FACILITIES MAINTENANCE IN THE U.S. NAVY

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A REPORT PRESENTED TO THE GRADUATE COMMITTEE
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ABSTRACT

The main purpose of this paper is to examine the various aspects of Facilities Maintenance Management of Shore Activities in the U.S. Navy. Included also are some references to Marine Corps installation operations and maintenance as it differs from the Naval side.

The paper will show the operational areas that maintenance management is composed of (planning, execution, and appraisal) as well as the details of the structural organization tasked to administer the maintenance function (Public Works Department for the Navy and Marine Air Bases, Facilities Maintenance Office for Marine Corps Ground Activities). Numerous excerpts from Naval Facilities Maintenance Instructions are included as appendices to help further detail the maintenance operational procedures and forms management.

In the final chapter, the writer examines various aspects of service contracts as they apply to accomplishing the maintenance function. More commonly known as Facility Support Contracts, they encompass far more than the standard garbage collection or grounds maintenance tasks of years past.

It must be noted that this paper does not establish facilities maintenance or service contract policy; furthermore, it does not necessarily reflect the views of

the Navy. It there are any conflicts between this paper and the Naval Facilities Management Instructions, Marine Corps Orders, or the Naval Facilities Contracting Manual (P-68), then those applicable reference instructions are to be followed.

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CHAPTER I

INTRODUCTION

A. Background. The expression Facility Maintenance Management (FMM) has many wide interpretations. In many cases the FMM effort ranges from variations in the processing of work orders to a complete absence of any control whatsoever. At times, the FMM process suffers due to a lack of funding support for the overhead costs, that includes inspectors, planners and estimators, and work reception. Experienced Maintenance Managers have seen these problems. The point here is that the system described in this report does not have universal acceptance in the Navy; in fact, from activity to activity, many organizational differences can be found. However, when the system is used properly, it will achieve better maintained facilities at a lower cost to the command.

B. Objectives. The objectives of the maintenance management system are to maximize use of available resources through the following means:

1. Increased workforce productivity.

2. Provide a consistent and proper level of maintenance to all shore facilities.

3. Reduce Maintenance Costs

4. Provide appropriate response to command requirements.

C. Precepts. The Navy's Facility Maintenance Management system is based on several "maxims" or precepts:

1. Maintenance and Repairs (M&R) are less costly if caught in their incipient stages; therefore, the system should find and generate M&R instead of waiting for it to appear as a customer request or an emergency call.

2. Enough money is never available to accomplish all the M&R; therefore, a consistent system of job priorities, based upon operational considerations and maintenance standards, should be used.

3. The planning and programming of the activity's maintenance effort (Maintenance Control) is not the job of the shop's supervisors or the Maintenance Division Director. A separate staff organization is needed to determine what will and will not be done and when to do it.

4. Maintenance Management should view and analyze the maintenance effort after work performance, both in terms of individual job performance and maintenance division productivity as a whole. (1-6.9)

D. Functional Breakdown. The Facilities Management System translates the above objectives and precepts into a simple set of procedures aimed at increasing maintenance productivity through the use of a Planning Phase, an Execution Phase, and an Appraisal Phase. For a better

understanding, these three phases can be further subdivided as follows:

1. Planning Phase
    (a) Work Generation
    (b) Work Classification
    (c) Work Input Control
    (d) Job Order Preparation (Planning & Estimating)
2. Maintenance Execution
    (a) Shop Scheduling
    (b) Shop Performance
3. Appraisal Phase
    (a) Appraisal
    (b) Quality Assurance (1-6.10)

These three functional areas are covered in the subsequent Chapters III, IV, and V. To understand how these functions are carried out, a basic understanding of the Maintenance Management organization is required; therefore, the components of the organization are detailed in Chapter II.

E. Maintenance Contracting. Since enough resources are never available to accomplish all the required M&R, the economics of this situation have resulted in the use of the private (commercial) sector to stretch the maintenance "dollar". The tool here is a service contract and it allows the maintenance manager to apply his limited in-house manpower

where it is most needed. Further, the savings achieved through contracting makes the Maintenance and Repair budget go much further. In many cases, the use of contract performance vice an in-house effort has resulted in some problems; consequently, this area must have special management and administrative requirements. These various requirements are briefly covered in Chapter VI, Summary of Service Contracts. (1-6.26)

F. Appendices. Several charts, forms, and procedural material are reproduced as appendices at the end of this report to support and further detail the material presented in the following chapters.

CHAPTER II

PUBLIC WORKS DEPARTMENT - DIVISIONAL FACILITY MAINTENANCE MANAGEMENT RESPONSIBILITIES

The Public Works Department (PWD) is the shore facility component tasked to perform the maintenance function. The associated divisions within the PWD responsible for Facilities Maintenance are detailed in the following sections: (2-2.3)

A. Maintenance Control Division (MCD)

1. Concept - Planning and estimating is most successful if all maintenance work is processed initially through a specified unit of the PWD that plans, estimates, and programs the work. This unit is the MCD, or the Facilities Management Engineering Division (FMED) at some activities.

2. Maintenance Control Division Functions - This unit is responsible for the preparation of the long-range maintenance plan, inspection, work reception and control, planning and estimating, and determining when engineering assistance is required. For maintenance work and by direction of the Public Works Officer, the Maintenance Control Director can authorize job orders within specified limits. MCD also prepares estimated standing job orders for typically a twelve month period and additionally specifies preventive maintenance inspection (PMI) frequencies. For work performed through service contracts, the MCD will

usually prepare the contract specifications. MCD is usually divided into the following "subdivisions". (1-2.16)

(a) Work Reception & Control Branch (WRCB)

This unit of the MCD handles screening, classifying, and recording all maintenance requests; controlling the processing of requests, inspection reports, job orders, and emergency/ service work authorization; typing job orders; and maintaining the inspection/ historical files.

(b) Inspection Branch (IB)

The IB carries out the shore facilities inspection program through performance of public works and utilities inspections within assigned schedules. Included under this responsibility is the technical control of the Preventive Maintenance Inspection (PMI) for the shops forces; preparation of inspection reports reflecting the physical plant condition and related job orders to correct the deficiencies uncovered; and preparation of the Backlog of Maintenance and Repair (BMAR). Unless the IB functions are combined with the Planning & Estimating Branch, this branch is staffed with wage board inspectors.

(c) Planning and Estimating Branch (P&EB)

(1) The P&EB prepares manpower and material estimates, and compiles estimating information for improving estimation techniques on labor/ material costs.

(2) Responsibility for overall job planning and preparing work estimates, initiating and expediting job orders for work performed by the Public Works Maintenance division lies with the P&EB. This branch prepares the main part of the job order with the Financial Branch of the Administrative Division providing the accounting data. The Public Works Officer, or his Assistant, and the Maintenance Control Director can approve job orders.

(d) Service Contract Branch

This branch is responsible for the preparation and inspection of Facility Support Contracts as well as certifying contractor invoices for payment. Contract administration, including advertising, receiving bids, awarding the contract, negotiating change orders, and paying the contractor is handled through the Officer In Charge of Construction; however, there are exceptions to this. Emphasis on the Commercial Activities (CA) Program has resulted in workload surge on this branch.

(1) Contract Preparation - In the firm bid procedure, contract preparation is normally accomplished as an initial step; however, many activities lack the in-house expertise to prepare service contract specifications. This situation is rapidly changing as more personnel are run through appropriate NAVFAC training courses. To support the

activities, NAVFAC is preparing Performance Work Statements (PWS) which provide a basic guideline for formulating contract plans and specifications. The activity is still responsible for tailoring these PWSs to their specific command needs.

(2) Contract Administration - NAVFAC has established within the OIC organization a new billet titled Service Contract Manager (SCM). The SCM is the position with responsibility for service contract management. He is either assigned to the contracts field office or to the activity in the service contract branch of the Public Works Department. Technical guidance is supplied from the EFD. After contract award, the SCM is the main point of contact with the contractor. His principal responsibility is to insure the contract runs smoothly and the purchased product is provided in accordance with the contract specification. If change orders become necessary, he processes them and makes a recommendation to the MCD or OIC, depending on the organization, to issue a change. If the contractor is having problems, the SCM recommends action to the MCD/ OIC involving time, money, quality, or safety and he coordinates matters of contract interpretation with the contractor, contract specialist, and MCD/ OIC. The Quality Assurance Program (QAP) provides the SCM with the required information on contractor performance. Furthermore, the SCM has the

responsibility and technical control over the QAP. The SCM duties can be delegated to the Public Works Department (PWD) if mutually agreed between the OIC and PWD that adequately trained PW staffing is available. If the SCM is placed in the PWD, this branch is usually placed under the cognizance of the MCD. (1-2.17)

(3) Inspection - Insuring contractor performance through the QAP requires a Quality Assurance Evaluator (QAE) billet. The QAE serves as the "eyes and ears" of the SCM. This billet performs the contract inspection/ surveillance and reports directly to the SCM. The QAE is on the activity's ceiling and may be located in any of the PWD divisions or in a department other than Public Works; however, the position reports only to the SCM on service contract matters. Under the SCM or a Supervisory QAE, the inspector will prepare and implement a QAE Surveillance Plan. Activities requiring several QAEs usually establish a Supervisory QAE position. This position is an interface in the chain of command between QAE and SCM. At larger activities, the PWD may delegate some or all of the SCM duties to the Supervisory QAE depending on the Supervisory QAE's experience and the activity level of involvement with service contracts. (1-2.18)

B. Maintenance Division (MD)

1. Division Size - Generally, the operating maintenance

force should be sufficiently large enough to perform both regular and non-recurring maintenance. Construction, alterations, and major repair or maintenance may be accomplished through contract or in-house if the shop's forces are capable of performing the work.

2. Functional Responsibilities - The MD responsibilities include the maintenance of all public works, utilities, and Family Housing. On some facilities, however, Family Housing work may be done by contract. Where authorized, the MD may also perform construction, alteration, and repair work, excluding contract work. As well as performing planned maintenance inspections (PMI) and emergency/ service work, the MD also handles utilities plant work not accomplished through the Utilities Division (UD). Additional tasks include grounds maintenance and upkeep, and all pest control operations.

3. Maintenance Division Components - The MD components will vary depending on the activity type and size due to availability of certain shop skills (or lack thereof) within other activities on the installation. The grouping of shops into branches as detailed in the following paragraphs are only examples and may require some realignment locally to obtain maximum efficiency depending on respective shop size and availability of support from other shop resources aboard the activity. The following shop breakdown is one

possibility and can vary as required.

(a) Building Trades Branch - This unit includes the following trades: carpentry, painting, masonry, and riggers. Riggers may be placed in the Transportation Division depending on local conditions.

(b) Metal Trades Branch - The following trades are possible here: plumbing and pipe fitting, boiler maintenance, sheet metal, and machine.

(c) Electrical Branch - This branch can include high voltage lines, electrical communications and fire alarm, and refrigeration/ air conditioning.

(d) General Services Branch - If present, this unit may include: grounds and janitorial labor, refuse disposal, grounds structures (railroads, roads, etc.) and pest control. At smaller activities, this branch may be combined with the Building Trades Branch.

(e) Emergency/ Service Branch - This unit handles about 50%, or more, of all work on an emergency or service nature; consequently, this results in the other shops having more time for scheduled maintenance or construction and repair work.

4. Maintenance Division Administrative Support - The staff of the MD can include clerical personnel, a maintenance scheduler, and various shop planners. The maintenance scheduler performs overall shop planning and scheduling at

the division level. The shop planners provide supplemental detailed planning at the work center level. Additionally, the shop planners should check incoming material to insure correct quantities and quality. Organizationally, the shop planners may be under the shop foreman or directly under the Maintenance Scheduler. (1-2.19)

5. Supervision of Maintenance Division

(a) Shops Engineer - This position directs and coordinates all matters pertaining to shops operations and for maintaining liaison between the Public Works Department and other units on shop related matters. At smaller activities, this position may be combined with the Assistant Public Works Officer or the Shops Superintendent.

(b) Shops Superintendent - This billet reports directly to the Shops Engineer or the Assistant Public Works Officer, depending on the activity size, on all operational and administrative matters. In addition, this position performs the following supervisory tasks: production and overhead control, job assignments for work centers, workmanship quality, material usage, personnel assignment, and personnel training for the various trades. (1-2.18)

C. Utilities Division (UD)

1. Functional Responsibilities - This division handles the operation of utility plants and distribution systems and the corresponding operator inspection, PMI, and service work for

power, heating, refrigeration, compressed air, and sewage treatment plants. Pumping stations and auxiliaries, water, steam, gas, electrical, and fuel oil distribution systems also fall under the cognizance of the UD.

2. Secondary Functions - Responsibility for determining the need for maintenance, scheduling shut down time for availability of equipment/ systems for maintenance and overhaul, inspecting work in progress, and final acceptance upon work completion usually rests with the UD. The UD also provides needed assistance as requested for control inspections in specialized areas.

3. Staffing - The UD is made up of the minimum number of utility trades personnel to accomplish the above responsibilities. Maintenance beyond the scope in paragraph 1, above, is recommended by the UD director and processed through the MCD for accomplishment by station forces in accordance with the NAVFAC instruction MO-321, Facilities Management, or contract. For work performed with station forces, the UD provides the technical experience as required with augmentation from the MD when additional resources are needed.

4. Utilities Division Components - The UD component structuring varies with the activity type and size and depends on the degree to which utilities are generated and/ or purchased. The following unit breakdown is one possible

divisional organization.

(a) Generation & Distribution Branch - This unit may contain steam, gas, electrical, and miscellaneous other utilities.

(b) Potable Water & Waste Water Branch - Water and sewage treatments are the principal functions in this unit. (1-2.20)

D. Transportation Division (TD)

1. Functional Responsibilities - This division has cognizance over all transportation and equipment services to all activity components. These duties include: operating base vehicles and equipment pools: operating passenger and freight transport systems; maintaining automotive, tactical, construction, railroad, fire fighting, and weight handling equipment. The TD also determines maintenance and repair required, schedules work, performs maintenance and overhaul, and inspects work in progress as well as that completed.

2. Organizational Components - This unit normally consists of two branches: an Equipment Maintenance Section under a Superintendent or Foreman and an Operations Branch under a Senior Enlisted (military) person. The overall TD Director is responsible for organizing, planning, supervising, and coordinating work of the two branches. The major functions of the two branches are detailed below.

(a) Operations Branch - This unit handles the following

functions:

(1) Operates station bus systems for personnel movements.

(2) Operates trucking system for intra-station movement of equipment and material. A limited amount of off-station shipping is also handled.

(3) Provides equipment and operators for facilities maintenance functions as requested by the Maintenance and Utilities Divisions.

(4) Assigns vehicles on a long term basis to station departments and other tenant activities.

(5) Operates station motor pool and provides vehicles on a daily and trip basis.

(b) Equipment Maintenance Branch - This shop is responsible for the accomplishment of the following functions:

(1) Plans and schedules all maintenance work to ensure efficient shop's loading and minimize equipment down time.

(2) Inspects and performs maintenance necessary to ensure safe and serviceable equipment in a cost effective manner.

(3) Accomplishes all maintenance work as authorized on shop repair orders.

(4) Performs Quality Control Inspections to ensure

the safety and reliability of all maintenance completed. (1-2.20)

E. Variations at Marine Corps Activities

As stated at the beginning of this section, the Public Works Department is usually tasked with facilities maintenance. Although the PWD at Marine Air Stations are like Naval Activities, the facilities maintenance function at ground activities is assigned to the Facilities Maintenance Officer, a Marine Engineering Officer, in accordance with the Marine Corps Order 11000.7B. (2-2.22) Facilities Maintenance Organization in the Marine Corps, as it differs from the Navy, is covered in the attached Appendix titled "Facilities Maintenance, Marine Corps". While there are some minor administrative as well as operational differences, all other aspects of Marine Corps Facility Maintenance are similar to Navy Facilities Maintenance, which is representative in the remainder of this report. Minor Differences will be covered with the corresponding area on the Navy side in subsequent chapters.

CHAPTER III

PLANNING PHASE OF MAINTENANCE

A. Work Generation

Maintenance requirements are generated by customers, command (zone) inspections, and by the PWD through the Shore Facilities Inspection System (SFIS). Additional special inspections are performed on special facilities as required.

1. Customer Requests - These are either written requests or phone calls to the Work Reception Branch of MCD. Figure III-1 is one form of a work request used by customers for requesting service from the PWD. Generally, it is for a job over a certain level (usually work requiring over 16 manhours) and not of an emergency scope. Smaller job requests are sent in via a service call (see Figure III-2) form or over the phone. Emergency requirements are received by phone and recorded on the service call form. It is very important that the customers be trained in submitting work requests so they know how to acquire service from the PWD. (1-6.12)

2. Zone Inspections - Another method that produces work for PWD to accomplish is the Military "Zone" Inspection. Typically, the discrepancy lists and corresponding reports of action taken on the discrepancies are maintained in the

WORK REQUEST (MAINTENANCE MANAGEMENT)

NAVFAC 9-11614/20 (REV. 3-80) S/N-0105-003-7510
Supersedes NAVDOCKS 2321

(PW Department see instructions in NAVFAC MO-321)

Requestor see Instructions on Reverse Side

PART I - REQUEST (Filled out by Requestor)

1. FROM: RESEARCH DIVISION	2. REQUEST NO.: 50-001-84
3. TO: PUBLIC WORKS DEPARTMENT	4. DATE OF REQUEST: 7/6/84
5. REQUEST FOR: [X] COST ESTIMATE [ ] PERFORMANCE OF WORK	5a. REQUEST WORK START:
6. FOR FURTHER INFORMATION CALL: JOHN DOE EXT. 419	7. SKETCH/PLAN ATTACHED: [ ] YES [X] NO

8. DESCRIPTION OF WORK AND JUSTIFICATION *(Including location, type, size, quantity, etc.)*

PARTITION OFF ROOM IN BUILDING NO. 14 FOR OFFICE SPACE

9. FUNDS CHARGEABLE	10. SIGNATURE *(Requesting Official)*: (signed) JACK JONES

PART II - COST ESTIMATE
(Filled out by Maintenance Control Division if estimate requested)

11. TO: RESEARCH DIVISION	12. ESTIMATE NO.: 8073456

13. COST ESTIMATE	
a. Labor	$ 1,380
b. Material	$ 2,490
c. Overhead and/or Surcharge	$ 400
d. Equipment Rental/Usage	$ ———
e. Contingency	$ 854
f. TOTAL	$ 5,124

14. SKETCH/PLAN ATTACHED: [ ] YES [X] NO

15. Based on priority by

[X] APPROVED. PROGRAMMING TO START IN computer.

