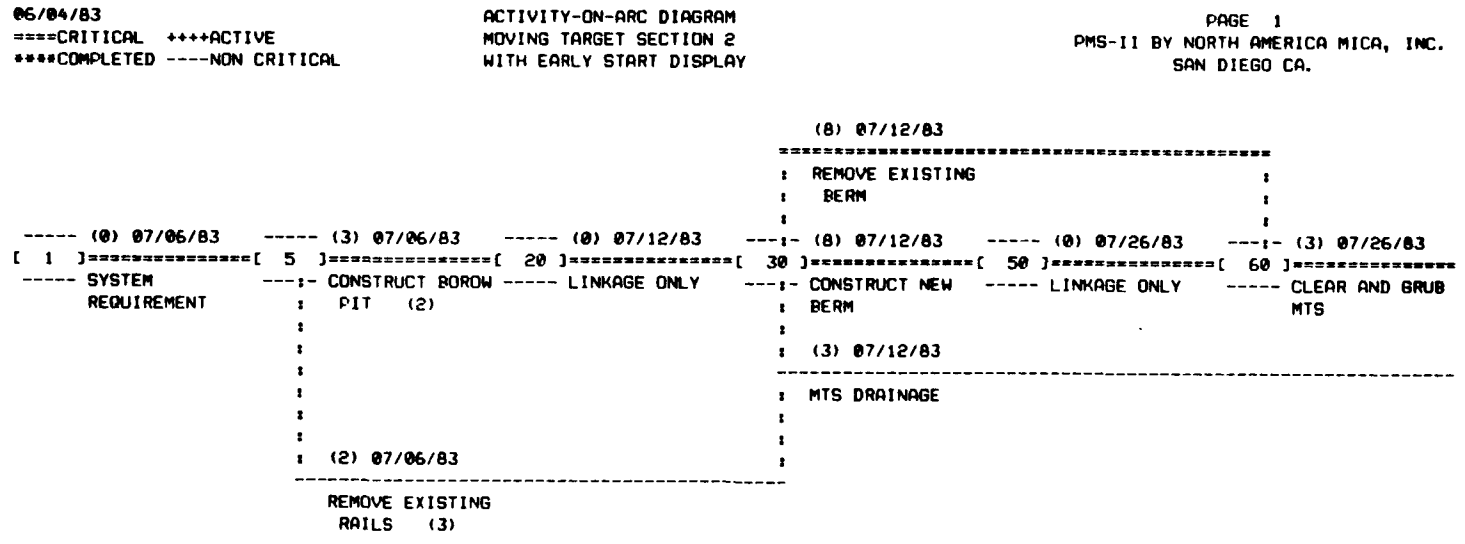

Figure A3. Arrow diagram.

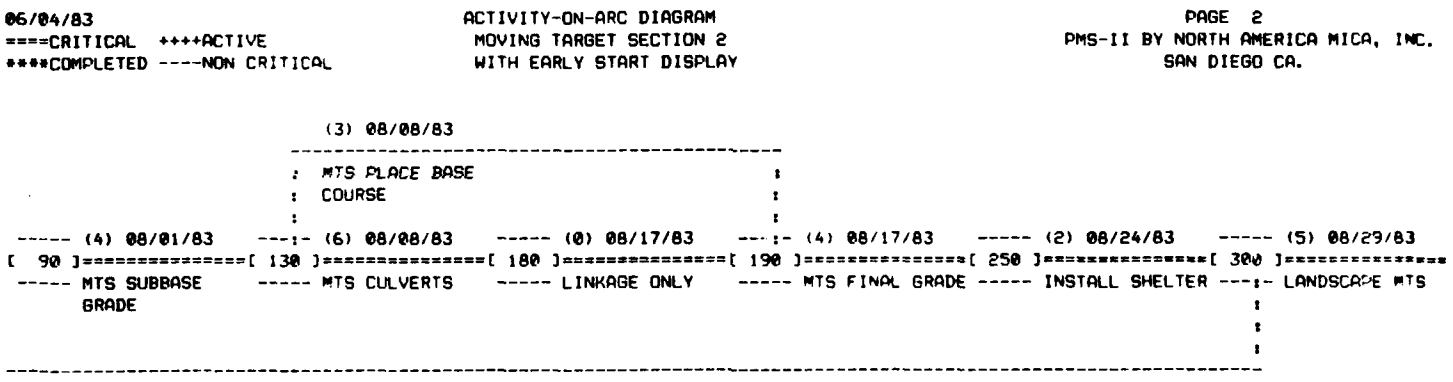

Figure A3. (Cont'd).

06/04/83
====CRITICAL ++++ACTIVE
****COMPLETED ----NON CRITICAL

ACTIVITY-ON-ARC DIAGRAM
MOVING TARGET SECTION 2
WITH EARLY START DISPLAY

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Figure A3. (Cont'd).

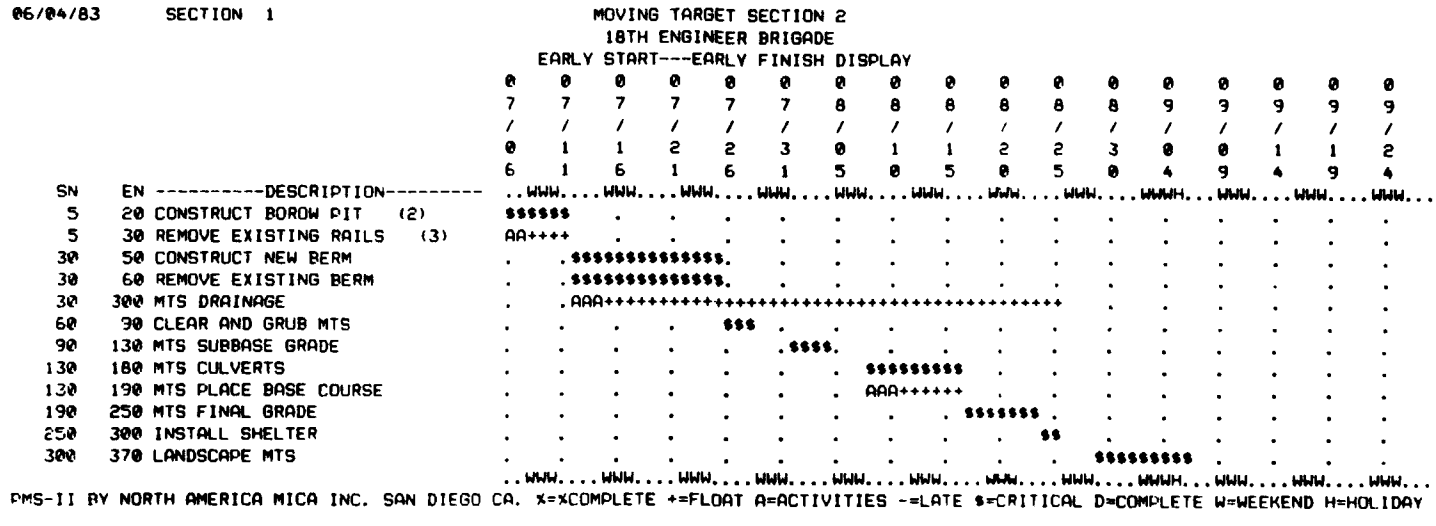

Figure A4. Gantt bar chart.