[ ] APPROVED. BASED ON PRESENT WORKLOAD, THIS JOB CAN BE PROGRAMMED TO START IN _____, IF AUTHORIZED BY 25TH OF _____ AND FUNDS ARE MADE AVAILABLE.

[ ] DISAPPROVED. *(See Reverse Side)*

16. SIGNATURE: (signed) JOHN SMITH	17. DATE: 7/6/84

PART III - ACTION (Filled out by Requestor)

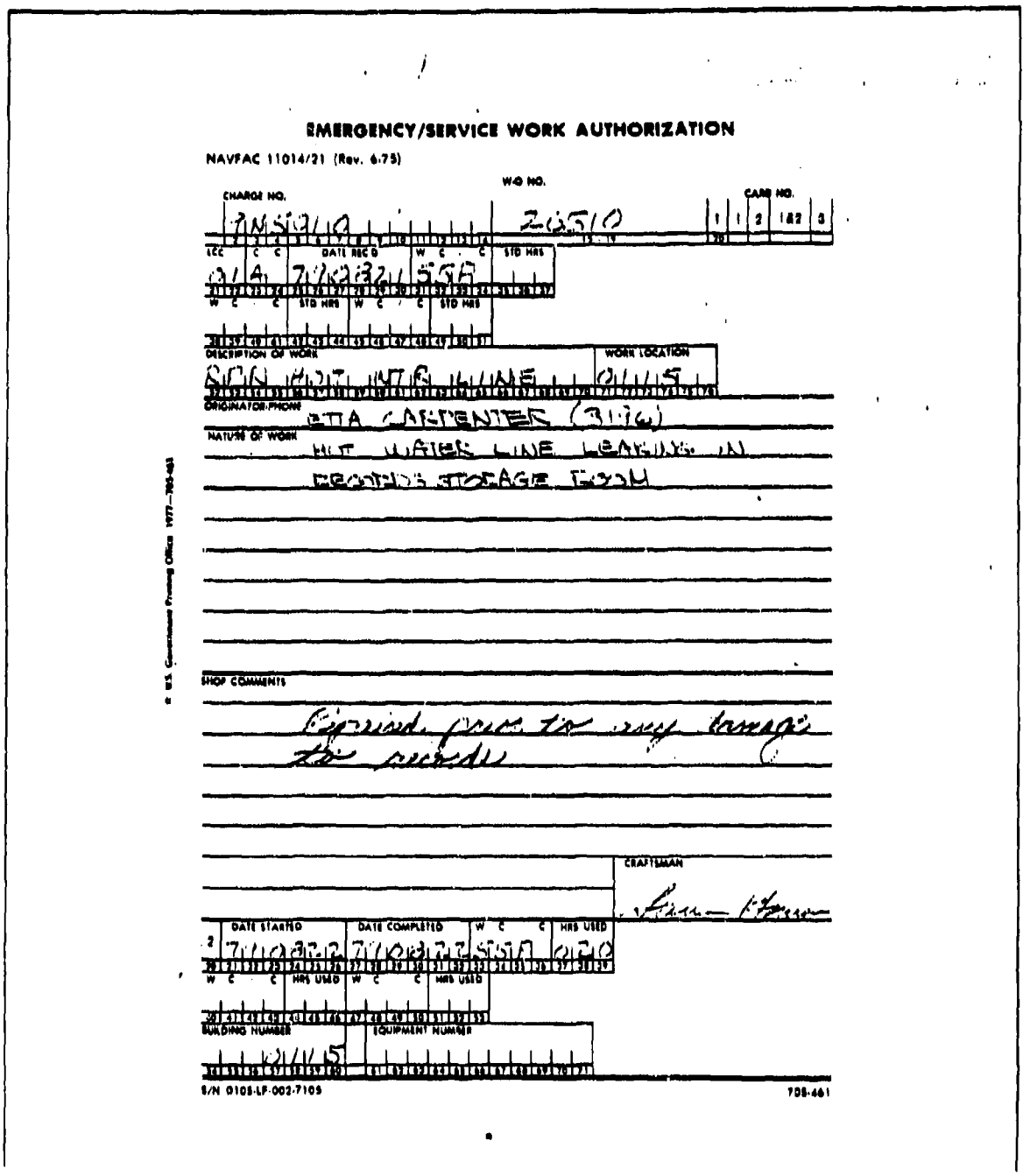
18. TO:

19. AUTHORIZATION TO PROCEED IS ATTACHED *(If box is not checked, funds are not involved)*: [ ] NAVCOMPT 148 [ ] OTHER

20. WORK REQUESTED: [ ] WAS/WAS CANCELLED [ ] WAS/WAS COMPLETED [ ] WILL BE PERFORMED BY OTHERS

21. SIGNATURE	22. DATE

Figure III-1 Work Request



EMERGENCY/SERVICE WORK AUTHORIZATION

NAVFAC 11014/21 (Rev. 6-75)

WO NO.

CHARGE NO.

CARD NO.

LCC | C C | DATE REC'D | W C C | STD HRS

DESCRIPTION OF WORK

WORK LOCATION

ORIGINATOR/PHONE

NATURE OF WORK

SHOP COMMENTS

CRAFTSMAN

DATE STARTED | DATE COMPLETED | W C C | HRS USED

BUILDING NUMBER | EQUIPMENT NUMBER

S/N 0108-LF-002-7105

7DS-461

Figure III-2 Emergency/ Service Work Authorization

Administrative Office (Station Inspector's Office at Marine Corps Activities).

3. Shore Facilities Inspection System (SFIS) - The most efficient and effective method of generating work is continuous inspection as this procedure identifies hidden as well as visible problems. (1-6.12) The SFIS handles existing facilities and equipment. Deficiencies are identified and corrective action initiated to put the facility back into the required condition. If the SFIS is properly administered, the inspection process will usually spot deficiencies in the early development stages; consequently, the number of breakdowns along with repair costs should be lowered and a sufficient backlog of work (to allow effective work programming/ scheduling) is provided. This inspection program does not involve new construction, alterations, or improvements except where these additions might influence the maintenance level to be performed. Facilities inspection should necessarily be performed by personnel, with some corresponding trades expertise, who know the facilities to be maintained and the appropriate conditions standards. Facilities Maintenance Management is most efficient with available resources when the maximum portion of all repair work is generated from inspection. The SFIS is broken down into four main inspection types as detailed in the following paragraphs.

(a) Operator Inspection. This inspection includes examination, lubrication, and minor adjustments to systems and equipment over which the PWD has cognizance. Specific details for inspections are usually covered in the standard operating procedures for the respective operator. Equipment breakdowns and deficiencies beyond the operator's capacity/ authority are reported to the corresponding supervisor and/ or to the Work Reception Branch (2-6.1)

(b) Preventive Maintenance Inspection (PMI). This area of inspection involves examination, lubrication, minor repair and adjustments of facilities, systems, and equipment to which no operator is assigned. PMI handles items that, if disabled, could interfere with essential operations of a Naval/ Marine Corps activity, endanger life or property, or involve a high cost or long lead time for repair or replacement. While the Inspection Branch has the responsibility to determine what is inspected and the frequency involved, the shops' personnel generally carry out the PMI. Determinations of what and how often to inspect are normally made with advice from the shops personnel and using appropriate Navy and commercial publications. Breakdowns are reported, as soon as practicable, to the respective supervisor and/ or work reception branch for appropriate follow-up action. Deficiencies are reported to the Inspection Branch Manager, in the MCD, via the shop

inspector's supervisor. The Inspection Branch reviews reported deficiencies, initiates any required action, and during Control Inspection evaluates the PMI effectiveness. (2-6.1)

(c) Control Inspection (CI). The CI is a facility examination, scheduled in advance, to determine the existing facility condition as compared to the required level of maintenance. The objectives of these inspections are as follows: to monitor adequacy of operator inspections and PMI; to achieve reductions in repair costs and breakdown frequency; to provide a well balanced work flow to allow effective planning and scheduling; to provide inspection service for facilities not covered by PMI or operator inspection; to eliminate over maintenance; to classify defects as to the hazard degree and serve as a basis for safety certification; and to provide better planning for labor utilization and material requirement determination. Control inspection is accomplished through Inspection Branch personnel or by Planning and Estimating personnel. Inspectors do not adjust or correct equipment problems; consequently, they report deficiencies to the Inspection Branch Manager and breakdowns to the cognizant supervisor or Work Reception & Control. When the Inspection Reports are completed, the Inspection Branch Manager processes the reports. The Maintenance Control Director (or Facilities

Management Engineering Director) reviews the Inspection Summaries for acceptance, correction, or rejection with corresponding work authorization where required. Control Inspections are typically divided into structural/ building, electrical, or mechanical as required by the respective activity. (See Figure III-3 for an example of a Control Inspection Report.)

4. Special Inspections. In addition to the station inspection program, a program exists for providing inspections that require specialized skills, tools, and/ or equipment. Examples of these specialized inspections include, but are not limited to the following areas: airfield pavements, underground utilities, moisture in built-up roofing, underwater inspections, and unfired pressure vessels. This program is handled through the NAVFAC EFDs. These inspection results are combined with the Control Inspection findings to yield a composite facility condition for future maintenance programming. (2-6.2)

B. Work Classification

After the work requirement has been identified, it must be classified. Obviously, it is not practical or economical to manage a three hour service call with the same "attention to detail" as a major, 500 manhour minor construction or repair job. In addition, required work must not be held up on emergencies. All work, consequently, goes through an

☐ DCIS ☒ CONTROL INSPECTION

2	7160	4	61010	44540	A	SCHED 4-75 ACT 4-18-75	INITIAL JK / DATE 4-25

Admin. Bldg., Security

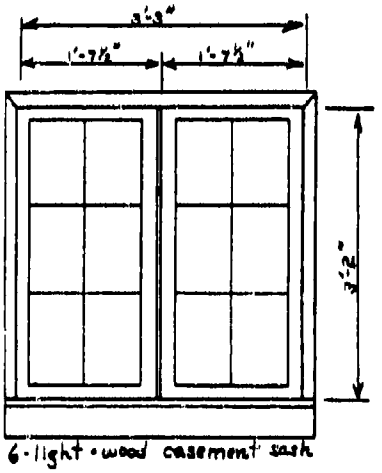
H.E. Snoops

11. INSPECTION TIME USED: 3½ hrs

12. SHEET NO. 2 OF 7

13. DESCRIPTION OF ITEM AND DEFICIENCY

Carp	Replace 2 broken 6-light wood casement sash, including astragal on east side of bldg. Frame and casings in good condition — DO NOT REPLACE. Reuse existing hardware. Sash size: 1'-7½" x 3'-2".	
Paint	Prime and apply 2 coats white paint.	



6-light wood casement sash

FIGURE 6-5
INSPECTORS REPORT (NAVFAC 9-11011/330)

Figure III-3 Control Inspection Report

initial classification and screening process at the work reception branch. During this process, the work receptionist (trouble call desk) filters off illegal work, identifies emergencies for immediate action by the emergency/ service work center, and non-emergency service work (less then 16 manhours). Additional factors that determine appropriate classification are the funding types involved, job duration, repetitive nature, urgency, and customer type.

1. Work (Classification) Categories. All generated work is categorized into one of the areas detailed below.

(a) Emergency Work. This work covers all emergencies that require immediate action to prevent damage or loss of government property, restore disrupted essential services, and eliminate safety hazards. Until the emergency problem is solved, the emergency designation is assigned to the work. This work is typically charged against a job order established for emergency work for work less than 16 hours and against the proper facility cost account numbers for emergencies requiring over 16 manhours. If the emergency work can be planned and estimated prior to completing it, then a minor or specific job order should be used for requirements in excess of 16 manhours. (Minor and specific are defined in the next sections.) After the basic emergency problem is corrected, any additional work required

to finish correcting the situation should be processed according to the work involved. The initial emergency work is authorized on Emergency/ Service Work Authorization Form. (See Figure III-2)

(b) Service Work. This work category is relatively minor in scope and can be accomplished under 16 manhours and the current established dollar limit (most recently this limit was $1000 but is subject to change). Service work is authorized on the Emergency/ Service (E/S Ticket).

(c) Minor Work. Minor work is greater than that for an E/S authorization and less than that for a specific Job Order, which is typically forty manhours (or whatever the local activity cut off for minor work is). A minor job is planned and estimated with Engineered Performance Standards (EPS) if there is an applicable section. The costs are collected, with other similar jobs, against a standing job order rather than as individual jobs. This results in less paper work for the MCD. These authorizations are processed as detailed in Appendix B(1). This work is not used at Marine Activities. (2-4.1)

(d) Specific Work. These specific job orders authorize the performance of a specific quantity of work. These jobs are planned and estimated using EPS (where possible); furthermore, they are scheduled and individually cost accounted for performance evaluation. An example of a

specific job is repair of a weather damaged roof. Large specific jobs are possible candidates for contracting out. Specific job orders are processed as outlined in Appendix B(2). Specific job orders are authorized for the following work types:

(1) Jobs for other activities that are authorized by a Request for Performance of Work (NAVCOMPT Form 2275).

(2) Jobs exceeding the Minor Work limit.

(3) Job orders issued to correct poor workmanship by Public Works personnel.

(4) Each job not funded from Public Works funds and which the customer requires separate cost accumulation. (2-4.2)

(e) Standing Job Orders. In this classification, all work of a repetitive nature is included where cost accumulations are required. These job orders (SJO) typically include the following details:

(1) Complete specification of the work as broken down into distinct job phases (A job phase is any amount of work that can be accomplished by one craft without having to stop for another trade to perform some required element).

(2) Work Area location.

(3) Equipment types considered (in estimate).

(4) Labor hour estimate by job phase (using EPS).

(5) Time interval the job order spans (month, quarter, or year).

(6) Proper accounting data.

Two types of SJOs are used: estimated and unestimated. The estimated SJO should include a work description, frequency cycle, and precise time and cost estimates. With estimating, realistic labor and material estimates are developed based on EPS, which yields a definite cost reduction. The unestimated SJOs cover the repetitive work that can not be estimated due to lack of historical data and EPS or the nature of the work. These unestimated types are issued as a fiscal document for recording total annual charges. Work that is service in nature should not be accomplished through an unestimated SJO. As an example, SJOs are not for replacing glass, clogged plumbing, or emergency repairs. Changes on an unestimated SJO are minimized in this way.

All SJOs are reviewed at least annually to determine the necessity of work authorized, specification completeness, adequate frequency for functions performed, reasons for labor hours variation from estimate, and the total maintenance force hour requirements. (2-4.3)

2. Rework. This work type is for correcting poor quality or defective work. Rework requests are initiated by customers, and PWD supervisors. After rework initiation, the requests

are then routed to the Maintenance Control Director. The MCD and the Directors of the MD and UD jointly investigate the work and submit recommendations to the Public Works Officer, or his Assistant PWO. The PWO/ APWO decides the cause of the problem and takes appropriate action to prevent recurrence. Upon approval of the PWO, the MCD will prepare a specific job order to perform the rework. The processing of rework specific job orders is identical to other specific job orders except that the labor is classified under labor class code 40 (for rework). (Refer to Appendix D for a complete listing of all labor class codes.) (2-4.4)

3. Amendments to Job Orders. An amendment may re-open a closed job order or change a current one under execution. For an already closed job order, the amendment typically states that the original job order is closed along with the purpose for re-opening it, such as performing additional required work. If the amendment increases the estimate dollar total, it tabulates the previous total estimate together with the amount of increase or decrease and the amended total estimate. A standing, specific, or supplementary job order may be amended for various reasons, such as:

(1) re-opening a closed job order,

(2) modifying the technical specifications and plans,

(3) increasing or decreasing the dollar estimate and/ or scope,

(4) changing the accounting classification,

(5) or a combination of any of the above or other reasons.

Actual requests for amendments are initiated at any supervisor level in the Maintenance or Utilities Divisions and funneled through that respective director to the Facilities Management Engineering Division (or MCD). The request states all essential facts so the amendment can be issued and yet minimize any added investigation. The Director of the MCD reviews all such requests and also approves them, if so authorized, or makes appropriate recommendations to the PWO/ APWO for final approval on those where the supporting facts justify the action. (2-4.6)

C. Work Input Control

1. Input Control Scope. Work input control provides planning and job status information from the work inception through completion. Included are the following functions: screening jobs for actual need, determining relative urgency, programming those requirements through the planning stages, authorizing the work, insuring a balanced work load for each work center, staying informed on each job's status, and insuring proper work completion. Work programming is an orderly process that balances jobs needed for daily activity

operations with priority work required for operations, repair urgency, or safety. Actual work prioritizing procedures assure high priority requirements are handled as quickly as possible. If the work is generated through inspection, required priorities are much easier to establish. (Determining priorities is discussed under Priorities later in this section.) Individual work categories are handled together as a unit. For example, minor construction is controlled typically by setting a total dollar amount for the fiscal year. This limit is fixed as some maximum percent of the total maintenance/ repair budget. The station planning board then prioritizes the work requests for final approval by the station Executive Officer. Maintenance and repair efforts are directed at the highest priority repairs on the highest priority facilities. This does not mean that some facilities go without maintenance; however, various facilities are maintained at different levels. These maintenance level determinations are based on the respective activity's overall condition and mission.