06/04/83 ACTIVITY REPORT FOR MOVING TARGET SECTION 2 PAGE 1
18TH ENGINEER BRIGADE

SNODE	ENODE	DUR	%CP		START FINISH	STATUS
1	5	0	0%	H/V =	SYSTEM REQUIREMENT	
				MANHR= 0	EARLY - 07/06/83 07/06/83	
				AUX-2= 0	LATE - 07/06/83 07/06/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	20	3	0%	H/V = H	CONSTRUCT BOROW PIT (2)	CRITICAL
				MANHR= 36	EARLY - 07/06/83 07/11/83	
				AUX-2= 0	LATE - 07/06/83 07/11/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	30	2	0%	H/V = H	REMOVE EXISTING RAILS (3)	
				MANHR= 36	EARLY - 07/06/83 07/07/83	
				AUX-2= 0	LATE - 07/07/83 07/11/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 1 / 1	
20	30	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 07/12/83 07/12/83	
				AUX-2= 0	LATE - 07/12/83 07/12/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	50	8	0%	H/V = H	CONSTRUCT NEW BERM	CRITICAL
				MANHR= 192	EARLY - 07/12/83 07/25/83	
				AUX-2= 0	LATE - 07/12/83 07/25/83	
				ARTEP= 13-8	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	60	8	0%	H/V = H	REMOVE EXISTING BERM	CRITICAL
				MANHR= 192	EARLY - 07/12/83 07/25/83	
				AUX-2= 0	LATE - 07/12/83 07/25/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	300	3	0%	H/V = H	MTS DRAINAGE	
				MANHR= 36	EARLY - 07/12/83 07/14/83	
				AUX-2= 0	LATE - 08/23/83 08/25/83	
				ARTEP= 13-20	ACTUAL-	
					TOTAL/FREE FLOAT = 24 / 24	
50	60	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 07/26/83 07/26/83	
				AUX-2= 0	LATE - 07/26/83 07/26/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
60	90	3	0%	H/V = H	CLEAR AND GRUB MTS	CRITICAL
				MANHR= 36	EARLY - 07/26/83 07/28/83	
				AUX-2= 0	LATE - 07/26/83 07/28/83	
				ARTEP= 13-3	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	

NEW START DATE
08/01/83

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Figure A5. "Marked-up" detailed activity (subtask) report.

SNODE	ENODE	DUR	%CP		START FINISH	STATUS
90	130	4	0%	H/V = H MANHR= 72 AUX-2= 0 ARTEP= 13-11	MTS SUBBASE GRADE EARLY - 08/01/83 08/04/83 LATE - 08/01/83 08/04/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	CRITICAL
130	180	6	0%	H/V = H MANHR= 126 AUX-2= 0 ARTEP= 13-22	MTS CULVERTS EARLY - 08/08/83 08/16/83 LATE - 08/08/83 08/16/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	CRITICAL
130	190	3	0%	H/V = H MANHR= 72 AUX-2= 0 ARTEP= 13-11	MTS PLACE BASE COURSE EARLY - 08/08/83 08/10/83 LATE - 08/11/83 08/16/83 ACTUAL- TOTAL/FREE FLOAT = 3 / 3	
180	190	0	0%	H/V = MANHR= 0 AUX-2= 0 ARTEP=	LINKAGE ONLY EARLY - 08/17/83 08/17/83 LATE - 08/17/83 08/17/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	
190	250	5	0%	H/V = H MANHR= 90 AUX-2= 0 ARTEP= 13-8	MTS FINAL GRADE EARLY - 08/17/83 08/23/83 LATE - 08/17/83 08/23/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	CRITICAL
250	300	3	0%	H/V = H MANHR= AUX-2= 0 ARTEP=	INSTALL SHELTER EARLY - 08/24/83 08/25/83 LATE - 08/24/83 08/25/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	CRITICAL
300	370	4	0%	H/V = H MANHR= AUX-2= 0 ARTEP= 13-15	LANDSCAPE MTS EARLY - 08/29/83 09/06/83 LATE - 08/29/83 09/06/83 ACTUAL- TOTAL/FREE FLOAT = 0 / 0	CRITICAL

MOVING TARGET SECTION 2

CALCULATIONS BASED ON USING ACTUAL START/FINISH DATE LOGIC

TOTAL ACTUAL COST = 0
TOTAL PAYMENTS = 0
OVER / UNDER = 0

START/END DATES : 07/06/83
CUSTOMER : 7ATC
DAYS PER WEEK : 4
SORT PARAMETERS = / /

PROJECT MGR : 79/B/EM/SWAN
LAST PAYMENT DATE :
BURDEN % : 0

HOLIDAYS OMITTED

STARTS	LENGTH	DESCRIPTION
09/05/83	1	LABOR DAY

Figure A5. (Cont'd).

date 08|01|83 page 1 of 1

[1] Schedule Number: 390271 (6 char) [2] Task Title: MOVING TARG. SECT. 2 (25 char max)

[3] Start Date: 08|01|83 (mmddyy) [4] Bn/Co/Plt: 79|B|GM|SWAN (20 char max)

[5] Workdays/Week: 4 (1-7) [6] Desired Completion Date: 09|06|83 (mmddyy)

A-ADD D-DELETE C-CHANGE [7]	START NODE I [8]	END NODE J [9]	TASK DESCRIPTION (30 characters max) [10]	DURATION (workdays) [11]	H-Horz. V-Vert. [12]	MAN HOURS OF EFFORT [13]	ARTEP TASK [14]
C	190	250	MTS FINAL GRADE	5	H	90	13-8
C	250	300	INSTALL SHELTER	3	H	72	
C	300	370	LANDSCAPE MTS	4	H	120	13-15

Figure A6. Change sheet.

00/01/83 ACTIVITY EDIT LISTING - MOVING TARGET SECTION 2 PAGE 1
18TH ENGINEER BRIGADE

SN	EN	DUR	%CP	ACT-ST ACT-FN	DESCRIPTION	H/V	MANHR	AUX-2	ARTEP	PLANNED MAT	PLANNED LAB	PLANNED BUR	ACTUAL MAT	ACTUAL LAB	ACTUAL BUR
1	5	0	0		SYSTEM REQUIREMENT		0	0		0	0	0	0	0	0
5	20	3	0		CONSTRUCT BORROW PIT (2)	H	36	0	13-7	0	0	0	0	0	0
5	30	2	0		REMOVE EXISTING RAILS (3)	H	36	0		0	0	0	0	0	0
20	30	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
30	50	8	0		CONSTRUCT NEW BERM	H	192	0	13-8	0	0	0	0	0	0
30	60	8	0		REMOVE EXISTING BERM	H	192	0	13-7	0	0	0	0	0	0
30	300	3	0		MTS DRAINAGE	H	36	0	13-20	0	0	0	0	0	0
50	60	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
60	90	3	0		CLEAR AND GRUB MTS	H	36	0	13-3	0	0	0	0	0	0
90	130	4	0		MTS SUBBASE GRADE	H	72	0	13-11	0	0	0	0	0	0
130	180	6	0		MTS CULVERTS	H	126	0	13-22	0	0	0	0	0	0
130	190	3	0		MTS PLACE BASE COURSE	H	72	0	13-11	0	0	0	0	0	0
180	190	0	0		LINKAGE ONLY		0	0		0	0	0	0	0	0
190	250	5	0		MTS FINAL GRADE	H	90	0	13-8	0	0	0	0	0	0
250	300	3	0		INSTALL SHELTER	H	72	0		0	0	0	0	0	0
300	370	4	0		LANDSCAPE MTS	H	120	0	13-15	0	0	0	0	0	0
										0	0	0	0	0	0

Figure A7. Updated edit listing.

08/01/83 ACTIVITY REPORT FOR MOVING TARGET SECTION 2 PAGE 1
18TH ENGINEER BRIGADE

SNODE	ENODE	DUR	%CP		START FINISH	STATUS
1	5	0	0%	H/V =	SYSTEM REQUIREMENT	
				MANHR= 0	EARLY - 08/01/83 08/01/83	
				AUX-2= 0	LATE - 08/01/83 08/01/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	20	3	0%	H/V = H	CONSTRUCT BOROW PIT (2)	MUST START AND CRITICAL
				MANHR= 36	EARLY - 08/01/83 08/03/83	
				AUX-2= 0	LATE - 08/01/83 08/03/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
5	30	2	0%	H/V = H	REMOVE EXISTING RAILS (3)	POSSIBLE
				MANHR= 36	EARLY - 08/01/83 08/02/83	
				AUX-2= 0	LATE - 08/02/83 08/03/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 1 / 1	
20	30	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 08/04/83 08/04/83	
				AUX-2= 0	LATE - 08/04/83 08/04/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	50	8	0%	H/V = H	CONSTRUCT NEW BERM	CRITICAL
				MANHR= 192	EARLY - 08/04/83 08/17/83	
				AUX-2= 0	LATE - 08/04/83 08/17/83	
				ARTEP= 13-8	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	60	8	0%	H/V = H	REMOVE EXISTING BERM	CRITICAL
				MANHR= 192	EARLY - 08/04/83 08/17/83	
				AUX-2= 0	LATE - 08/04/83 08/17/83	
				ARTEP= 13-7	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
30	300	3	0%	H/V = H	MTS DRAINAGE	
				MANHR= 36	EARLY - 08/04/83 08/09/83	
				AUX-2= 0	LATE - 09/21/83 09/26/83	
				ARTEP= 13-20	ACTUAL-	
					TOTAL/FREE FLOAT = 27 / 27	
50	60	0	0%	H/V =	LINKAGE ONLY	
				MANHR= 0	EARLY - 08/18/83 08/18/83	
				AUX-2= 0	LATE - 08/18/83 08/18/83	
				ARTEP=	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	
60	90	3	0%	H/V = H	CLEAR AND GRUB MTS	CRITICAL
				MANHR= 36	EARLY - 08/18/83 08/23/83	
				AUX-2= 0	LATE - 08/18/83 08/23/83	
				ARTEP= 13-3	ACTUAL-	
					TOTAL/FREE FLOAT = 0 / 0	

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Figure A8. Updated detailed activity (subtask) report.

SNODE	ENODE	DUR	%CP			START	FINISH	STATUS
90	130	4	0%	H/V = H	MTS SUBBASE GRADE			CRITICAL
				MANHR= 72	EARLY -	08/24/83	08/30/83	
				AUX-2= 0	LATE -	08/24/83	08/30/83	
				ARTEP= 13-11	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			
130	180	6	0%	H/V = H	MTS CULVERTS			CRITICAL
				MANHR= 126	EARLY -	08/31/83	09/12/83	
				AUX-2= 0	LATE -	08/31/83	09/12/83	
				ARTEP= 13-22	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			
130	190	3	0%	H/V = H	MTS PLACE BASE COURSE			
				MANHR= 72	EARLY -	08/31/83	09/06/83	
				AUX-2= 0	LATE -	09/07/83	09/12/83	
				ARTEP= 13-11	ACTUAL-			
					TOTAL/FREE FLOAT = 3 / 3			
180	190	0	0%	H/V =	LINKAGE ONLY			
				MANHR= 0	EARLY -	09/13/83	09/13/83	
				AUX-2= 0	LATE -	09/13/83	09/13/83	
				ARTEP=	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			
190	250	5	0%	H/V = H	MTS FINAL GRADE			CRITICAL
				MANHR= 90	EARLY -	09/13/83	09/20/83	
				AUX-2= 0	LATE -	09/13/83	09/20/83	
				ARTEP= 13-8	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			
250	300	3	0%	H/V = H	INSTALL SHELTER			CRITICAL
				MANHR= 72	EARLY -	09/21/83	09/26/83	
				AUX-2= 0	LATE -	09/21/83	09/26/83	
				ARTEP=	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			
300	370	4	0%	H/V = H	LANDSCAPE MTS			CRITICAL
				MANHR= 120	EARLY -	09/27/83	10/03/83	
				AUX-2= 0	LATE -	09/27/83	10/03/83	
				ARTEP= 13-15	ACTUAL-			
					TOTAL/FREE FLOAT = 0 / 0			

MOVING TARGET SECTION 2

CALCULATIONS BASED ON USING ACTUAL START/FINISH DATE LOGIC

TOTAL ACTUAL COST = 0
TOTAL PAYMENTS = 0
OVER / UNDER = 0

START/END DATES : 08/01/83
CUSTOMER : 7ATC
DAYS PER WEEK : 4
SORT PARAMETERS = / /

PROJECT MGR : 79/B/EM/SWAN
LAST PAYMENT DATE :
BURDEN % : 0

HOLIDAYS OMITTED

STARTS	LENGTH	DESCRIPTION
09/05/83	1	LABOR DAY

Figure A8. (Cont'd).