2. Responsibility. Input control responsibility is tasked with the Facilities Management Engineering Director and subject to review and approval by the Public Works Officer. Required decisions must take into account resource availability and, at times, involve several PWD divisions.

While at large activities review of work input control is typically the responsibility of the Assistant Public Works Office, at small and medium sized activities the Public Works Officer may serve this task.

3. Work Reception/ Control Branch Functions. This branch of MCD screens, classifies, and records all incoming maintenance and repair work requests. The branch carries out the following tasks: controlling processing of work requests, job orders, and inspection reports. Additional functions include posting and maintaining job status/ work progress charts and keeping inspection/ work order/ historical files. This branch handles job order flows within the MCD and to the shops divisions. Besides the above functions, this branch handles corrections of work request errors and cross checks with inspection reports for need verification and to insure that the work has not already been planned for accomplishment. (2-7.1)

4. Maintenance Level Effort. Upon deciding that work should be accomplished within twelve months, the relative importance of a particular job to other known work must be established. Each activity facility is assigned a Level of Maintenance Classification Code (LMC) that relates the activity mission to the respective facility. This determines authorization and work programming priority. The LMC is of vital necessity to avoid wasting scarce resources

on equipment and facilities that are not completely mission oriented and required on a continuous use basis. Refer to Appendix B(3) for a listing of LMCs and corresponding classification characteristics. (2-7.2)

5. Work Performance Type. The Maintenance Control Director (or Facility Management Engineering Director) whether a job, or portion of it, is to be done through shop forces, military forces, or contract. This "method of performance" decision is based on the planned and current workload of the work centers involved, work urgency, shops' capability to do the proposed work, and whether the function has been contracted under the Commercial Activity Program. Shop force or contractual performance of the work involved influences the cost estimate nature, or whether one is required, and the authorizing documents.

6. Work Timing. Deferral of job order issuance may be necessary due to budget constraints, weather considerations, and work center capability. During idle off-peak seasons, maintenance of facilities and equipment is an important aspect of job planning. As an example, the air conditioning/ reefer shop typically performs A/C and refrigeration maintenance during the off-peak (winter) months in areas with hot summer weather. Due to known work backlog, it may be beneficial not to issue job orders immediately in an effort to promote uniform shops workload.

Before final job order approval and subsequent release to the shops for performance, the complete backlog of job orders is reviewed to determine any which may take priority over those currently being programmed for accomplishment. (2-7.5)

7. Work Assignment Priorities. To establish the relative importance of each job to all other work requirements, a priority assignment of some form is required. Manhour availability and funding limits usually do not allow the accomplishment of all required and desired work immediately; therefore, a work priority classification system allows scarce resources to be optimally targeted by defining a particular job's relative importance for planning purposes. The Maintenance Control Director assigns the priority to the preliminary estimate, which usually determines when that particular job is selected for final estimating. After the final estimate is complete, the original priority now influences the job placement into the schedule. A priority system allowing work classification based on major work scope and justification contains the following type classes:

(a) Mission Function - work required to accomplish the activity's mission.

(b) Prevention - work necessary to prevent significant facility deterioration through continual use.

(c) Safety - work required to prevent injury to personnel.

(d) Aesthetic - work needed to maintain or improve a facility's appearance. (2-7.6)

8. Automated Data Support (ADP) & Word Processing. All information generated from work input control can be stored for later use through ADP or word processing. This is a major part of the BEST automated system (Base Engineering Support, Technical) developed for Public Works. Refer to Appendix C for a description of the BEST program. (2-7.15)

9. Work Authorization Files. Work Reception and Control maintains these files for up to typically five fiscal years. Completed Specific Job orders and minor work orders are filed in issue sequence by date or by property number. Emergency/ Service Work authorizations are filed by building number in issue sequence. Periodic analysis of current emergency/ service and completed reports by the MCD should identify recurring maintenance or other problem areas. (2-7.16)

10. Job Order Termination. A completed job order indicates that the requirements as specified in the job order have been met, the quantity and quality of the job have been inspected and certified correct by the cognizant shops foremen of the Maintenance and Utilities Divisions, unused materials returned to shops stores, and the customer is

satisfied. Refer to Procedure Chart #8 of Appendix B(2) for completed job order processing. Closing out completed job orders promptly and correctly is an important part of maintenance management. (2-7.17)

D. Job Order Preparation

The last two sections included methods for the Maintenance Control Director (same as the FMED) to classify the work type, decide which jobs to undertake, and which resources to use in the work's performance. For those requirements the MCD decides to accomplish, and with station forces, a "work plan" must be developed. This plan is the result of the planning and estimating process. This process determines estimates of manpower (time), material, money and most important the operational sequence required to do the job. (1-6.19) Jobs are usually broken into several phases with each phase composed of a number of tasks.

1. Job Planning. The job order states the work to be done, equipment and material required, phased sequence of work, and what crafts will do the work. Consequently, the phases comprising the job are described, and the applicable work centers are indicated for each phase. By listing phases in proper order of accomplishment, phases are less likely to be omitted; interrelations of various work centers are detailed; the shop planning and scheduling function is assisted in achieving better coordination; and shop planners

concerned with material procurement can decide more effectively when material availability will allow scheduling a job. (2-8.1)

2. Material Selection. Selection of appropriate materials to meet the particular job requirements is usually based on NAVFAC maintenance and operations technical publications, activity policy, fund limitations, federal standard specifications, planner experience, or other data. Under certain circumstances, a specific material requirement, specified by proprietary name, should include the justifying reasons to insure that unusable substitutes are not procured through the Supply Department.

3. Job Estimating. An estimate is an analysis of all known components of a proposed job and the resultant forecast of all related requirements (materials, manpower, etc.) needed to perform the work.

(a) Proposed Work Scope. The P & E specifies the work to be done and which crafts are required for the respective job phases. A clear, concise, and brief description of the entire job is then entered under the description block of the Work Authorization Estimate (Maintenance Management), NAVFAC Form 11014/22. See Appendix E(1) for an example of this form. (2-8.2)

(b) Job Phasing. This process involves breaking a job into parts corresponding to crafts, or within a respective

craft, where the planning and scheduling step requires a more detailed breakdown. Following this breakdown, each responsible Planner & Estimator (P & E), for the respective craft discipline, prepares a Job Phase Calculation Sheet for each phase tasked to the P & E. This Phase Sheet includes as attachments, where necessary, appropriate plans, specifications, sketches, and other required data. The P & E tasked with overall responsibility for the job order preparation collects all phase sheets, places them in the sequence of performance, and performs the overall estimate. The actual planning, or sequencing, of the job phases may use the Critical Path Method (CPM) for phase scheduling purposes. Refer to Appendix E(2) for a CPM application. To prevent confusion at the shops level regarding work content and accomplishment, each job phase description should be simply written and clear as to the nature and scope of work to be accomplished. The final estimate, with the job phase calculation sheets and other supporting data detailed above, is forwarded via the Work Generation Branch to the Facility Management Engineering Division (FMED) Director for review and approval.

(c) Job Order Preparation. After FMED director approval, the estimate is routed to the Work Reception & Control Branch to log in the job and distribute it to the appropriate supervisors. The information contained on the

Job Order and attached Job Order Continuation Sheets, NAVFAC Forms 11014/22 and 11014/22A respectively, is essentially the same as on the estimate. The individual Job Phase breakdown and descriptions on the job order are exactly the same as on the Job Phase Calculation Sheets, NAVFAC 11014/23. Refer to Appendix E(1) for a Job Order Form NAVFAC 11014/22 and Appendix E(3) for a Job Order Phase Calculation Sheet. The individual work phases as set up on the job order are arranged in the sequence to be performed as determined in the initial planning steps. (Again, CPM can be very useful here in the timing of each phase within the overall respective job order schedule.) Comprehensive guidance for completing the forms NAVFAC 11014/22 and 11014/22A are contained in Appendix E(4). (2-8.3)

4. Techniques of Estimation. Reliable and accurate guidelines are required to estimate the maintenance effort, expressed in manhours required, necessary to accomplish a specific task. The P & E's accurate estimate provides this required guide. To formulate accurate task estimates, the P & Es usually use either of three estimating sources: experience, historical files, or predetermined time standards. P & E experience and historical files provides rough guidance on how much time the respective trades personnel used on prior work of similar nature and/ or scope. Predetermined time standards provide the means to

generate more accurate time estimates for specific tasks. Engineered Performance Standards (EPS) are predetermined time standards for specific trade tasks based on timed motion studies (an industrial engineering process). The EPS references are NAVFAC prepared and are available for about three-fourths of the M & R/ construction type work. Since the FMED evaluates deviations between estimated and actual manhours used, the more accurate EPS is a better and fairer method for the shops personnel involved.

5. Estimate Types. There are two types of estimates commonly used depending on the respective requirement. The simplest is a scoping estimate using short, easy computations with unit cost information as guidance. These estimates are for work that would not be authorized or are for planning purposes only. Inspection generated items that can not be accomplished in the near future, projected maintenance, or items slated for contract performance are included as areas for scoping estimates. As an example repairs to a wooden frame structure might be based on prevailing overall costs per square foot cost of materials and labor. References used for this estimate are the Unit Price Standards, NAVFAC P-716.0. The final estimate is done for work analyzed in detail on a job plan. It is the most accurate estimate of manhours and material requirements with associated costs. The estimate is broken down by work

center in the sequence the various phases are performed, with a summary of work centers involved. Listing by sequence of the work segments reduces the chance of omitting required steps of the work to be done. Reference to the probable work flow, as through a bar chart or CPM, shows the interdependence of the various phases, and corresponding work centers, during the course of the job. (2-8.4)

6. Factors Influencing the Estimate. In the preparation of the final job estimate, several factors that have a major impact on resource requirements must be taken into account. Travel Time is required for necessary trips between the shop facility and the job site per worker per day. In addition, Preparation Time is applied for preparation and clean up in the shop and at the work site. The actual Work Performance Time is the manhours needed for actual craft work performance to complete the job order. The craft time for each job task as listed on the Job Phase Calculation Sheet is recorded to the nearest tenth of an hour. Delay time is personal, unavoidable, balancing, planning, and communication delays. For direct and indirect material requirements, material types and costs are specified with the shop planner having access to the quantity data used in calculating the estimated material costs. When required specialized equipment is not owned locally and can not be obtained without charge, then equipment rental costs from

commercial sources is included. If the job order is not issued within a reasonable time after completion of the final estimate, it should be reviewed and revised to account for more current labor and material costs. Any increase or decrease in scope due to the delay in job order authorization is incorporated. Overhead and surcharges are applied as necessary in accordance with the Navy Comptroller Manual, Volume III. (2-8.5)

7. Job Plan & Estimate Review. Job order impact on the facilities management and the shops is so important that the P & E Supervisor typically examines completed final estimates. This review involves the factors detailed below.

(a) Accuracy. Technical descriptions and arithmetic calculations are checked as thoroughly as possible, time permitting.

(b) Completeness. Review of the final estimate should insure no item or phase is omitted.

(c) Clarity. The description should be clear and concise to all personnel. (2-8.6)

CHAPTER IV

MAINTENANCE EXECUTION

A. Shop Scheduling

After the decision is made to accomplish a job with station forces, the job is planned and estimated, and the job order is written, the specific work must be programmed into a specific month, or Shopload Plan, for physical accomplishment. This scheduling effort typically involves balancing workload requirements against shopload capabilities and other constraints. (1-6.19) Shops scheduling commits shops personnel in advance of execution to assure proper coordination of personnel, materials, equipment, and work site. The shop schedule is a carefully prepared advance plan that takes into account the overall amount of work required, availability of craft personnel to accomplish the work, materials and equipment, and the particular jobsite. Other factors considered are proper work phase sequence, proper craft sequence to perform the phases, and the optimal size work force to be tasked to perform those work phases. Adherence to a rigid schedule for all work is not practical and some flexibility must be provided. This required flexibility is achieved through a two-step system of Master Scheduling and Work Center Scheduling. Master Scheduling commits 75% of the shop's available manhours to specific job orders. This 75% is

reflected in both the Master and Work Center Schedules. The remaining 25% of available shop force manhours is scheduled for emergency/ service work and Minor Work Authorizations (if, the minor classification is used). This 25% is the cushion that provides the flexibility necessary to absorb urgent work or unforeseen emergencies that may occur. This 75-25% can be adjusted up or down if several important specific jobs interrupt the Master Scheduled Work or if a large emergency/ service (or Minor Work) authorization backlog develops in the work center. This 75-25% split is based on remaining manhours after deducting for fixed assignments (standing job orders, periodic inspections, etc.), leave, holidays, and other indirect or overhead time. (2-9.1)

1. Master Scheduling. This schedule procedure results in a coordinated plan for accomplishment of specific jobs typically with minor work included at some installations. It assigns work centers to specific work for distinct weekly periods. The Master Schedule should be changed only for major changes in job conditions or work scope; for major delays in delivery of material; or when the Master Schedule is interrupted for emergency conditions. Under the supervision of the Maintenance Division Director, the Master Scheduler (MS) sets up the Master Schedule. The MS may be located in the FMED (or MCD); however, the FMED is more

concerned with medium and long range M&R planning with the shops handling work execution. Close liaison and coordination is absolutely essential to assure long range planning and the Master Schedule are compatible. The MS develops the schedule on the Job Schedule, NAVFAC Form 9-11014/26, and then waits for notification of material availability from the shop planners. Material availability is not necessarily full material receipt. Once an estimated material delivery date is received from the Supply Department, the MS establishes tentative time slots when the work centers involved have sufficient personnel available to perform the work in accordance with the tentative job plan. All tentatively scheduled jobs are reviewed at the weekly scheduling meeting with required changes made so that each job schedule becomes the optimum plan for that specific job. Refer to Appendix F(1) for an example of a job schedule (NAVFAC 9-11014/26). A firm schedule is then posted on the Master Schedule Board and which all Work Centers stick to.

(a) Available Manhours. In preparing a tentative job schedule, the MS must know not only the total manhours available for scheduling from each Work Center but also those hours previously committed. The Work Center Labor Hour Availability Log is commonly used to determine personnel availability. It shows for each upcoming work week (five workdays per week) the total manhours available

for Master Scheduling in each Work Center and those hours already scheduled for each Work Center. Refer to Appendix F(2) for an example of this labor hour log. The manhours available for each Work Center is entered in the "Available LH" slot and as each job is scheduled, the hours committed for each Work Center are entered in the corresponding spaces in the log with periodic totaling of the actual and tentative scheduled hours. With this procedure, the MS can quickly determine the extent to which each Work Center is loaded in the upcoming weeks; consequently, he can ascertain when a new job may be scheduled or what changes must be made to coincide with revised starting or completion dates. (2-9.2)

(b) Master Schedule Board. (MSB) The MSB is centrally located where job status review takes place. It shows a job through the various stages of awaiting materials, awaiting scheduling, and the scheduled and actual progress for the job duration. It shows when job orders were issued to the shops as well as scheduled starting and completion dates. This "eliminates" those jobs that have been pending for an abnormally long period. The MSB should indicate at least four to six weeks scheduling, whether a job is ahead or behind schedule, total work scheduled for each Work Center per week, and, most importantly, schedule deviations (in

labor hours) to indicate that corrective action is required. See Appendix F(3) for an MSB example. (2-9.5)

2. Work Center Scheduling. (WSC) This schedule accounts for daily craft personnel work assignments for the following week; consequently, this is a daily and weekly operation. The Work Center Schedule Form, NAVFAC 9-1014/27, indicates the Specific Job Orders that receive work the following week and the labor-hours needed to be in accordance with the Master Schedule. After deducting for overhead and other fixed assignments, the Work Center Supervisor slates the totals for each job and other minor work (or emergency/ service work if applicable) into a daily plan to provide an assignment for all those remaining productive manhours available for each day of the following week. WSC requires close coordination among the Work Center Supervisors on a job to determine site availability, when a preceding craft phase is to be completed, and when following dependent phases can be started (as delineated in the job CPM). If a priority or emergency job is sent to a Work Center after the Weekly Master Schedule, then the smaller jobs, not the larger multi-craft specific job orders, should be interrupted to provide the needed personnel for that other imminently required job. This minimizes the impact on other scheduled job phases and the resultant required Work Center and Master Schedule changes.

As a result of daily jobsite visits, and due to other mitigating factors such as emergency leave or bad weather, it may be necessary to implement a schedule change. Before switching the labor force, the impact on other Work Centers must be checked and the proposed changes discussed with those respective Work Center Supervisors. Each Supervisor then adjusts the Work Center Schedule appropriately. At the end of each day, Work Center Schedules should reflect work assignments for the following day. (2-9.12)

B. Shop Performance

Even though Maintenance Management concentrates primary attention on achieving increased productivity through planning and estimating, inspection, and scheduling, this does not reduce the need for sound supervision and good work performance. Where the largest potential lies for efficiency and savings is at the work site. Furthermore, the most important and critical resource is the people performing the work. A supervisor, therefore, must take care of his people. He should provide positive and firm leadership and, at the same time, treat his subordinates with dignity. If the supervisor does this, when the "chips are down", those same people will be there when he really needs them!