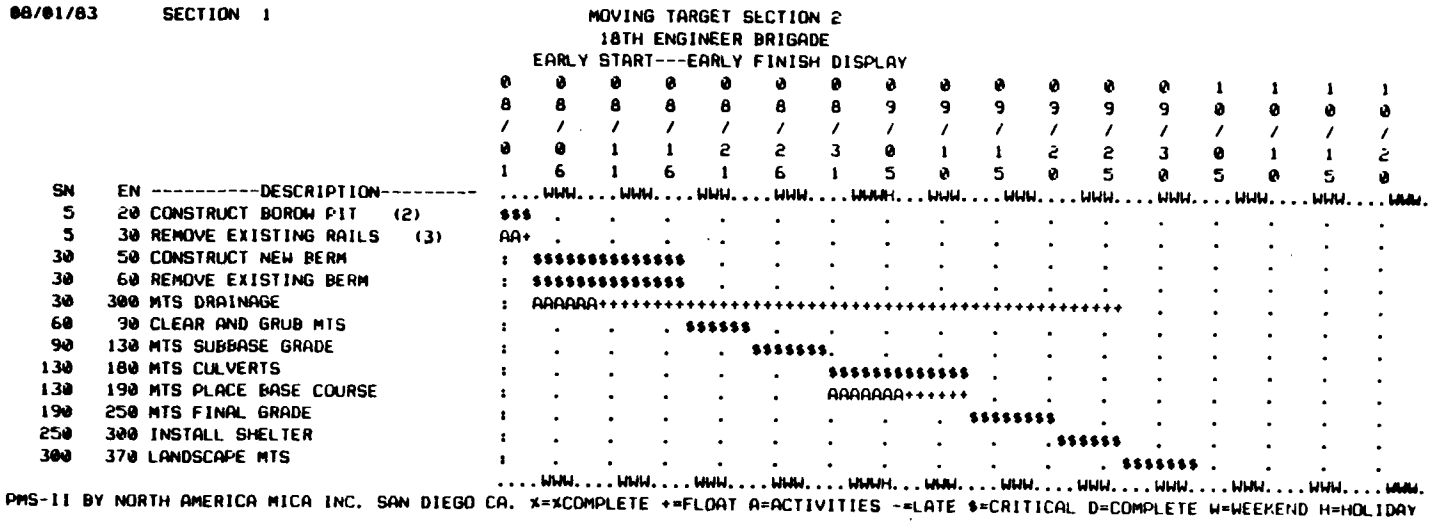

Figure A9. Updated Gantt bar chart.

APPENDIX B:

CPM DATA INPUT FORM AND INSTRUCTIONS

The CPM Data Input Form is used to establish the detailed breakdown of the project at the activity level and to establish the Initial Weekly Progress Report (IWPR) input. This form contains the information necessary to calculate actual versus scheduled completion, provides for error checking, and is the basis for producing the "Monthly Contractor and Troop Construction Cost Report," the "Project Status Report," and several other reports (Figure B1).

There are two possible uses of this input form: (1) the information can be entered into the Critical Path Method program which will check the network logic, calculate early and late event dates, and locate the critical path. A variety of reports, such as activity-on-arrow diagram and bar charts, can be produced; (2) the information can be used to fill out the initial WPR so that it may be entered into the IWP data base to allow weekly progress reporting to begin on the project, with no requirement for using the critical path calculations or subsequent reports.

Block 1. Enter the schedule number of the task. This is a six-character value assigned by the brigade and is unique to each task.

Block 2. Enter the task title (25 character maximum).

Block 3. Enter start date mmddyy format. Example: 2May83 = 050283.

Block 4. Enter BN/CO/PLT/OIC. Twenty characters including slashes can be used.

Block 5. Enter the number of workdays per week used in the planning of the task.

Block 6. Enter desired completion date (mmddyy).

Block 7. This block is used to indicate changes to be made to a CPM that has already been submitted.

(a) Enter an "A" to add a subtask and then complete blocks 8 through 17.

(b) Enter a "D" to delete a subtask and enter its I and J numbers in blocks 8 and 9.

(c) Enter a "C" to change a subtask. Enter its I and J numbers in blocks 8 and 9, and then make an entry in only those blocks to be changed.

Note: If the node numbers must be changed for network logic requirements, the following procedures may be used to change I or J. Enter C in block 7; enter original I and J; place the desired change(s) in parentheses next to the original I and/or J.

date 06 04 83 page 1 of 3

[1] Schedule Number: 91207 (6 char) [2] Task Title: TARGET SECTION 2 (25 char max)

[3] Start Date: 07 06 83 (mmddyy) [4] Bn/Co/Plt: 79 | B | 2 (20 char max)

[5] Workdays/Week: 4 (1-7) [6] Desired Completion Date: 0830 83 (mmddyy)

A-ADD D-DELETE C-CHANGE [7]	START NODE I [8]	END NODE J [9]	TASK DESCRIPTION (30 characters max) [10]	DURATION (workdays) [11]	H-Hori. V-Vert. [12]	MAN HOURS OF EFFORT [13]	ARTEP TASK [14]
	1	5	START	0		0	
	5	20	CONST. BORROW PIT	3	H	36	13-7
	5	30	REMOVE EXISTING RAILS	2	H	36	
	20	30	DUMMY	0		0	
	30	50	CONST. NEW BERM	8	H	192	13-8
	50	60	REMOVE EXISTING BERM	8	H	192	13-7
	30	300	MTS DRAINAGE	3	H	36	13-20
	50	60	DUMMY	0		0	
	60	90	CLEAR AND GRUB MTS	3	H	36	13-3
	90	130	MTS SUBBASE GRDE	4	H	72	13-11
	130	180	MTS CULVERTS	4	H	126	13-22
	130	190	MTS BASE COURSE	3	H	72	13-11
	180	190	DUMMY	0		0	

Figure B1. Example of a completed CPM input form.

Example:

Block (8)	Block (9)	
		The event identified by 5-20 is
5(7)	20(29)	now identified by 7-29.

Blocks 8 and 9. If the Critical Path Method Program is to be used, the following notation conventions must be observed when numbering the nodes of a network.

(a) The first I of the network must be the number 1.

(b) Only one subtask, the first subtask in the network, can begin with I=1.

(c) For every subtask the I number must be less than J.

(d) Number the I and J nodes in increments of 10 to allow for insertions and changes later. The node number must be five digits or less.

Block 10. Enter a subtask description of 30 characters maximum.

Block 11. Enter the duration of subtask in workdays. Duration is the number of "task" days (24-hour) to accomplish some task. Thus, it may take 5, 10, 20, or 30 days (duration) to accomplish 30 mandays of effort, depending on how many men work on the task each day.