CHAPTER V

APPRAISAL AND QUALITY ASSURANCE

A. Appraisal. Appraisal is a basic requirement of a management system in measuring performance; consequently, it is an important part of Facilities Maintenance Management in the Navy. Except for certain Marine Corps Activities, as detailed in Appendix A, the Public Works Officer is ultimately responsible for efficient and successful maintenance operations. The PWO assigns various responsibilities to his subordinates to carry out a multitude of management functions and delegates the corresponding necessary authority; however, he cannot delegate overall responsibility. If the Public Works Department is to operate successfully, the PWO must be fully informed on all important aspects of the maintenance operation. Management reports detailed in Chapter 10, Report Requirements, of MO-321 assist greatly in controlling and measuring the shops' maintenance effort. (Refer to Appendix G for a full copy of Chapter 10, MO-321.)

1. Facilities Management Appraisal Questionnaire Purpose. This checklist provides a method for monitoring the maintenance management system status. The areas of particular importance include Shore Facilities Inspection, Work Input Control, Planning and Estimating, Shop Scheduling, Actual Work Accomplishment, Maintenance

Resources, Management Reports, and other Miscellaneous Areas. The questionnaire answers allow the responsible managers to access reasons for deviations from programmed expected results, and to follow up with the necessary corrective actions. Refer to Appendix H for a full reproduction of the Maintenance Management Appraisal Questionnaire, as it appears in NAVFAC MO-321.

2. Appraisal Questionnaire Usage. How useful this questionnaire will be depends heavily on close cooperation and understanding between PWD organizational divisions involved both directly and indirectly with the questionnaire results. Management personnel attitudes influences whether the questionnaire's use is constructive or destructive. The questionnaire can be a useful tool for improving cost efficiency and labor performance if it is used within a framework of complete objectivity and education. In addition, any analysis based on questionnaire results must reach all PWD components to maximize the usefulness. Every manager from the Public Works Officer down to the shop foreman and work leader should investigate those respective variances outside acceptable ranges and take the required corrective action. A questionnaire illuminating problem areas should stimulate the responsible manager to prepare an action plan to improve performance with short interval follow up "inspections" to monitor progress. (2-11.1)

B. Quality Assurance For In-House Operations. (QA)

Substantial effort has been directed to quality assurance for Facility Support contracting. Under the Commercial Activities Program (CA), the government is required to comply with the same conditions of the contract if performance is accomplished with in-house forces. Even for non-CA work, it is good management to monitor performance. Since inspections performed are for the government and associated in-house personnel, inspections can be made on a weekly, bi-monthly, or monthly frequency depending if problem areas persist. Random inspections are excellent to assure objectivity and that sufficient records are made to accurately gauge the desired performance.

The Quality Assurance responsibilities vary from activity to activity depending on local management policy and the type and amount of work done in-house. The Work Management Branch, or other similar section, of the FMED is typically assigned in-house QA inspectional duties. This in-house function is related to performance factors, quality of end product, and responsiveness of service. It does not attempt to evaluate direct supervision of the function. The end result is specified in terms of product or service quality, improved customer relations, and cost effective services. Combined with the Maintenance Management Program, this function provides essential feedback to the appropriate

managers for all key areas of public works effort and not just to the Maintenance and Utilities Divisions.

CHAPTER VI

FACILITY SUPPORT CONTRACTS IN THE U.S. NAVY

I. General Information

A. Responsibility

The Naval Facilities Engineering Command (NAVFAC) is tasked with the responsibility for authorization to perform the design, planning, development, procurement, construction, alteration, repair, and maintenance at all shore activities for the U.S. Navy. In addition to the authority above, this Command exercises technical control over the alteration, maintenance, and repair of public works and utilities. The repair of these facilities, when beyond the capacity of the local workforce, can be performed by contract. (3-1.3.1)

B. Definition - Facility Support Contracts (FSCs)

FSCs are contracts, financed out of Operations & Maintenance, Navy (OMN) or Naval Industrial Funds (NIF), with the purpose of accomplishing the maintenance or repair of real property facilities, vehicles, and equipment. These contracts are used to restore those same facilities to initial or usable condition through overcoming disaster, damage, wear and tear, deterioration, and to perform the required services to maintain facilities in an operable condition. FSCs are classified as maintenance construction

or maintenance service contracts depending on the work required.

1) Maintenance Construction Contracts (MCC) - These are FSCs which accomplish construction, which is defined by the Davis-Bacon Act as construction, alteration, and/or repair including painting or decorating of facilities. The Department of Labor (DOL) has final authority to determine if a contract involves construction as defined in the Act; furthermore, DOL has usually found in debatable cases that construction is involved. Neither DOD, Navy, or GAO has authority to prescribe if work is construction or not due to the statutory vesting of authority in DOL. (3-9.1.1) These contracts must include a Davis-Bacon wage rate determination (from DOL) and be supported by bid bonds along with the Miller Act performance and payment bonds. (3-9.1.2)

2) Maintenance Service Contracts. All FSCs not requiring construction, as noted above for MCCs, are defined as Maintenance Service Contracts (MSCs). These contracts include automotive and equipment repair, HVAC system maintenance, janitorial services, and minor repairs on as needed basis not involving continuous work. For example, spot painting damages on a house is service; however, painting the complete house is construction. Repairing a short section of damaged fence is service, but replacing a whole fence line is construction. All MSCs must include a

Service Contract Act wage determination (see below on wage laws).

C. Contract Types

Several contractual strategies are used in maintenance and are discussed in this section.

1) Fixed Price Incentive (FPI) If a Base Operating Services Contract is required, where a contractor performs nearly all of the maintenance and operation services at an installation, a competitively awarded FPI contract may be requested through NAVFAC.

2) Fixed Price Contract (FPC) The firm, fixed price contract, whether lump sum or unit price, is preferred for all contracts. This contract provides a price not subject to adjustment by reason of contractor's cost experience in performing the work. The FPC places maximum risk on the contractor and maximum incentive to insure the employees perform efficiently.

3) Time & Materials In some repair contracts, the quantity of repair work can not be determined in advance so as to permit the bidding of a fixed price contract. In such cases, fixed unit price (time and materials) contracts are authorized. In this type of contract, a firm, fixed price is established per unit with the number of units to be procured left open. (3-9.1.2)

4) Open-End Contracts (OECs) Open-end contracts may be used for either MSCs or MCCs; however, both service and construction can not be included in the same contract. OECs may be either Requirement (RC) or Indefinite Quantity Contracts (IQC). The IQC is a fixed unit price contract and does not specify the total amount of work which the Navy requires or when such maintenance is required. The government, through this contract, can call for the work when needed. The bid documents establish a base amount of work for evaluation purposes which gives the contractor a basis for estimating overhead and mobilization costs in preparing the bid. To constitute valid consideration, the contract sets a base amount of work as a guaranteed minimum which will be ordered during the contract period. RCs are similar to an IQC except:

(a) the government is obligated to order from the contractor, and no other source (unless the contract reserves the right to the government to use in-house employees), all services specified in the contract during the contract period.

(b) the contract states that the government is not obligated to place any minimum orders.

(c) a reasonable maximum quantity must be stated, on a per order and per contract basis, to guard the contractor against an unanticipated workload. (3-9.1.4)

D. Wage Law Requirements

There are two basic statutes under which the DOL determines minimum wage rates. These are the Davis-Bacon Act and the McNamara - O'hara Service Contract Act. The determination of which rate applies is a duty vested solely with the DOL. (3-9.1.8)

1) Davis-Bacon Act (DBA) This statute requires that advertised specifications for all contracts over $2000 for construction, alteration, and/or repair, including decorating and painting, of public works of the United States shall have a provision stating the minimum wages to be paid to various types of laborers and mechanics will be determined by the Secretary of Labor. DBA wage determinations are normally published in the Federal Register, on a geographic area basis, remaining effective until superseded. In the absence of a Secretary of Labor wage determination, no construction contract may be awarded and no bids should be opened. In some areas, a wage determination must be obtained specifically for each contract. The wage determination must be set out in the IFB and resulting contract; furthermore, incorporation by reference is not permitted.

2) Service Contract Act (SCA) The SCA requires that all contracts in excess of $2500 for providing services in the United States through the use of service employees shall

contain a Secretary of Labor wage and fringe benefit determination. Contracts subject to the DBA are exempt. Unlike a construction contract, a specific SCA wage determination must be requested for each service contract. Out-of-scope work added to an existing contract also requires a new wage determination to apply for the additional work. As with the DBA, without a Secretary of Labor wage determination, or a response from the Secretary that no wage determination applicable to the specified locality and employee classes is in effect, no service contract may be awarded; therefore, no bids should be opened. The wage determination must be in the IFB and resulting contract documents; incorporation by reference is not permitted. (3-9.1.9)

II. Enforcing Performance

A. General Information

No contract may provide penalties for non-performance as appeal boards and courts hold these are legally unenforceable; however, a contract can provide a clause for liquidated damages, which is an agreement in the contract between the parties for the damages one party will suffer if the other fails to perform. These "liquidated damages" clauses result in compensation for the government for losses suffered and expenses incurred when work is not performed properly or not done at all.

B. Inspection

1) The key to assuring satisfactory performance from a Facility Support Contractor is adequate government inspection through trained and qualified inspectors. The more prone a particular work type is to poor performance, the more important it is to assign an adequate number of inspectors familiar with the contract. Sporadic inspection with untrained personnel invites shoddy performance and results in legal inability to deduct from the contractor.

2) In order to substantiate deductions, pursuant to the deductions and liquidated damages clauses as specified in Sec. 9-303 of the NAVFAC Contracting Manual, and have those deductions stand on appeal to the Armed Services Board of Contract Appeals (ASBCA), thorough documentation of unperformed or shoddy work is essential. The best documentation is daily factual reports prepared by the onsite inspectors describing the unsatisfactory work or the non-performance.

3) FSCs are really an extension of the in-house public works force. As such, the work typically performed by station forces is performed by contractor personnel and inspected by qualified personnel in the service contracts branch of the activity public works department. (3-9.3.1) Where MSCs are used at stations with no public works personnel and are not serviced by a Public Works Center, the

respective Engineering Field Division provides inspection through the local OICC/ ROICC office. (3-9.3.2)

C. Termination for Default

1) Unless a contractor completely abandons the work, a termination for default due to poor performance is extremely difficult to prove and sustain at the ASBCA or in the courts. This usually is due to the poor work quality not being well documented and is shown only in general comments of discontent from the tenant activity. Again as noted above, the best evidence is the Inspector Daily Reports. (3-9.3.4)

2) If a contractor has not been paid the full amount due under the contract for the work done, then adequate documentation to support the corresponding deductions is required to sustain a termination for default. All computations of deductions as per a liquidated damages clause must be accurate and in exact accordance with the contract's schedule of prices. Additionally, the inspector's reports documenting all poor or non-performance must be on file! (3-9.3.5)

III. Negotiations

A. Change Orders

A change order is basically a negotiated sole source procurement; however, a change order within the scope of the contract and one outside the scope are handled differently.

In-scope change orders can generally be processed without obtaining additional authority from NAVFAC. The exception here is for change orders exceeding the original contract amount by 100% or, when the sum of all preceding change orders to date and the one proposed exceed the original contract price.

1) In-Scope Change Orders For FSCs, contract scope is the term for defining the extent of work as stated in the specification's general intention or description paragraphs for a specific bid item or items of work called for in the contract. Consequently, if a contract requires janitorial services in building "X", floor one, and it is determined that the same services are now required in the same building on floor three, this new requirement can usually be added to the existing contract in accordance with paragraph (A) above.

2) Out-of-Scope Change Orders Changes or additions that do not fall within the conditions of paragraph (1) above, are considered as out-of-scope; therefore, with the same contract for janitorial services in building "X" in force and it is later determined that the same services are required in building "Y", that work would be accomplished under separate contract. Adding out-of-scope work to an existing contract requires the procuring activity to obtain a new SCA Wage Determination for the added work. If the

contractor must pay different wages for identical work in different facilities, this can present substantial administrative problems for the contracts' office.

3) Deductive Change Orders (DCO) DCOs are the method used to eliminate work from the basic contract scope. Work determined to be unacceptable due to not meeting specifications is never a proper subject under the changes clause. (3-9.4.1)

B. Government Estimates

An independent government estimate of costs, in as great a detail as if the government is competing for the work, is prepared from the work scope for each proposed contract, modification, or change thereto.

C. Price Proposal Evaluations

Before any change order over $500,000 can be executed, the contractor by statute must provide cost and pricing data, certified by him to be current, complete, and accurate as of the date of agreement in price. Prior to negotiation, the Defense Audit Agency must audit the contractor's price proposal. The contractor's proposal consists of the following parts: direct and indirect costs, material costs, and profit. (3-9.4.2)

IV. Performance Specifications (PSs)

A. General Description

1) For FSCs, a performance specification may be more

appropriate for use than descriptive (detailed) specifications. Generally, a performance specification indicates the required results, verifiable as meeting specified contract criteria, and does not include unnecessary material (or process) specifics or limitations. Contract requirements including durability, strength, system output, fire resistance, toxicity, etc., are designated in the specification. Unless proper NAVFAC approval is obtained, PSs are not written specifying a particular product or feature proprietary to a sole manufacturer. (3-3.4.1) Proprietary requirements in contracts are not used unless it is established that no alternate choice can meet the necessary function. PSs are written to allow any contractor to bid those jobs whose labor/ equipment meets the required work's functional, technical, and physical needs. (3-3.4.2)

2) The standard clause package for technical specifications (TS) is tailored for each specific contract. TSs detail the exact services required, and how/ when the functions are to be performed. The TS must be clear and concise as to what service is required and the frequency of performance. Any questionable areas in the manner of performance or level of maintenance must be thoroughly detailed as it is the governments' responsibility to state the precise requirement and not the contractor. In

addition, a schedule should be provided so that services are performed at the time interval required. If the schedule is not provided, the contractor can use his own discretion in the servicing interval and this probably would not match what the government desires.

B. Sources of Technical Specifications

TSs, general paragraphs, and sample bidding information are available through the EFDs of NAVFAC. Selected specifications are listed in NAVFAC P-34, "Design Criteria Used In Contracts For Public Works". The P-34, other Federal/ Military specifications, and Maintenance/ Operational manuals can be ordered from the U.S. Naval Publications & Forms Center, Philadelphia, Pennsylvania. (3-9.6.1) Army Real Property Maintenance Activity (RPMA) type specifications containing inspection checklists and technical clauses are maintained at NAVFAC and are available to activities upon request. In addition, each EFD of NAVFAC maintains various types of specifications for referral to requesting activities. (3-9.6.2)

V. Contractor or In-house Performance

Facility Support Contracts are effective in accomplishing activity maintenance. The decision must be made whether to accomplish said maintenance with in-house forces or by a service contract. The following factors favor contractor performance.

1) Cyclic Work - A portion or entire function is not performed over the entire year; consequently, it is uneconomical to retain in-house personnel or use people out of their specialty.

2) Investment Costs - The frequency of work is not often enough to justify high priced equipment or tool costs to perform the job.

3) Availability of Skills - Certain work requires an unusual or high degree of skill that can not be retained in-house.

4) Contractor Specialization - As a result of high business volume and specialization, some contractors can provide a service less expensively than through in-house forces.

5) Workload Peaks - Customer request timing and funding variables often cause workload peaks. Using contractors may smooth out the workload.

The following factors may favor in-house performance.

6) Work Specification Difficulty - Some work is not very practical to specify until the actual need arises.

7) Time Factors - Certain types of work require prompt attention. Unless the activity already has a contract in effect allowing negotiation or specifying the particular type of work, in-house performance may be more timely.

8) Lack of Skills in the Private Sector - Some parts of the country may lack readily available skills required to support a mission requirement in a timely, satisfactory, and economical manner.

9) Support for Other Functions - Functions such as direct fleet support can be such an integral part of mission requirements that it is not desirable to obtain the service by contract.

Again, the above factors help determine if a function is performed in-house or by contract. (4-1 through 9 & 11, 2-3.3 & 4)

BIBLIOGRAPHY

1. Public Works Manual, Naval School For Civil Engineer Corps Officers, June 1981.

2. Facilities Management (NAVFAC MO-321), Naval Facilities Engineering Command, May 1985.

3. Contracting Manual (NAVFAC P-68), Naval Facilities Engineering Command, February 1985.

4. Service Contracts: Specifications & Surveillance (NAVFAC MO-327), Naval Facilities Engineering Command, November 1985.

5. Student Guide for Facilities Support Contracting, Naval School for Civil Engineer Corps Officers, November 1983.

6. Real Property Facilities Manual - Facilities Maintenance Management (Marine Corps Order P11000.7B), Headquarters, United States Marine Corps, June 1980.