Block 12. Enter "V" for vertical construction, "H" for horizontal.

Block 13. Enter total number of manhours of effort necessary to complete the subtask.

Block 14. Enter five-character ARTEP task number corresponding to the construction subtask. Example: 14-12.

date 06 04 83 page 1 of 3

[1] Schedule Number: 991071 (6 char) [2] Task Title: TARGET SECTION 2 (25 char max)

[3] Start Date: 07 06 83 (mmddyy) [4] Bn/Co/Plt: 79 | B | 2 (20 char max)

[5] Workdays/Week: 4 (1-7) [6] Desired Completion Date: 0830 83 (mmddyy)

A-ADD D-DELETE C-CHANGE [7]	START NODE I [8]	END NODE J [9]	TASK DESCRIPTION (30 characters max) [10]	DURATION (workdays) [11]	H-Hori. V-Vert. [12]	MAN HOURS OF EFFORT [13]	ARTEP TASK [14]
	1	5	START	0		0	
	5	20	CONST. BORROW PIT	3	H	36	13-7
	5	30	REMOVE EXISTING RAILS	2	H	36	
	20	30	DUMMY	0		0	
	30	50	CONST. NEW BERM	8	H	192	13-8
	30	60	REMOVE EXISTING BERM	8	H	192	13-7
	30	300	MTS DRAINAGE	3	H	36	13-20
	50	60	DUMMY	0		0	
	60	90	CLEAR AND GRUB MTS	3	H	36	13-3
	90	130	MTS SUBBASE GRDE	4	H	72	13-11
	130	180	MTS CULVERTS	4	H	126	13-22
	130	190	MTS BASE COURSE	3	H	72	13-11
	180	190	DUMMY	0		0	

Figure B1. Example of a completed CPM input form.

APPENDIX C:

WEEKLY PROGRESS REPORT (WPR) INSTRUCTIONS AND FORMS

WPR Input

The WPR is used to update existing information in the usage of mandays, equipment, and construction status based on one reporting period (Figures C1 and C2). This report is required from all project officers to each individual task.

Certain blocks on the WPR need only be completed should the ACMS become nonoperational. If this applies to a data block, it is noted in the following instructions.

Period end. A reporting period covers a 1-week span from Saturday through Friday. "Period end" is the date corresponding with close of business Friday. Reminder: All dates are informat mmddyy.

Block 1. The task number is obtained from the construction directive.

Block 2. Example: 293/A/2.

Block 3. The task title is obtained from the construction directive.

Block 4. Task location.

Block 5. "Start date" is the date work is scheduled to begin.

Block 6. Task completion date from CWS.

Block 7. Number of workdays the task is ahead or behind schedule.

Block 8. Percent scheduled complete from CWS.

Personnel use. Each type of personnel use has two blocks. The "Period" block is always completed and lists the personnel use for the reporting period. The "to date" block is completed only if the ACMS is nonoperational and is the sum of the personnel use for the period and the "to date" mandays for that personnel use from the previous reporting period's Project Status Report.

Block 9. Support personnel. Temporary duty (TDY) not chargeable to the job in mandays are support personnel or "overhead" persons supporting the workforce; e.g., clerks, toolroom keepers whose sole job is maintenance of tools, mechanics, brigade quality assurance people, and higher headquarters visitors or inspectors. This work is not chargeable to job costs.

Block 10. Direct construction personnel. TDY chargeable to the job in mandays are direct construction personnel working directly on a task, including necessary command and supervisory personnel and headquarters staff who are onsite to perform specific subtasks on the tasks. This work is chargeable to job costs.

Section I: Task Identification

PERIOD END: [illegible]

(1) Task number: 390271

(2) Bn/Co/Plt: [illegible] / A / [illegible]

(3) Title: TARGET SECTION 2

(4) Location: RANGE [illegible]

(5) Start Date: 040184

(6) Completion Date: [illegible]

(7) Number of days ahead (+) or behind (-) critical path: -3

(8) Percent scheduled complete from CWS: 17.0

Section II: PERSONNEL USE THIS PERIOD

US TDY RATE	SUPPORT (9) TDY MANDAYS NOT CHARGED TO JOB		DIRECT CONSTRUCTION (10) TDY MANDAYS CHARGED TO JOB		(11) MANDAYS WORKED ON SITE		(12) MANDAYS LOST DUE TO		
	Period	To Date	Period	To Date	Period	To Date		Period	To Date
OFF	1		1		1		Weather	0	
NCO	2		2		2		Maint	0	
EM	1		50		45		Other	5	

Section III: EQUIPMENT USED THIS PERIOD

(13) CODE	(14) DESCRIPTION	(15) HR RATE	(16) US EQUIP HRS Period	(16) US EQUIP HRS To Date	(17) CSC EQUIP HRS Period	(17) CSC EQUIP HRS To Date
16	CRANE SHOVEL		160			
16.1	BACK HOE		60			
1	AUGER		40			
72	PAVING MACHINE		50			

Section IV: Other Cost(s) this period

(18) CSC Labor: 0

(19) CSC TDY: 0

(20) CSC Equip: 0

(21) Rental Fees: 350

(22) Transportation: 0

(23) Other US TDY: [illegible]

Figure C1. Example of Weekly Progress Report input.

Section V: Construction Work by Subtask (or Activity)

(24) TASK WT	TASK

(25) I-J	(26) SUBTASKS	(27) SCH MHRS	(28) ACT MHRS Period	(28) ACT MHRS To Date	(29) WT	(30) PHY % COMP	(31) PROGRESS
30-50	CONST BERM		92			97	
30-60	REMOVE BERM		180			100	
25-70	CONST ROAD		50			90	
30-300	MTS DRAINAGE		38			90	

Section VI: (32) Remarks

(33) CSC Additional Expenses		(34) Period	(35) To Date	(36) Period	(37) To Date	(38)) Period	(39) To Date
	Mandays	A 0		B 0		C 0	
	Cost ($)	A 0		B 0		C 0	

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_____18th ENGR BDE
_____CUSTOMER
_____USAEDE

AUTHENTICATION:

_____OIC/NCOIC
_____CO CDR
_____BN S-3

Figure C1. (Cont'd).