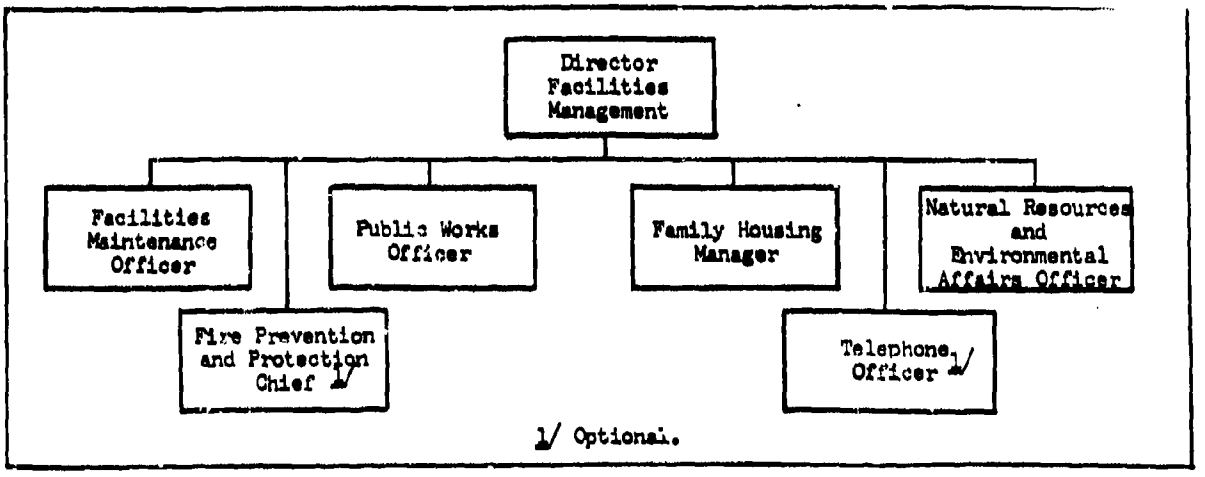
APPENDICES

APPENDIX A

FACILITIES MAINTENANCE ORGANIZATION- MARINE CORPS

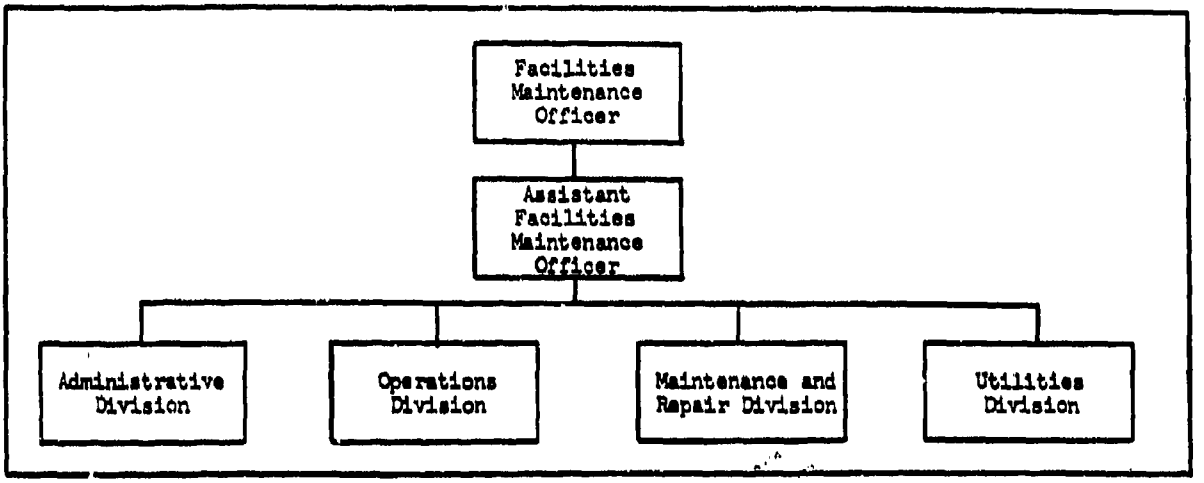
APPENDIX A

The extent to which Facilities Maintenance (referred to as Real Property Maintenance Activity, or RPMA, in the Marine Corps) influences the organizational composition, personnel requirements, and responsibilities of the facilities maintenance department. The criteria, therefore, for determining the suitability of an organizational structure are based on functions common to facilities maintenance departments at Major Marine Corps Activities. In addition, at Marine Air Stations, the maintenance department is under the cognizance of the Public Works Officer while at ground activities the maintenance function is under the Facilities Maintenance Officer. Figure A-1 reflects a typical Marine Corps Air Station (MCAS) Maintenance Division. At a large MCAS, there are separate Maintenance & Utilities Divisions.

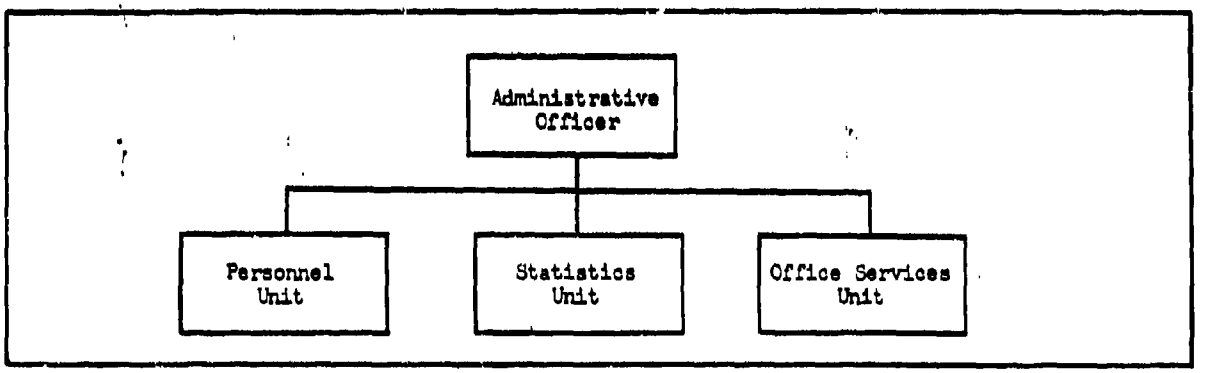


--Typical Facilities Management Organization.

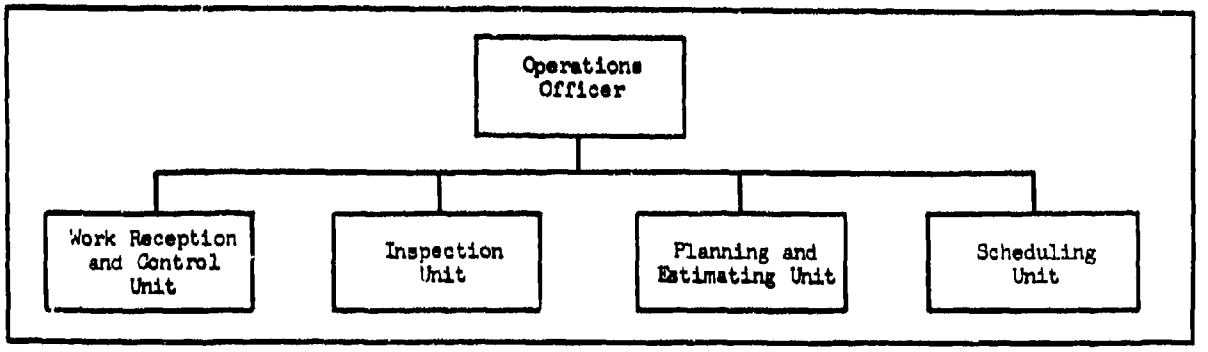
Figure A-1



--Facilities Maintenance Department.



--Administrative Division.



--Operations Division.

APPENDIX B

B(1). MINOR WORK PROCEDURE

B(2). SPECIFIC WORK PROCEDURE

B(3). LEVEL OF MAINTENANCE CODES

Appendix B (1)

CHART NO. 5
INITIAL PROCESSING OF SPECIFIC JOB ORDERS AND MINOR WORK AUTHORIZATIONS
(IN FACILITIES MANAGEMENT ENGINEERING DIVISION)

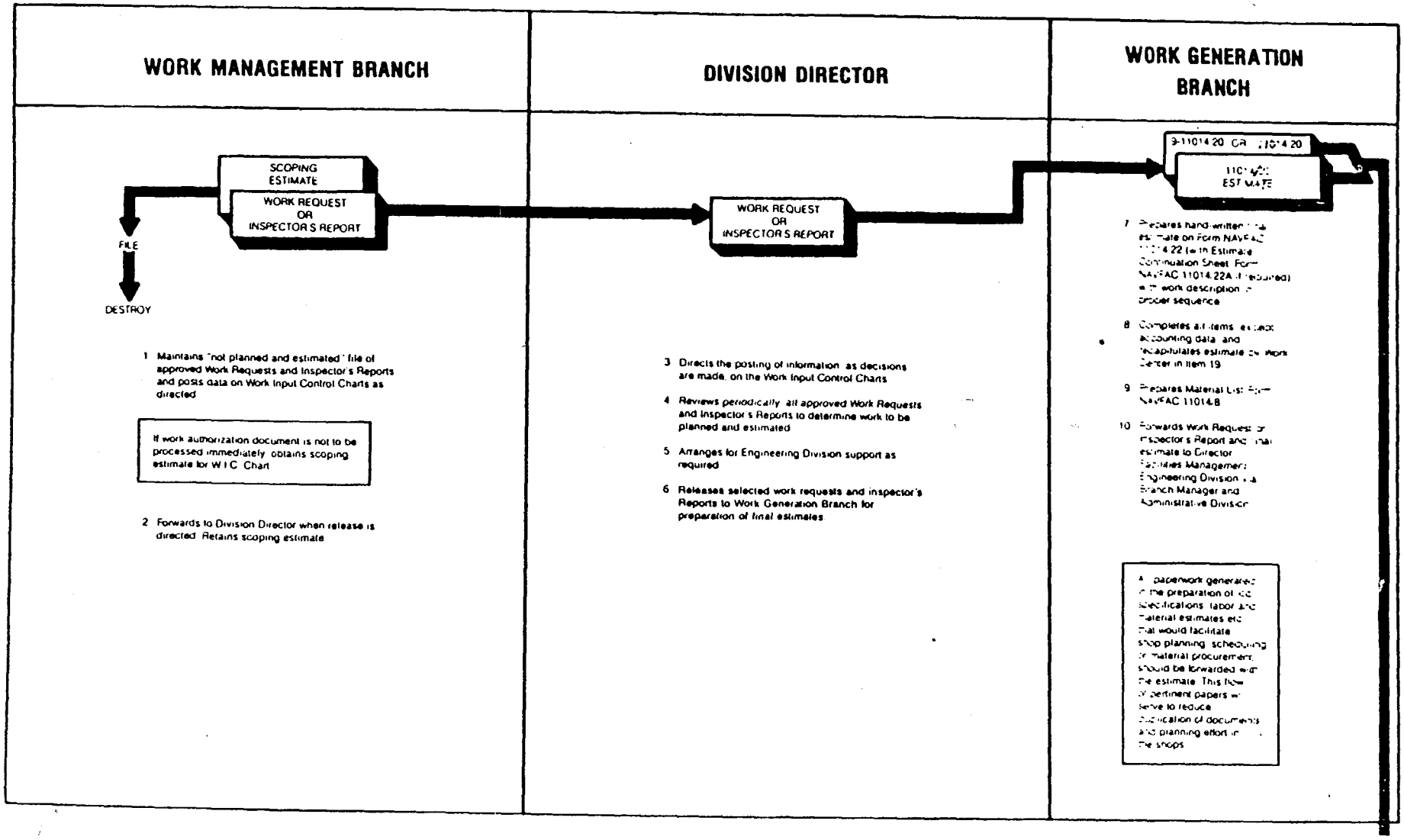


CHART NO. 5 (Continued)

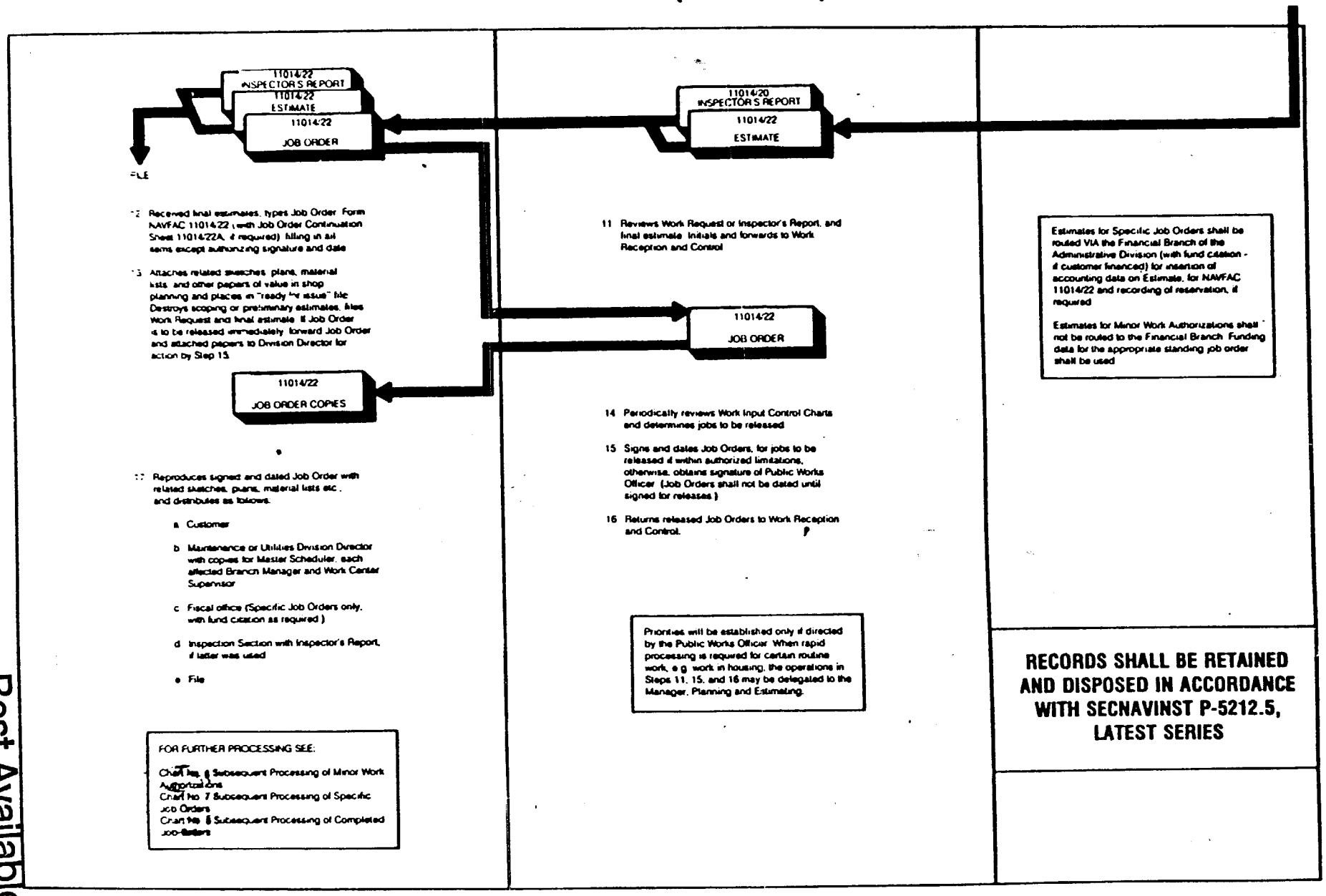


CHART NO. 6
SUBSEQUENT PROCESSING OF MINOR WORK AUTHORIZATIONS
(SEE CHART NO. 5 FOR INITIAL PROCESSING)

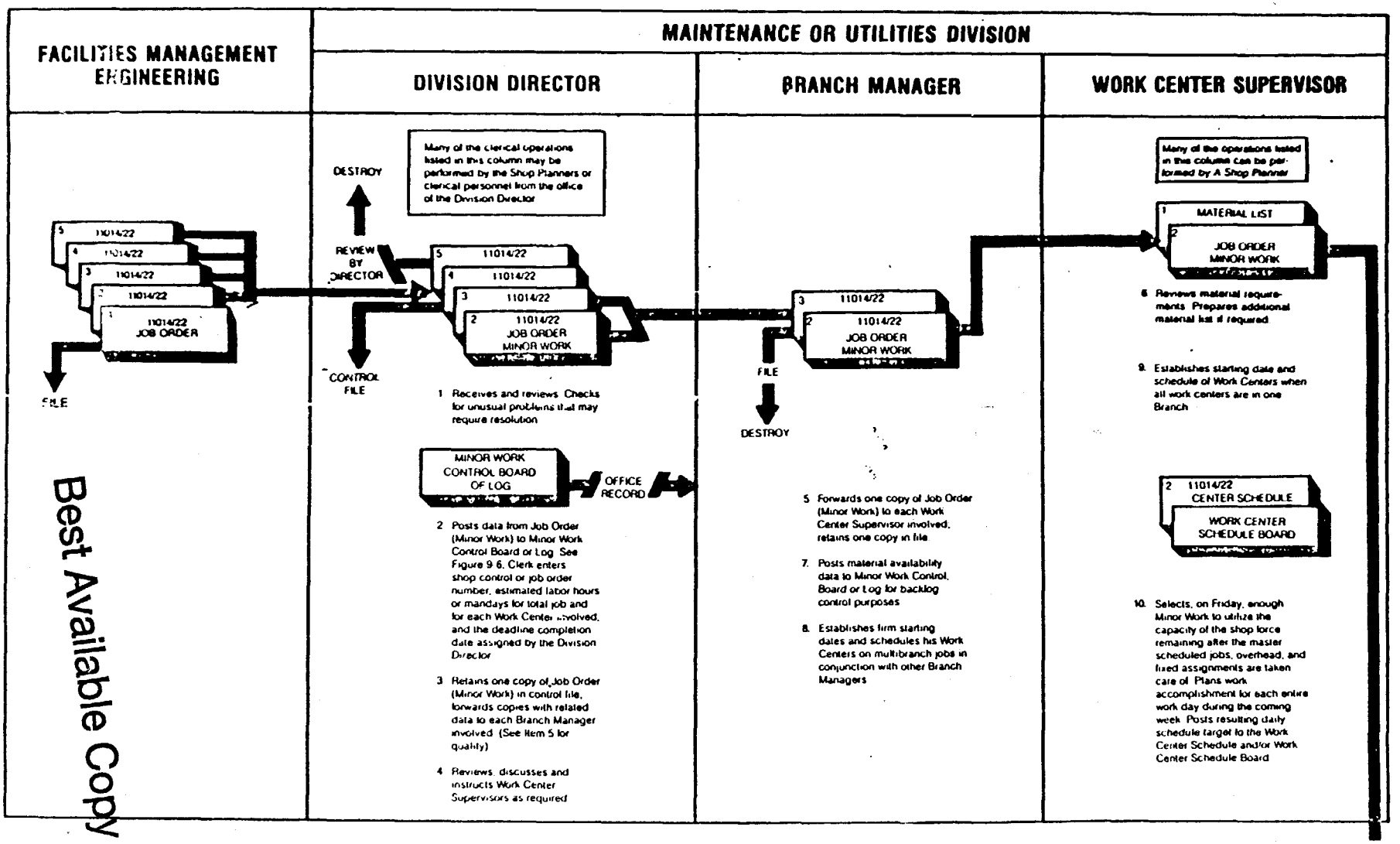


CHART NO. 6 (Continued)

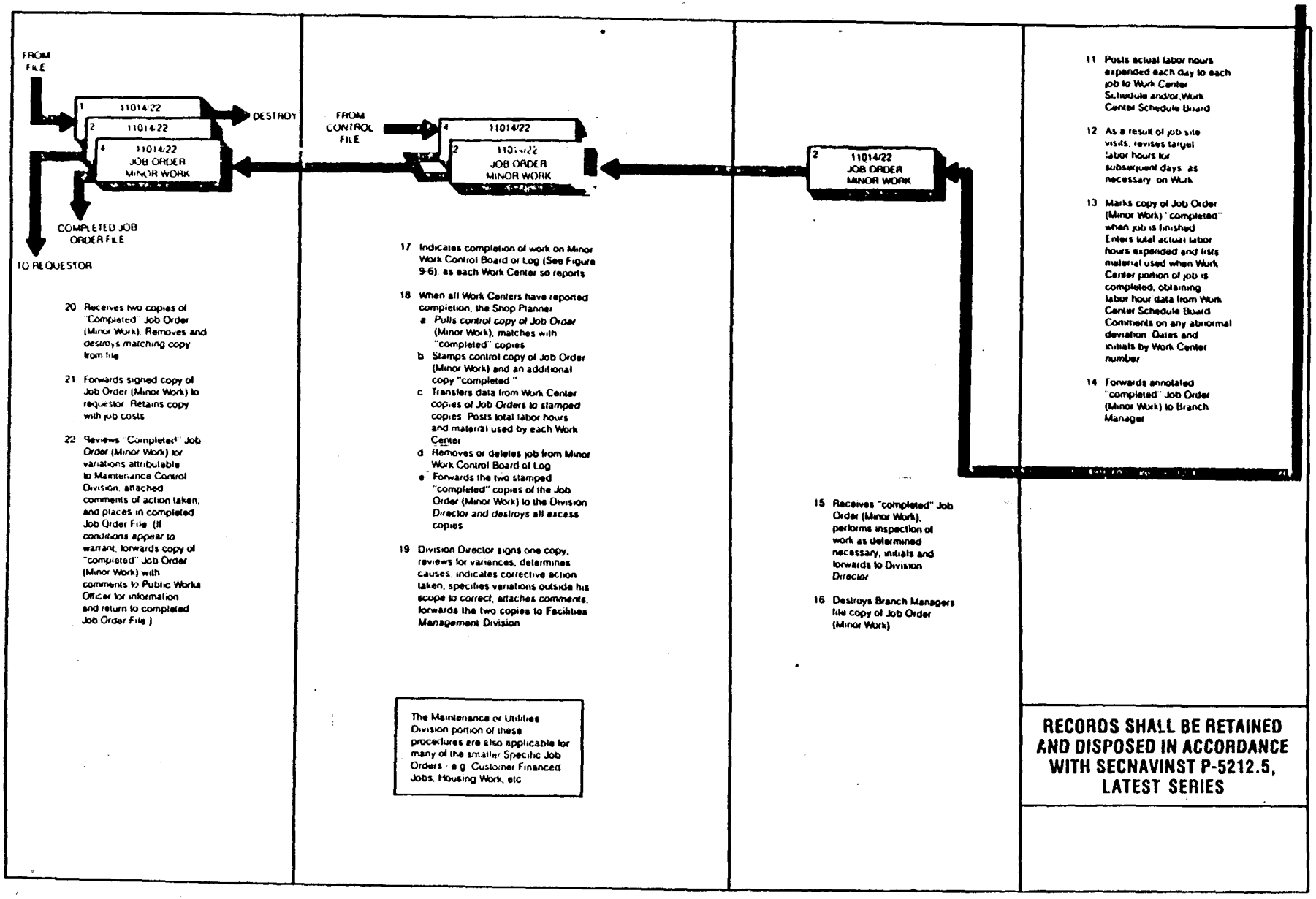


CHART NO. 7
SUBSEQUENT PROCESSING OF SPECIFIC JOB ORDERS (SCHEDULING)
(SEE CHART NO. 5 FOR INITIAL PROCESSING)

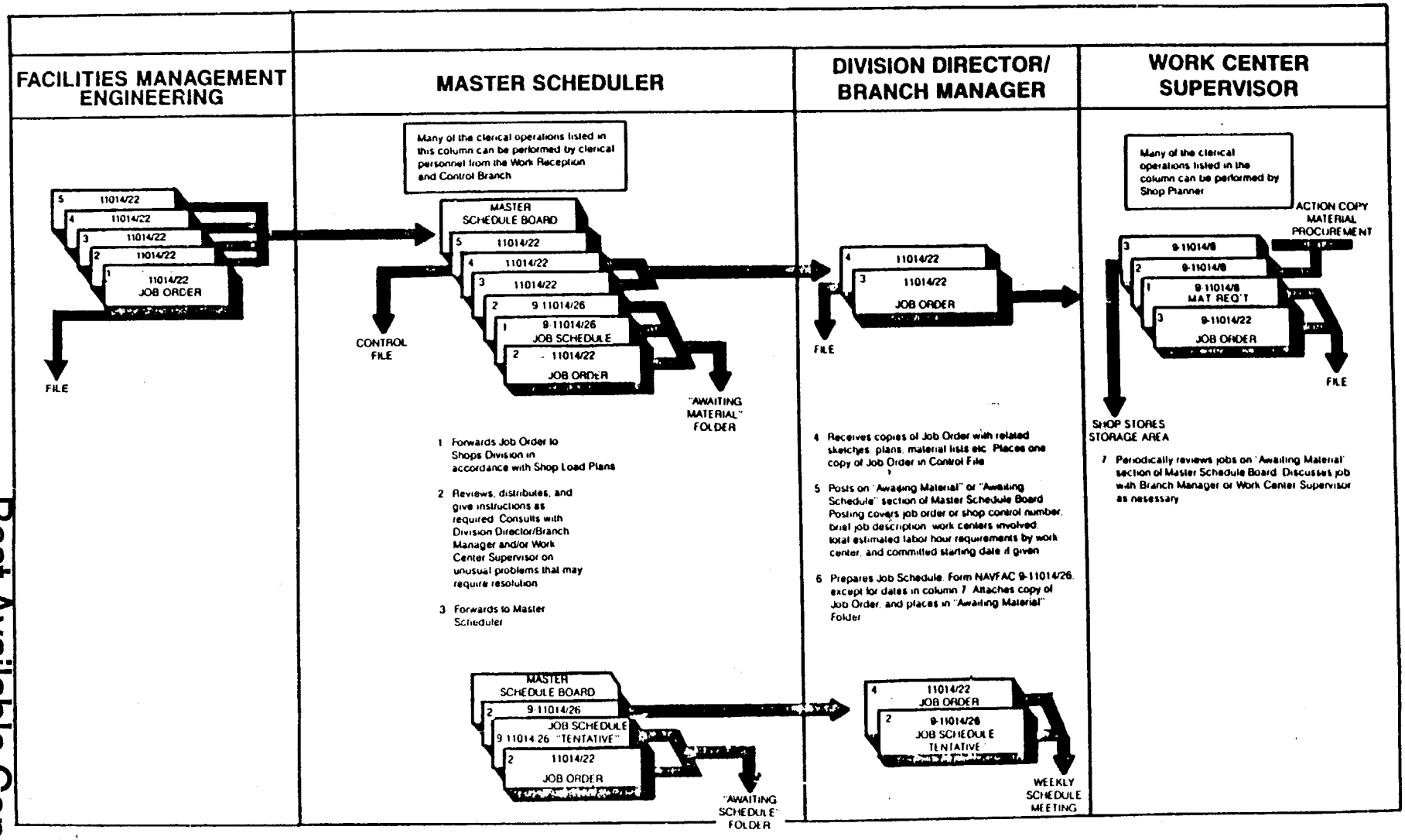


CHART NO. 7 (Continued)

8 Posts or transfers job to "Awaiting Schedule" section of Master Schedule Board

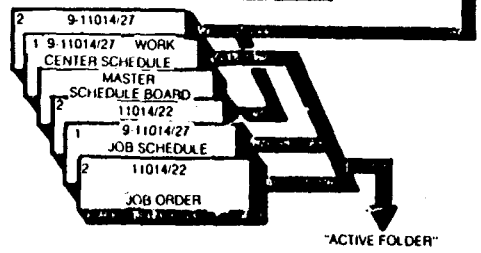
9 Transfers Job Order and Job Schedule from "Awaiting Material" Folder to "Awaiting Schedule" Folder

10 Reviews jobs on "Awaiting Schedule" section of Master Schedule Board and determines jobs to be activated

11 Schedules the job on the Job Schedule Form NAVFAC 9-11-14/26 by providing dates of consecutive work weeks in column 7 as determined from Work Center Manhour Availability Log Checks "Tentative" Schedule block on Job Schedule

12 Distributes copies of "Tentative" Job Schedules to appropriate Branch Managers on Wednesday

This completes the process of tentative scheduling and the job is now ready for discussion at the weekly scheduling meeting



"ACTIVE FOLDER"

15 Conducts weekly scheduling meeting at 10 00 A M Thursday

The planned schedule should not be changed on the Master Schedule at any time except by authorized amendment to change in scope of work or except in the event of a general emergency which disorganizes the entire schedule

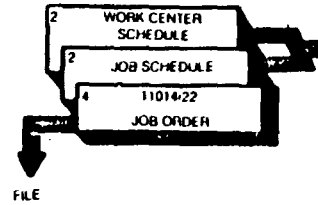
16 Collects all "Tentative" Job Schedules and destroys after preparing "Final" Job Schedules as a result of weekly scheduling meeting

17 Posts the newly scheduled jobs on the "Active" section of the Master Schedule Board and removes those jobs from the "Awaiting Schedule" section Transfers Job Orders and all related documents from "Awaiting Scheduling" Folder to "Active Folder

18 Makes revisions to schedules of jobs on the "Active" section of the Master Schedule Board that were rescheduled at the weekly scheduling meeting

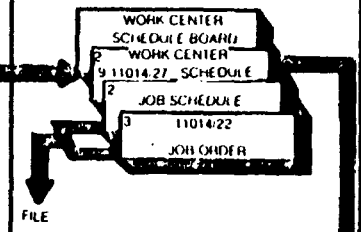
13 Reviews tentative job schedules prior to weekly scheduling meeting

14 Attends weekly scheduling meeting at 10 00 A M Thursday



20 Establishes target dates for jobs in which several of his Work Centers will be involved during the coming week

21 Meets with each Work Center Supervisors (and Shop Planner) during Friday morning, reviews and discusses Work Center Schedule and job schedules for newly scheduled jobs



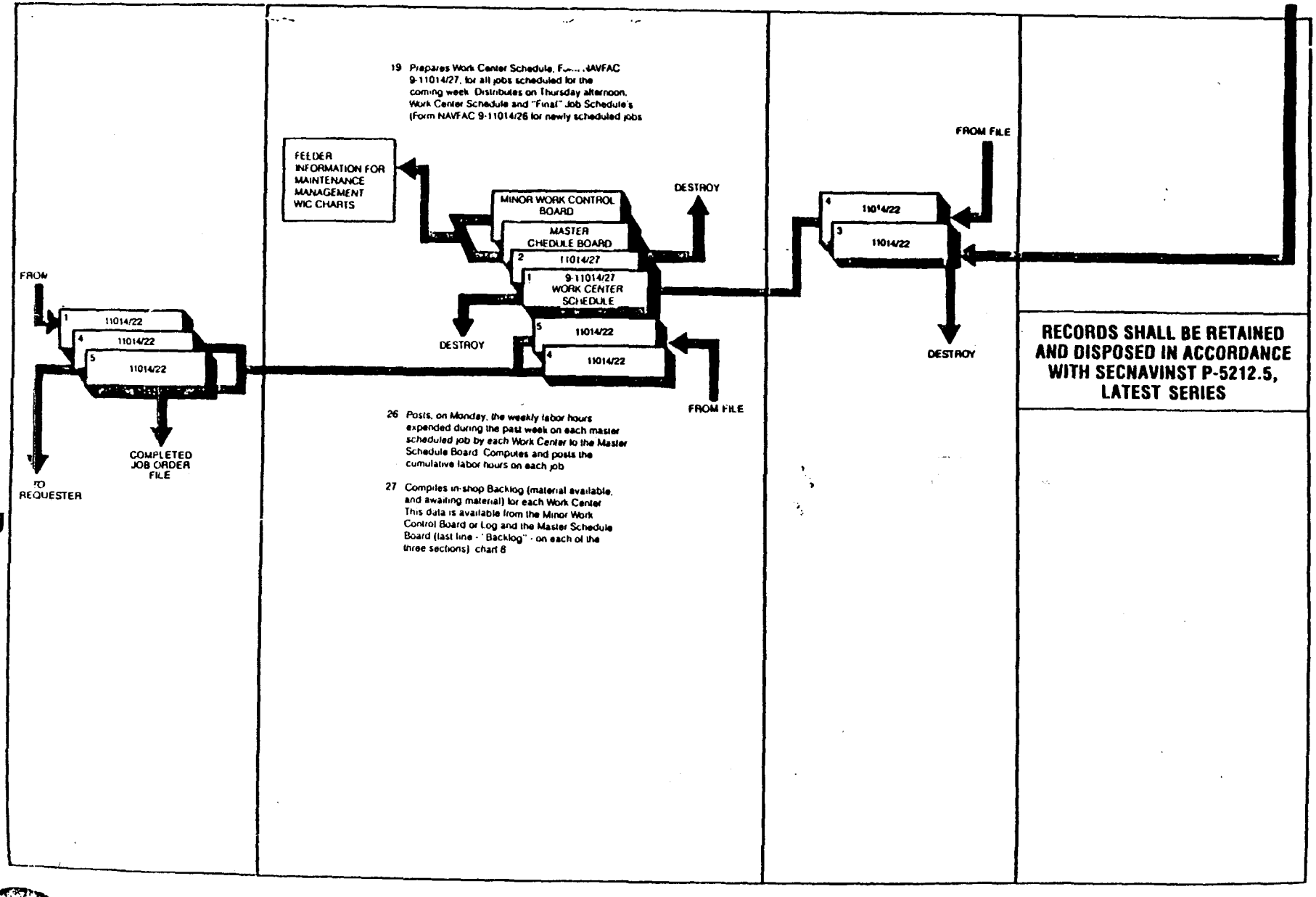
22 Plans, on Friday, work accomplishment for entire Work Center force for each work day during the coming week Posts resulting daily schedule target to the Work Center Schedule and/or Work Center Schedule Board

23 As a result of daily visits to jobs, revises target labor hours for subsequent days, as necessary, on Work Center Schedule

24 Posts weekly, by 9 00 A M Monday, from the Work Center Schedule Board to the Work Center Schedule for the past week, the total labor hours expended during the past week on each master scheduled job

25 Forwards the posted Work Center Schedule for the past week to the Master Scheduler

CHART NO. 7 (Continued)



Appendix B (2)

CHART NO. 8
SUBSEQUENT PROCESSING OF COMPLETED SPECIFIC JOB ORDERS)
(SEE CHARTS NO. 5 AND 7 FOR PROCESSING PRIOR TO COMPLETION)