Section I: Task Identification

(1) Task number: 39 C27 1
(3) Title: TARGET SECTION 2
(5) Start Date: 04 01 84
(7) Number of days ahead (+) or behind (-) critical path: - 2
(8) Percent scheduled complete from CWS: 17.0

PERIOD END: 05 04 84
(2) Bn/Co/Plt: 293 / A / 2
(4) Location: [illegible]
(6) Completion Date: [illegible]

Section II: PERSONNEL USE THIS PERIOD

US TDY RATE	SUPPORT (9) TDY MANDAYS NOT CHARGED TO JOB		DIRECT CONSTRUCTION (10) TDY MANDAYS CHARGED TO JOB		(11) MANDAYS WORKED ON SITE		(12) MANDAYS LOST DUE TO		
	Period	To Date	Period	To Date	Period	To Date		Period	To Date
OFF	1	4	1	4	1	4	Weather	0	10
NCO	2	8	2	8	2	8	Maint	0	14
EM	1	9	50	250	45	200	Other	5	24

Section III: EQUIPMENT USED THIS PERIOD

(13) CODE	(14) DESCRIPTION	(15) HR RATE	(16) US EQUIP HRS Period	(16) US EQUIP HRS To Date	(17) CSC EQUIP HRS Period	(17) CSC EQUIP HRS To Date
16	CRANE SHOVEL	18.87	160	490		
16.1	BACKHOE	1.38	60	360		
1	AUGER	2.90	40	94		
72	PAVING MACHINE	4.76	50	103		

Section IV: Other Cost(s) this period

(18) CSC Labor: 0
(19) CSC TDY: 0
(20) CSC Equip: 0
(21) Rental Fees: 350
(22) Transportation: 0
(23) Other US TDY: 250

Figure C2. Example of Weekly Progress Report with manual computation blocks completed.

Section V: Construction Work by Subtask (or Activity)

(24) TASK WT	TASK
13.0	TAXIWAY SECTION 2

(25) I-J	(26) SUBTASKS	(27) SCH MHRS	(28) ACT MHRS Period	(28) ACT MHRS To Date	(29) WT	(30) PHY % COMP	(31) PROGRESS
30-50	CONST BERM	192	92	92	20.9	47	9.8
30-60	CONST BERM	192	180	180	20.9	100	20.9
25-70	CONST ROAD	72	50	63	7.3	90	7.0
30-300	MTS DRAINAGE	36	38	38	3.9	90	3.5

Section VI: (32) Remarks

(33) CSC Additional Expenses		(34) Period	(35) To Date	(36) Period	(37) To Date	(38)) Period	(39) To Date
	Mandays	A 0	0	B 0	0	C 0	0
	Cost ($)	A 0	0	B 0	0	C 0	0

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_____CUSTOMER
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AUTHENTICATION:

_____OIC/NCOIC
_____CO CDR
_____BN S-3

Figure C2. (Cont'd).

Blocks 11 and 12. Entries in these blocks identify the TDY mandays charged to the job in Block 10. The estimation should be done as accurately as possible and rounded in favor of the task. The most important point to remember is to be consistent in the approximation. Example: Weather has resulted in a loss of approximately .5 day for a work force of 27. A good approximation to be used would be 14 mandays charged for that day worked onsite and 13 mandays charged for that day lost to weather. Block 11 is for mandays worked at the job site. Block 12 is for mandays lost while on TDY due to weather delay, maintenance downtime, or other factors. "Other" is defined as all mandays on TDY that have not been accounted for in the above categories of work onsite, weather, and maintenance. Some examples of these categories are staff duty officers (SDO), orderlies (CQ), compensatory time, and scheduled training.

Block 13. Equipment identification code taken from "Hourly Rates of Equipment Costs." Authorized equipment codes will be published periodically by the brigade.

Block 14. Equipment description taken from "Hourly Rates of Equipment Costs."

Block 15. Hourly rate of cost for operation and maintenance taken from "Hourly Rates of Equipment Costs." This block is to be completed only if the ACMS is nonoperational.

Equipment hours. There are two blocks of equipment hours for each type of equipment. The "period" equipment hours is always completed and is the number of hours a piece of equipment was used during the reporting period. The "to date" equipment hours blocks are completed only if the ACMS is nonoperational and is the sum of the "period" manhours for the equipment code and all previous hours the equipment was used for the task. These data can be found on a Summary Equipment Cost report that lists all equipment costs for the entire length of the task or by summarizing the equipment usage for the equipment code listed on all previous Project Status Reports.

Block 16. Number of hours for each piece of U.S. equipment used on the task during the reporting period.

Block 17. Number of hours for each piece of CSG equipment used on the task during the reporting period.

Block 18. CSG labor charges for the period.

Block 19. CSG TDY allowances for the period.

Block 20. CSG equipment charges for the period.

Block 21. Rental fees for the period.

Block 22. Transportation costs for the period.

Block 23. Other U.S. TDY costs for the period.

Block 24. Task weight taken from the S-3 report and the task title. This block is only completed if the ACMS is nonoperational.

Block 25. I-J number of subtasks (or activities) currently being worked on (even if completed during the current reporting period), or that have been started and are not 100 percent complete (even if they were not worked on during the current report period).

Block 26. Subtasks. This is the description of the subtask (or activity) from the IWPR.

Block 27. Scheduled manhours. This is taken from the IWPR. This block is only completed if the ACMS is nonoperational.

Block 28. Actual manhours. Manhours for the period are always listed. "To date" manhours need only be listed should the ACMS become nonoperational. These manhours are sum of the "period" manhours and the actual manhours listed on the IWPR output listing from the previous reporting period.

Block 29. Task (or activity) weight taken from the IWPR output listing. This block need only be completed should the ACMS become nonoperational.

Block 30. Physical percent complete.

Block 31. Progress. This block is only completed if the ACMS is nonoperational. Progress is computed by multiplying weight (Block 29) by physical percent complete (Block 30) and dividing by 100.

Block 32. Remarks. List S1, S2/3, S4, EMMO, TRAINING, and VISITORS. Address current problems and any items of interest or requests for action. Summarize significant weekly progress. Additional comments for clarification on the other blocks such as "Lost Time" are in order.

Block 33. CSG supplement allowance denoting mandays and U.S. cost (dollars) per period. None of these figures are entered into the ACMS.

Block 34. Type A CSG expenses for the period.

Block 35. Type A CSG expenses to date.

Block 36. Type B CSG expenses for the period.

Block 37. Type B CSG expenses to date.

Block 38. Type C CSG expenses for the period.

Block 39. Type C CSG expenses to date.

APPENDIX D:

CONSTRUCTION SUMMARY REPORTS

AS OF 09 MAR 84

AS 39

TASK	TITLE	SD	CD	%SCH	%ACT	+/-DAYS
[illegible]	TARGET SECTION 3	22-07-84	05-10-84	23.0	26.3	-5
[illegible]	TARGET SECTION 1	22-07-84	07-30-84	16.0	22.3	-6
[illegible]	TARGET SECTION	22-07-84	07-30-84	18.0	43.5	-14

Figure D1. Weekly Construction Status Report.

CONSTRUCTION AS OF 02 MAR 84

	%SCH	%ACT
RANGE 79	8.0	0.0
RANGE 39	8.0	0.0

FUNDING

	ALLOCATED	EXPENDED	%
RANGE 79	15,000.00	149.00	0.9
RANGE 39	29,555.00	2,588.50	8.7

Figure D2. Weekly Construction Status Summary Report.

RG 39 AS OF 09 MAR 84

%WT	PROGRESS	TASK	SCH MH	ACT MH	%SCH	%ACT
32.4	18.3	390271 TARGET SECTION 2	846	368	23.0	38.2
32.4	17.4	432011 TARGET SECTION 1	846	569	16.0	53.3
35.2	17.5	792333 TARGET SECTION	918	548	18.0	49.8
100.0	47.4		2,610	1,485		

Figure D3. S-3 Weekly Construction Status Report.

Section I: Task Identification

For Period: 09 MAR 84

(1) Task Number: 398271
(2) Bn/Co/Plt: 79 /B/1
(3) Title: TARGET SECTION 2
(4) Location : RANGE 39
(5) Start Date: 27 FEB 84
(5) Completion Date: 30 JUN 84
(7) Number of days ahead(+) or behind(-): -6
(8) Percent Scheduled complete from CWS : 23.0%
Percent Actual complete : 38.2%

Section II: Personnel Use Period/To Date

	SUPPORT		DIRECT CONSTRUCTION					
US TDY RATE	(9) TDY MANDAYS NOT CHARGED TO JOB		(10) TDY MANDAYS CHARGED TO JOB		(11) MANDAYS WORKED ON SITE		(12) MANDAYS LOST DUE TO	
	Period	To Date	Period	To Date	Period	To Date	Period	To Date
OFF	0	1	1	1	1	1	Weath 0	0
NCO	1	2	1	2	1	2	Maint 7	7
EM	0	1	48	51	33	41	Other	

Financial Progress To Date

TYPE FUNDS	ALLOCATED FUNDS ($)	EXPENDED TO DATE ($)	REMAINING FUNDS ($)	FINANCIAL % COMPLETE
US TDY	21855.00	71.00	20984.00	0.33%
US EQUIPMENT	3500.00	1428.75	2071.25	40.82%
CSC TDY	0.00	0.00	0.00	N/A
CSC EQUIPMENT	0.00	0.00	0.00	N/A
CSC LABOR	0.00	0.00	0.00	N/A
TOTALS	24555.00	1499.75	23055.25	6.10%

Figure D4. Project Status Report.

Weekly Equipment Cost Report For Period: 29 MAR 84

Task No. :390271 Title :TARGET SECTION 2
Bn/Co/Plt :79 /B/1 Location :RANGE 57

DESCRIPTION	ITEM NO.	$/HOUR	HOURS	COST
Crane Shovel, Basic Unit,	16. 0	$ 13.07	45	$ 5[illegible]
Backhoe Crane Shovel: 3/4 cu	16. 1	$ 1.38	45	$ [illegible]
Distributor Water Tank Type	23. 0	$ 4.76	20	$ 95.20
Drilling Machine, Percussion,	34. 0	$ 3.56	20	$ [illegible]
Generator Set, Diesel	30. 0	$ 2.23	100	$ 223.00
			WEEKLY TOTAL	$ [illegible]

Figure D4. (Cont'd).

AD-A143 031 AUTOMATED CONSTRUCTION MANAGEMENT SYSTEM (ACMS) VOLUME 1 USER'S GUIDE(U) CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN IL J S YOUNG JUN 84 1/2

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END
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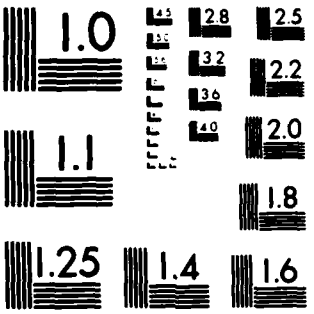

PN NUMBER: 3093-79-e20060 CUSTOMER: 7ATC

BILLING NUMBER: 2 From: 030284 To: 030984

DA FORM 2544: 3093-79-e2 DATE: 010184

TITLE: GRAF 84 UNIT: 37

TYPE OF FUNDS	ALLOCATED FUNDS	PROJECT COST TO DATE	PREVIOUS CUMULATIVE BILLING	BILLING THIS PERIOD	BALANCE
US TDY	21055.00	71.00	16.00	55.00	20984.00
US EQUIP	3500.00	1428.75	127.70	1301.05	2071.25
CSG TDY	0.00	0.00	0.00	0.00	0.00
CSG EQUIP	0.00	0.00	0.00	0.00	0.00
CSG LABOR	0.00	0.00	0.00	0.00	0.00
TOTAL	24555.00	1499.75	143.70	1356.05	23055.25

Schedules Included:

390271

Figure D5. Customer Billing Report.

BATTALION : 79 From: 02 MAR 84

REPORT NUMBER: 2 To: 30 MAR 84

TYPE OF FUNDS	ALLOCATED FUNDS	COST TO DATE	PREVIOUS CUMULATIVE COSTS	COST THIS PERIOD	BALANCE
US TDY	31055.00	636.00	131.00	505.00	30419.00
US EQUIP	10500.00	1608.65	307.60	1301.05	8891.35
CSG TDY	1000.00	0.00	0.00	0.00	1000.00
CSG EQUIP	1000.00	1382.00	300.00	1082.00	-382.00
CSG LABOR	1000.00	200.00	200.00	0.00	800.00
TOTAL	44555.00	3826.65	938.60	2888.05	40728.35

Projects Included:

390271 792333

Figure D6. Battalion Costs Report.

RG 39

AS OF 09 MAR 84

Allocated/Expended Funds

Sch. No.	US TDY	US EQIUP	CSG TDY	CSG EQUIP	CSG LABOR	TOTAL
390271	21,055.00	3,500.00	0.00	0.00	0.00	24,555.00
	71.00	1,428.75	0.00	0.00	0.00	1,499.75
432011	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00	20,000.00
	185.00	1,699.70	300.00	400.00	200.00	2,784.70
792333	10,000.00	7,000.00	1,000.00	1,000.00	1,000.00	20,000.00
	565.00	179.90	0.00	1,382.00	200.00	2,326.90
TOTAL	35,055.00	14,500.00	5,000.00	5,000.00	5,000.00	64,555.00
	821.00	3,308.35	300.00	1,782.00	400.00	6,611.35

Figure D7. Summary Construction Cost Report.