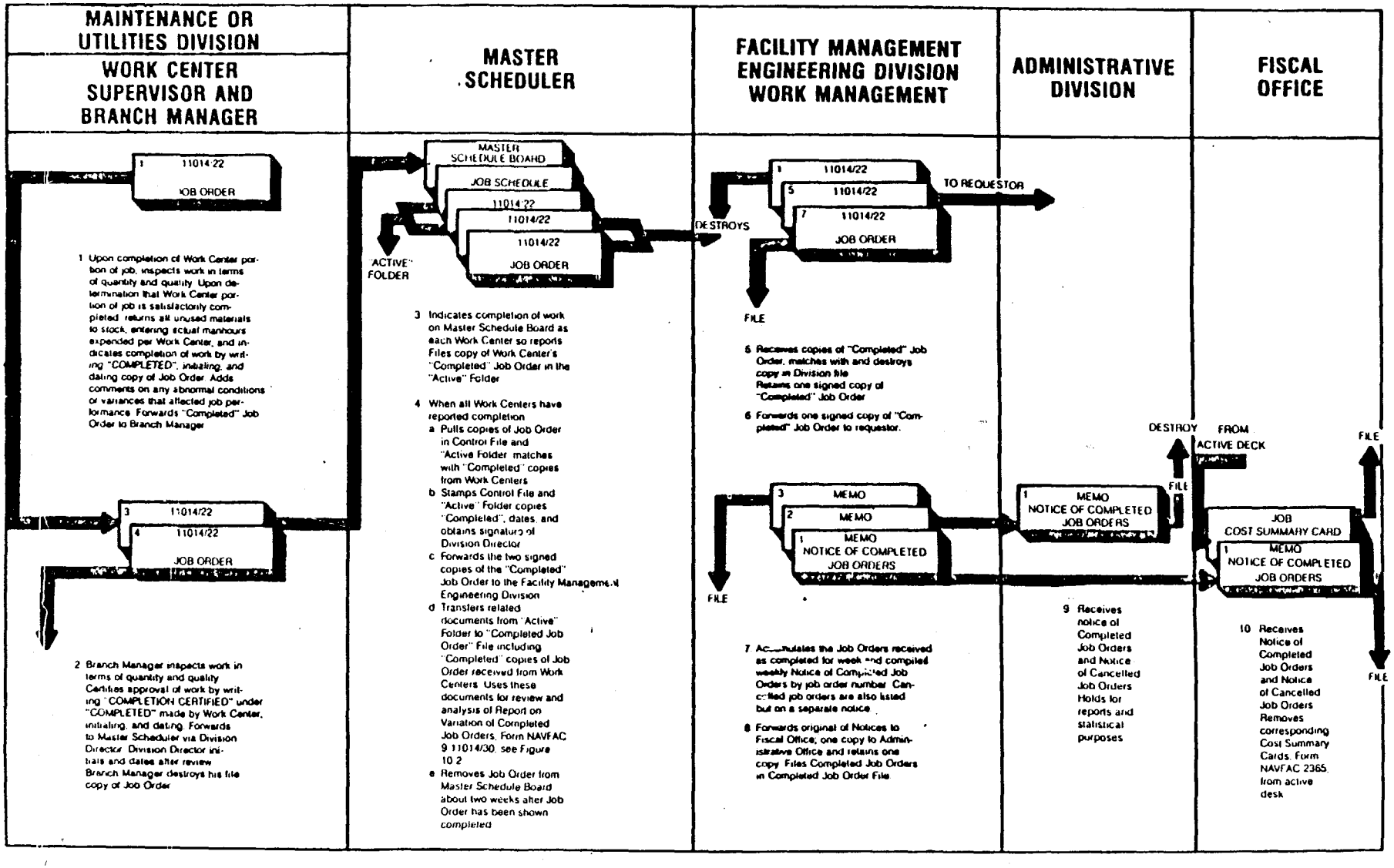
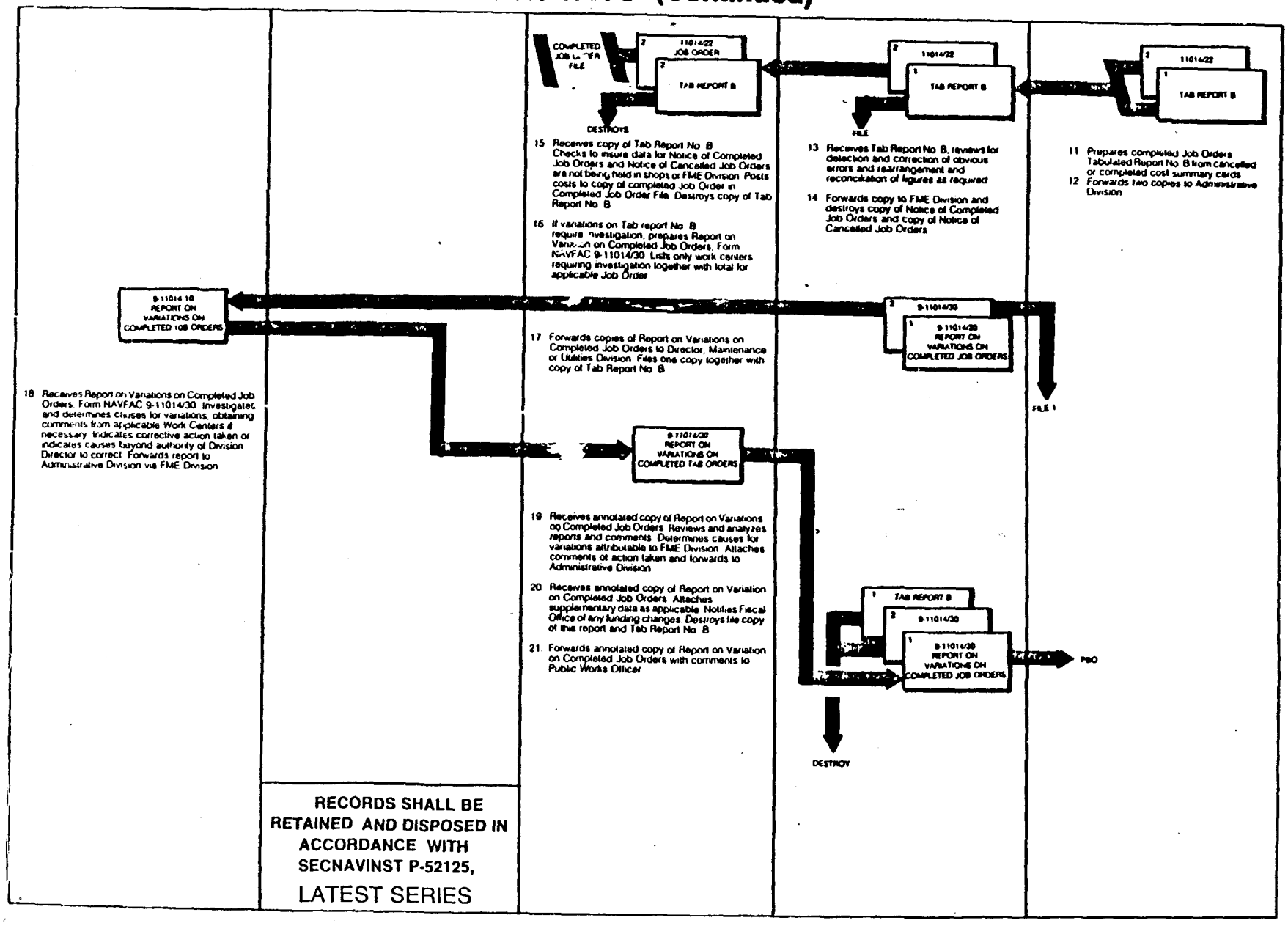


CHART NO. 8 (Continued)



Appendix B (3)

TABLE 7-1
Level of Maintenance Classification Codes
(LMC Codes)

Code	Classification Characteristics	Level of Maintenance
A	o Vital to activity mission o Active future of over 10 years o Excessive repair cost or downtime	o Maintain economically to assure full safe and efficient support for an indefinite period
B	o Important to activity mission o Active future use of 3-10 years o Excessive repair cost or downtime	o Maintain economically to fulfill facility mission for duration of facility life or mission
C	o Limited importance to activity mission	o Limited maintenance on basis of planned remaining useful life.
	o Substandard construction or future active life of less than 3 years	o Eliminate fire, health and safety hazards
	o Infrequently or only partially used	o Patch and reinforce instead of replacing wherever economical
	o No downtime effect and little effect upon activity mission	o Consider breakdown maintenance
D	o Inactive facilities required during mobilization)	o Limited maintenance to assure weather tightness, structural stability, protection from fire or erosion, elimination of safety or health hazards and to permit reactivation within the period prescribed under mobilization plans
	o Surplus facilities	o Eliminate fire, safety, and health hazards
		o Prevent pilferage or loss of items, effecting final disposal action

APPENDIX C

"BEST" COMPUTER SYSTEM

APPENDIX C

THE BASE ENGINEERING SUPPORT, TECHNICAL (BEST) MAINTENANCE CONTROL SUBSYSTEM

The BEST Maintenance Control Subsystem is a simple, flexible, interactive, automated management system to be operated and controlled by FME personnel. The system is comprised of standard user-friendly software and minicomputer equipment. It is designed to enhance the productivity of Navy public works maintenance personnel within the framework of the guidance provided in this manual.

Equipment for the Maintenance Control Subsystem will consist of a central processing unit (CPU), storage devices, visual display work stations, and printers. Size of CPU and storage devices, and number of work stations and printers will vary among activities.

NAVFACENGCOM will produce and maintain the standard BEST application software. Local additions to, or changes in, the standard software will be an activity responsibility.

Installation of BEST at shore activities will be performed under the direction of the Engineering Field Divisions. The first installations are planned for FY1985.

A brief description of the four modules comprising the maintenance control subsystem follows.

EMERGENCY SERVICE (E/S) MODULE.

The E/S Module supports all efforts associated with managing an E/S operation. It provides rapid work request processing and data retrieval ability, performs statistical analysis on E/S work orders, facilitates the use of Engineered Performance Standards (EPS), and generates E/S management analysis reports on demand.

One can query the system at any time for job status, nature of requested work, date called in, or any other characteristic of an outstanding or completed E/S work request.

Management reports can be generated; indicating E/S backlog, job turnaround times, or standard vs. actual hours used; to analyze current E/S work performance. Work center/craft supervisors can focus on these reports to increase E/S workforce productivity and responsiveness. Additional management applications include selective analysis of work orders relating to such categories as, a specific housing unit or building, a type of equipment (e.g. air conditioners, pumps, etc.), or an individual craft or shop. The selected jobs can also be arranged and printed in any desired order.

SHORE FACILITIES INSPECTION (SFI) MODULE.

The SFI Module performs all the normal clerical functions and operations associated with management of both the Control Inspection (CI) program for facilities and the Preventive Maintenance Inspection (PMI) program for installed dynamic equipment.

For both CI and PMI, a complete facility and equipment inventory, inspection frequencies, and labor standard hours are entered into the computer. This module produces schedules for both CIs and PMIs, with accompanying work orders specifying inspection requirements, frequencies, and inspection time standards. The schedules and requirements are based on the priorities and inspector availability which have previously been loaded into the computer. A listing, providing advance notice of scheduled inspections, can be produced for customers or other activity departments. Feedback from these listings may be a void basis for schedule revision. After the final schedule is approved, the system generates the inspection work orders. Upon completion, the actual labor hours expended on these work orders can be matched to the original schedule to produce performance reports and listings of omitted inspections.

The system can be queried at any time and management reports generated upon demand. This flexibility provides management an effective tool to ascertain the current condition of any facility or piece of equipment. Overall, this leads to better work scheduling, project selection, and maintenance.

WORK INPUT CONTROL (WIC) MODULE.

The BEST system's WIC module performs all normal clerical operations associated with monitoring work requests. It allows rapid data entry and retrieval, and generates management reports on demand. The module provides a means for the PWD to control the planned utilization of manpower resources as well as the definition, scheduling, and accomplishment of all work processed by the Facilities Management Engineering Division. This is done by providing Public Works Management with the ability to access the current status of work requests and job orders through each stage of their life.

The possibilities for control include:

- Screening individual jobs for necessity
- Determining the relative urgency (Priority)
- Programming work through the planning phase
- Authorizing the work
- Maintaining balanced workload for each resource pool
- Assuring proper completion of jobs

WIC tracks work requests and job orders from the time they are submitted until the work is completed by means of its four submodules.

1 - Work Identification and Status
2 - Shopload Planning
3 - Operating Plan
4 - Contract Status

The purpose of the Work Identification and Status submodule is to develop and maintain a workload identification system, to provide planning and status data on work from its reception to completion, and to control planning of work to facilitate shoploading and scheduling. After work is completed, the files are transferred from an "active" file to a "history" file and kept for comparative analyses.

The Shopload Planning submodule provides a plan for scheduling work to the PW Shops and relates the PWD backlog to manpower available for accomplishment.

The Operating Plan submodule records funding commitments, obligations, and expenditures. This permits management to forecast resource distribution over the available manpower and projected workload. The integration of work load and resources allows continuous evaluation and prioritization of the backlog.

The Contract Status submodule is a file which tracks work orders programmed for contract performance. This status information is used by the FME Division to detect potential scheduling conflicts with the in-house work force.

FACILITIES ENGINEERING JOB ESTIMATING (FEJE) MODULE

The FEJE Module is a computerized version of the Engineered Performance Standards (EPS) Handbooks, NAVFAC P-700 series, which provide for both scoping and detailed estimates. It is designed primarily to estimate jobs that are to be accomplished by in-house personnel, but can also serve as a baseline for work accomplished under contracts.

FEJE uses Work Codes and standards contained in the Unit Price Standards (UPS) Handbook, NAVFAC P-716.0, to generate scoping estimates. The UPS include per unit labor requirements by craft, material requirements by type, and special equipment by description to provide a per unit dollar estimate which is extended by the number of units in the job to develop the overall estimate. The unit data is tailored by applying local prices for labor, material, and equipment. Activities can also enter historical data to provide a basis for additional non-UPS scoping estimates. The Planner and Estimator can modify the line item extensions, if appropriate, to more properly reflect a specific job's content. Hardcopy estimates, including the job description, unit and extended quantities and associated costs, are generated for each Work Code.

FEJE utilizes the EPS standards and procedures to generate detailed estimates. Each job is structured into job phases and tasks within each phase. FEJE guides the Planner and Estimator to the most appropriate task time standard through a series of tutorial screen displays and through the use of a Key Word Index. Slotting is accommodated and task time standards are recorded for specific tasks within a phase. Non-EPS based tasks are entered by the user while developing the job estimate and nomograph factors are automatically calculated. Thus, a Job Phase Calculation Sheet including job identification and description is developed after each phase. Upon completion of all job phases, the FEJE Module produces a hardcopy Job Phase Calculation

Sheet for each phase, work authorization/estimate continuation sheet, and a work authorization/estimate summary sheet for each job. The work authorization/estimate sheet includes a line entry of craft costs, based on local wage rates, for each phase. The estimate sheet also displays the total number of EPS and non-EPS hours estimated. FEJE also permits establishment of local Task Time Standards. Interfaces with work input control, scheduling, and memorandum accounting systems are possible.

APPENDIX D

LABOR CLASS CODES

LABOR CLASS CODES	DESCRIPTION
01	**Service Work** - All productive non-emergency work performed under emergency/service work authorization, which is 16 manhours or less.
02	**Emergency Work** - All labor required to correct or repair a condition caused by a breakdown or an emergency including all labor subsequently authorized on a Minor Work Authorization or Specific Job Orders as well as that portion authorized by an Emergency/Service Work Authorization.
03	**Preventive Maintenance Inspection (PMI)** - All labor expended by semi-skilled and skilled tradesmen while performing preventive maintenance inspection and service.
04	**Standing Job Orders - Not Estimated** - All productive labor that is authorized on a standing job order which has not been estimated.
05	**Standing Job Orders - Estimated** - All productive labor that is authorized on a standing job order which has been planned, estimated, and scheduled.
06	**Minor Work Authorization** - All productive labor authorized on a minor work authorization.
07	**Specific Job Orders** - All productive labor authorized on a specific job order.
40	**Rework** - All labor used in the correction of faulty work on the part of the Public Works Department, regardless of the code previously applied.
41	**Supervision** - All supervisory personnel, and that part of a leader's time spent on supervision.
42	**Shops Indirect** - Semi-skilled and skilled craftsmen not directly chargeable to productive work which includes the schedulers and shop planners; also, labor spent in *maintenance and repair of shop equipment and power tools;* also, time expended by non-graded Public Works personnel on material handling when such labor is not chargeable directly to a job. Labor expended by shops personnel in *cleaning up their work area,* excluding work of the regular janitorial force.
43	**Allowed Time** - All non-productive time expended on official business; waiting for material, tools, parts, equipment, transportation, etc.; administrative leave, excused tardiness and time loss because of inclement weather; time spent awaiting work assignment.
44	**General Office and Clerical** - Graded personnel who are on the roster of the Maintenance or Utilities Divisions but not those graded personnel assigned to the Maintenance or Utilities Divisions who are on the roster of the Administrative Division.
45	**Leave** - All approved absences for sick, annual, and military leave, holiday pay, terminal leave, jury duty and all other leave for which pay is received.