GRAF84 Summary Equipment Cost Report From:02 MAR 84 To:09 MAR 84

Schedule No. :370279 Title :BARRACKS
Battalion :37 Location :RANGE 79

DESCRIPTION	ITEM NO.	$/HOUR	HOURS	COST
Auger, Earth, Skid-Mounted,	1.0	$ 2.90	10	$ 29.00
Cleaner, steam Press Jet: Wh	7.0	$ 0.86	15	$ 12.90
Comdressor RCP, PWR DRVN:	9.0	$ 0.86	10	$ 8.60
	WEEKLY SUBTOTAL FOR 02 MAR 84			$ 50.50
Crane Shovel, Basic Unit,	16.0	$ 18.87	40	$ 754.80
Backhoe Crane Shovel: 3/4 cu	16.10	$ 1.38	40	$ 55.20
Crane, Shovel, Basic Unit	17.0	$ 7.26	40	$ 290.40
	WEEKLY SUBTOTAL FOR 02 MAR 84			$ 1100.40
	02 MAR 84 THROUGH 09 MAR 84			$ [illegible]

Figure D8. Project Equipment Cost Report.

Unit: 43
Period: 01 JAN 84 - 09 MAR 84

Task No. & Title	Percent Actually Placed (period/cumulative)		Total Estimated Contractor Cost ($)	Total Estimated Troop Cost ($)	Contractor Cost ($) Placed For Period	Troop Cons. Cost ($) Placed For Period	Direct Cons. Placed Man Days	Cumulative Man Days
Operations and Maintaienance, ARMY								
432011 TARGET SECTION 1 OMA43201118	53.9%	53.9%	$ 25000	$ 20000	$ 13475	$ 2784	64	64
430277 BARRACKS MCA37027918	22.0%	22.0%	$ 25000	$ 20000	$ 5512	$ 3376	77	77
Sub Total 7ATC		. . .	$ 50000	$ 40000	$ 18987	$ 6161	141	141
Total 43			$ 50000	$ 40000	$ 18987	$ 6161	282	141

Figure D9. Monthly Contractor and Troop Construction Report.

GLOSSARY

construction directive: a directive ordering the brigade to complete a construction project. The brigade breaks down each project into separate tasks.

construction task: the smallest unit of construction effort to which a unique construction schedule number is assigned and for which a weekly progress report is required of the task. (The automated system's reporting forms and software programs can also be used to track progress on other types of "tasks" such as training, Bn/Bde overhead, combat missions and studies.

cursor: position indicator frequently used in displays on a video terminal to indicate a character to be corrected or a position in which data is to be entered.

data base: an organization of data files for central access, retrieval, and update.

hardware: physical components of the computer system.

operating system: software required to manage hardware and logical resources of a system.

project: all work under a construction directive.

project cluster: a unique set of project groups for which there is some common characteristic shared by all groups in the set. Each cluster is designated by a unique name, such as "18th Engineer Brigade," "Grafenwoehr Upgrade," or "FE Projects."

project group: a unique set of individual tasks for which there is some common characteristic shared by all tasks in the set. Each group is designated by a unique name, such as "Range 94," "6 Engineer Bn," "FE Baumholder," or "Vertical Projects." An individual task may be a member of no group, one group, or multiple groups.

project number (PN): a unique number assigned to all work under a construction directive by the brigade.

software: instructions that tell the hardware of a system what to do with data.

subtask: an activity in a construction network which forms a task. The PMS-II program refers to activities which are equivalent to subtasks.

task: a construction network of subtasks. The PMS-II program refers to "projects," which are equivalent to "tasks."

Weekly Progress Report: a report prepared weekly by the Project Officer of each task giving the status of the construction task.

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USAES
ATTN: ATZA-CD
ATTN: ATZA-TDO-CTT
ATTN: ATZA-DTE
ATTN: ATZA-FM

Commanding General
35th Engineer Brigade (Corps)
Sherman Road
Jefferson Barracks, MO 63125

Commander
30th Engineer Brigade
North Carolina National Guard
ATTN: LTC S. L. Camacho
Charlotte, NC 28200

Commander
CECOM Software Development
Support Center
ATTN: DRCPM-OTDS-SDSC/Mr. Gary Dozier
Building 138
Fort Leavenworth, KS 66027

Commander
7th Engineer Brigade
APO New York 09154

Commander
18th Engineer Brigade
ATTN: MAJ Baldwin
APO New York 09164

Commander
18th Engineer Brigade
APO New York 09164

Commander
20th Engineer Brigade
ATTN: Automation Officer
Fort Bragg, NC 28307

Commander
130th Engineer Brigade
APO New York 09165

Commander
2nd Engineer Group
ATTN: Automation Officer
APO San Francisco 96301

CDR USACE (DAEN-RDM)
WASH DC 20314

Commander
Area Army, COE
Area B Dubling 8, Room 98
Wright Patterson AFB, OH 45433

Commander
36th Engineer Group
Fort Benning, GA 31905

Commander
937th Engineer Group
Fort Riley, KS 66442

Commander
High Technology Test Bed
9th Infantry Division
ATTN: AFYO-TD-FDCS/MAJ Barber
Fort Lewis, WA 98432

CDR USACE (DAEN-ZCM/Dr. Meyer)
WASH DC 20314

Commander
U.S. Army Combined Arms Center
ATTN: ATZL-CAC-IA/CPT Nelson
ATTN: ATZL-CAC-C/CPT Lynn
Fort Leavenworth, KS 66027

Commander
U.S. Army Communications and
Electronics Command
ATTN: DAC-PM-OTDS-SDSC/MAJ Harris
Fort Leavenworth, KS 66027

Commander
U.S. Army Engineer Division, Europe
ATTN: Chief ADP/Mr. Dahlen
APO New York 09757

Commander
USARMR VIII
ATTN: COL John Coats
Fitzsimons Army Medical Center
Aurora, CO 80045

Commander
Naval Construction Battalion Center
ATTN: Code 152/Mr. Beringer
Port Hueneme, CA 93043

Superintendent
U.S. Military Academy
ATTN: MADN-F
West Point, NY 10996

Superintendent
U.S. Air Force Academy
ATTN: DFCE/MAJ Topper
Colorado Springs, CO 80840

Commander
LCDR George Eustace
U.S. Naval School
Civil Engineering Corps, Office
ATTN: Code 061/LCDR Eustace
Port Hueneme, CA 93043

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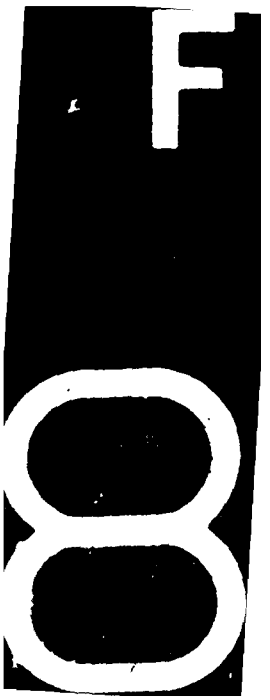
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