FIGURE 6-15
SUMMARY OF MAINTENANCE AND UTILITIES DIVISIONS LABOR CLASS CODES

APPENDIX E

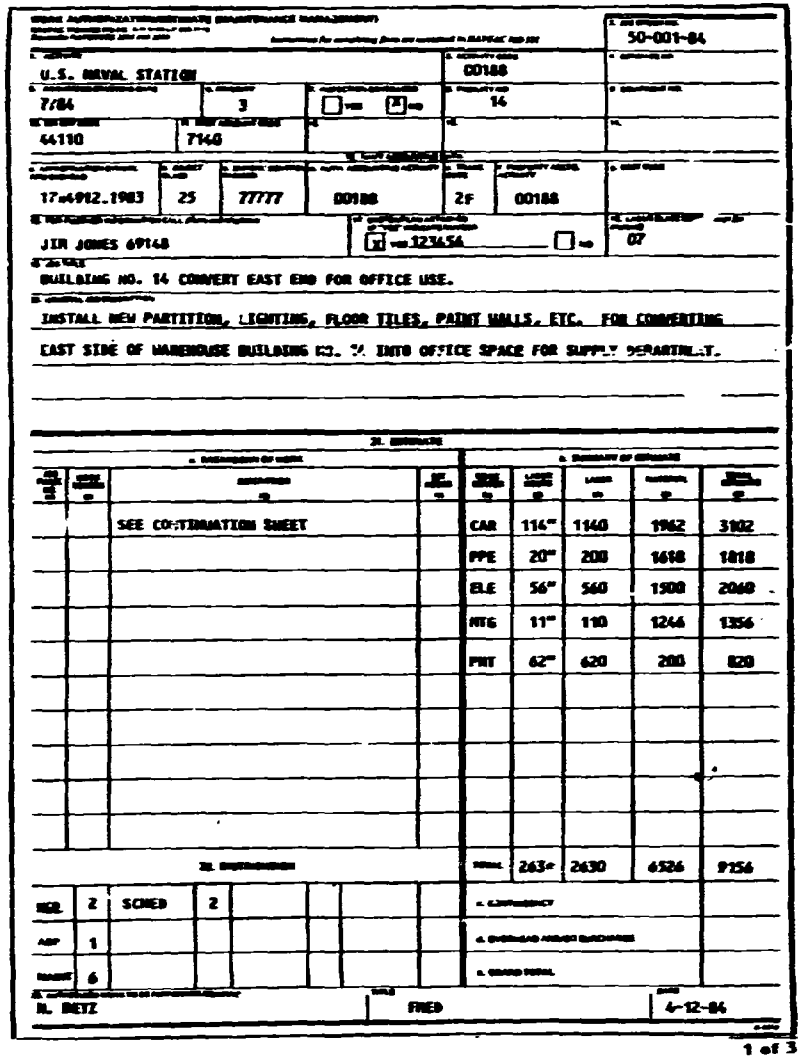
E(1). WORK AUTHORIZATION / ESTIMATE

E(2). CPM APPLICATION

E(3) JOB ORDER PHASE CALCULATION SHEETS

E(4). JOB ORDER PREPARATION INSTRUCTIONS

Appendix E (1)



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JIR JONES 69148 | ☒ no 123454 ☐ no | 07

BUILDING NO. 14 CONVERT EAST END FOR OFFICE USE.

INSTALL NEW PARTITION, LIGHTING, FLOOR TILES, PAINT WALLS, ETC. FOR CONVERTING EAST SIDE OF WAREHOUSE BUILDING NO. 14 INTO OFFICE SPACE FOR SUPPLY DEPARTMENT.

	SEE CONTINUATION SHEET		

CAR	114"	1140	1962	3102
PPE	20"	200	1618	1818
ELE	56"	560	1500	2060
MTG	11"	110	1246	1356
PNT	62"	620	200	820
	263"	2630	6526	9156

MEC	2	SCHED	2					
ARP	1							
PAINT	6							

R. METZ | FRED | 4-12-84

1 of 3

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1	CAR	CONSTRUCT A PARTITION 30' LONG, 12' HIGH, 2"x4" STUDS, 16" O-C, 1/2"x4'x8' GYP. BOARD, BASEBOARD, SHOE AND CEILING COVE--ONE SIDE ONLY (LEAVE STUDS OPEN ON INSIDE OF NEW OFFICE SPACE FOR OTHER CRAFT WORK).	26
2	PPE	INSTALL 11/2" WASTE LINE TO WATER COOLER, CONNECT TO EXISTING WASTE LINE IN CRAWL SPACE. INSTALL 11/2" VENT AND CONNECT TO EXISTING VENT STACK IN ATTIC. INSTALL 1/2" COLD WATER SUPPLY LINE TO COOLER, CONNECT TO SUPPLY LINE IN CRAWL SPACE. INSTALL VALVE AT COOLER END. USE COPPER TUBING.	5
3	ELE	REMOVE (8) EXISTING INCANDESCENT LIGHT FIXTURES AND 140' WIRE AND CONDUIT. INSTALL NEW (8) CIRCUIT DISTRIBUTION PANEL, CONDUIT, OUTLET BOXES FOR FLUORESCENT LIGHTS AND RECEPTACLES, AND PULL WIRES.	36
4	PPE	INSTALL 2" STEAM SUPPLY AND 3/4" CONDENSATE LINES TO RADIATORS AND CAP OFF ABOVE FLOOR. (CONNECT INTO EXISTING LINES IN CRAWL SPACE) (STEEL PIPE). INSULATE 2" STEAM SUPPLY LINE AND FITTINGS (FIBER-GLASS INSULATION).	9
5	CAR	INSTALL 1/2"x4'x8' GYP. BOARD, BASEBOARD, AND CEILING COVE ON NEW PARTITION INSIDE. INSIDE CHAIR RAIL ON ALL INTERIOR WALLS. INSTALL PREHUNG DOOR AND JAMB (DO NOT INSTALL SHOE MOLD AT THIS TIME).	16
6	ELE	INSTALL (18) FLUORESCENT LIGHT FIXTURES, (6) RECEPTACLES AND CONNECT WIRES.	20

2 of 3

FIGURE 5-2
Work Authorization/Estimate

Appendix E (2)

Appendix A

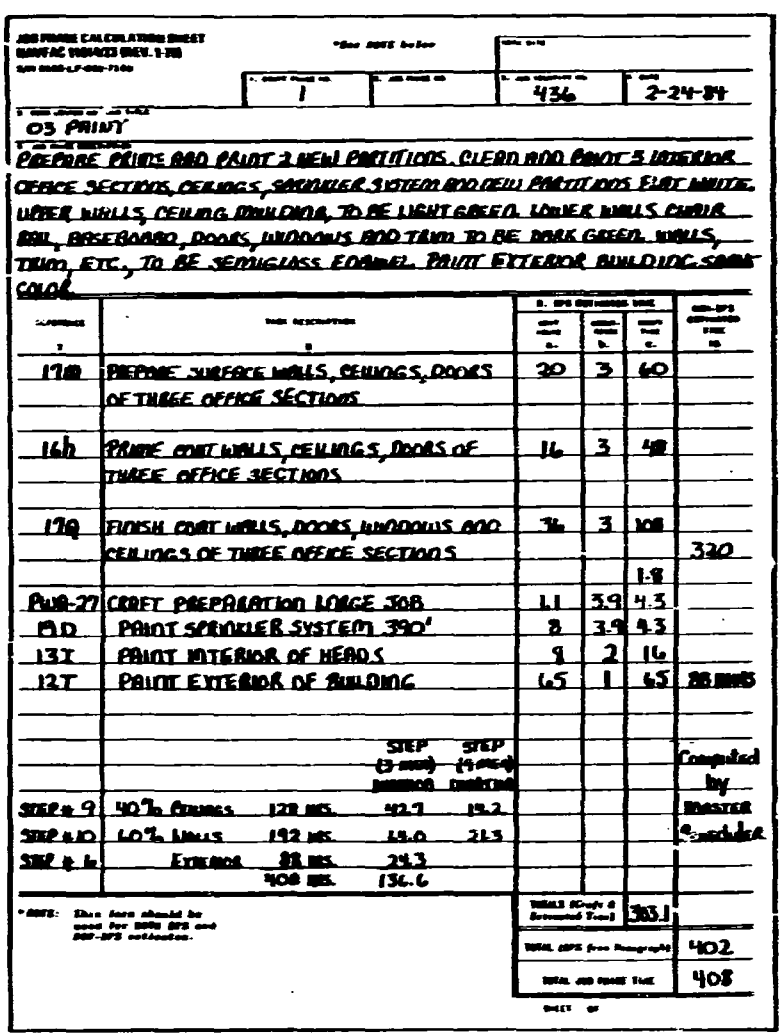
PROCEDURE

1. DIAGRAM DEVELOPMENT. The job order is received by the Master Scheduler through the normal job order procedure, except that Job Phase Calculation Sheets (Figure A-1) are included on those multicraft jobs estimated to cost $5,000 or more. The Master Scheduler may request the Job Phase Calculation Sheets on smaller size jobs when critical path scheduling is desirable.

a. Job Description. A sample job (Figure A-2) demonstrates the techniques and advantages of Critical Path Scheduling. This particular job typifies complexities that confront Master Schedulers on large multicraft jobs. This job was estimated to cost approximately $5,000, involved six work centers, and required outside purchase as well as Navy stock materials.

b. Step List. A step is a specified unit of work that can be accomplished without interference or interruption from any other work. The Master Scheduler develops a Step List (Figure A-3) of normal operations from each phase on the Job Phase Calculation Sheets, Figure A-1. The number of steps, or self-contained units of work, that is in each phase will be determined by the Master Scheduler by examining each task description. Figure A-1 shows that in some instances a single task is a step, and in other instances a step may consist of a number of tasks, or a step may be subdivided. For example, Figure A-1 shows interior painting in five items: The Step List regroups these into two steps: 9, paint ceiling, and 10, paint walls. As discussed in paragraph 4d, these steps might be regrouped as: 9, prepare ceilings and walls; 9a, prime ceilings and walls; 9b, paint ceilings and sprinkler system; 9c, paint upper walls; and 10, paint dado. The degree to which steps are combined, or subdivided, will depend upon the work directly involved, the type and amount of related work involved, and the degree of coordination required. After preparing the Step List, the Master Scheduler should prorate to each step that percentage of the "total job phase time hours" on the Job Phase Calculation Sheet that is contained in each step. This will allocate the proper share of the craft preparation, allowances, and travel time that is applicable to each step. Generally, prorating a phase won't cause a problem; however, allow sufficient time in each step for the applicable allowances. If desired, assistance can be obtained from the Planners and Estimators in prorating these allowances to the steps. The amount of total allocated hours for a step is divided by the number of personnel in the crew assigned to that step. The quotient is the duration time (clock time, calendar time, or crew time) for each step (Figure A-3). There may be other steps not shown on the Job Phase Calculation Sheets that should be considered, such as: direct procurement material lead time and stock item material lead time. These are separate steps.

c. Arrow Diagram. An arrow diagram (Figure A-4) shows graphically the interrelationships and interdependencies of the various steps in a total job plan. Each step in the job is represented by an arrow. The arrow diagram is simple in detail, but it does require some trial and error before the proper relationships of the steps are established. The arrow diagram should be constructed in accordance with the following criteria:



		1		436	2-24-84

03 PRINT

PREPARE PRIME AND PAINT 2 NEW PARTITIONS. CLEAN AND PAINT 5 INTERIOR OFFICE SECTIONS, CEILINGS, SPRINKLER SYSTEM AND NEW PARTITIONS FLAT WHITE. UPPER WALLS, CEILING BUILDING, TO BE LIGHT GREEN. LOWER WALLS CHAIR RAIL, BASEBOARD, DOORS, WINDOWS AND TRIM TO BE DARK GREEN. WALLS, TRIM, ETC., TO BE SEMIGLASS ENAMEL. PAINT EXTERIOR BUILDING SAME COLOR

17B	PREPARE SURFACE WALLS, CEILINGS, DOORS OF THREE OFFICE SECTIONS	20	3	60	
16h	PRIME COAT WALLS, CEILINGS, DOORS OF THREE OFFICE SECTIONS	16	3	48	
17Q	FINISH COAT WALLS, DOORS, WINDOWS AND CEILINGS OF THREE OFFICE SECTIONS	36	3	108	320
				1.8	
Pub-27	CRAFT PREPARATION LARGE JOB	11	3.9	43	
19D	PAINT SPRINKLER SYSTEM 390'	8	3.9	43	
13T	PAINT INTERIOR OF HEADS	8	2	16	
12T	PAINT EXTERIOR OF BUILDING	65	1	65	88 HRS

			STEP (3-man)	STEP (4-man)
STEP # 9	40% Rooms	128 HRS.	42.7	19.2
STEP #10	60% Walls	192 HRS.	64.0	21.3
STEP # 6	Exterior	88 HRS.	29.3	
		408 HRS.	136.0	

Compiled by Master Scheduler

TOTAL (Craft & Assumed Trade)	363.1
TOTAL MPS from Paragraph	402
TOTAL JOB PHASE TIME	408

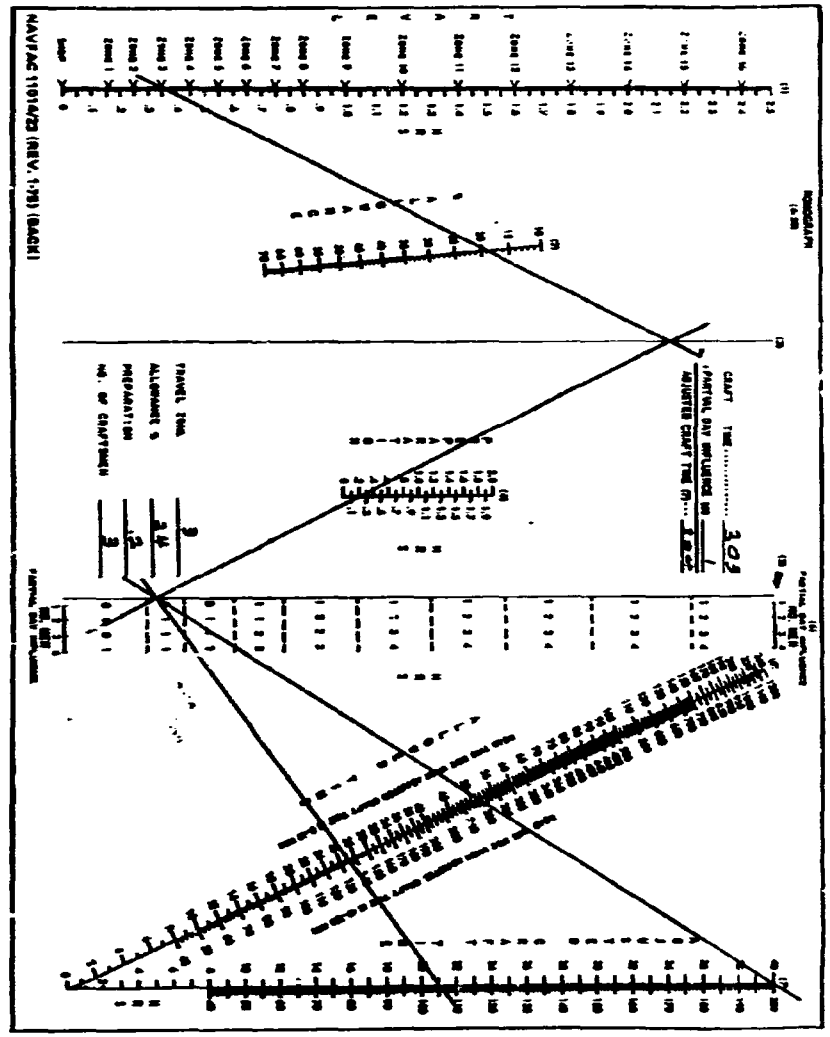
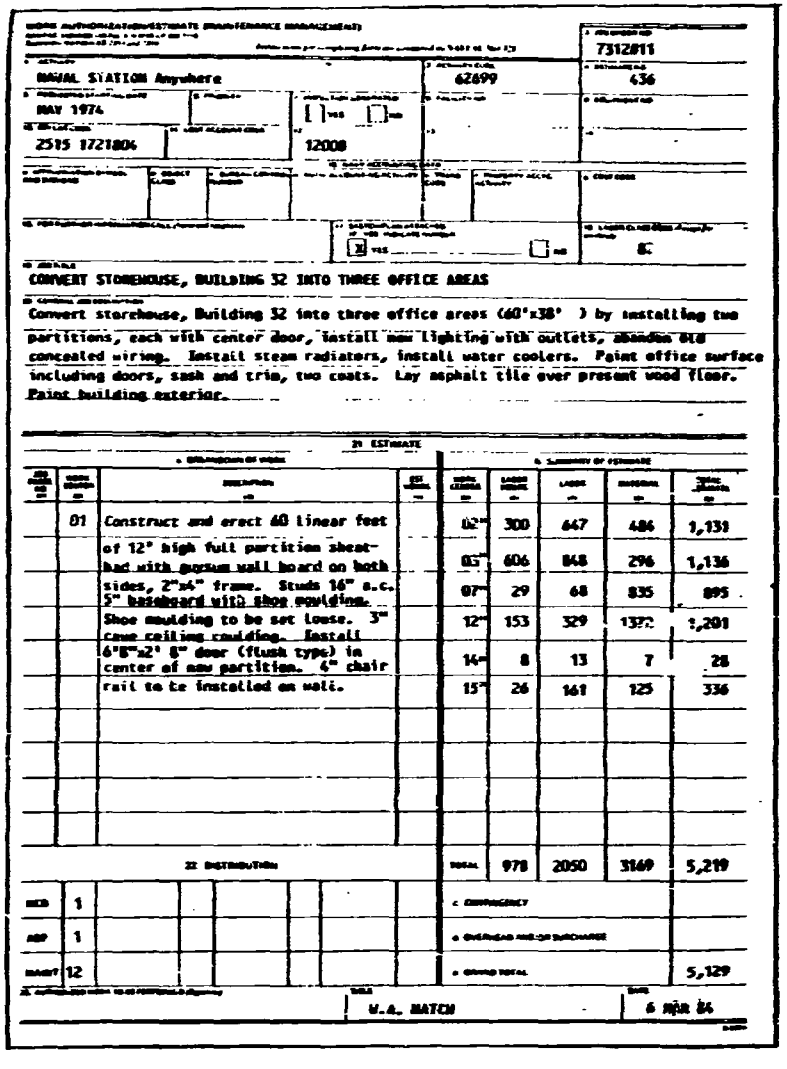


FIGURE A-1
Job Phase Calculation Sheet



NAVAL STATION Anywhere

7312811

62699

436

MAY 1974

2515 1721804

12008

CONVERT STOREHOUSE, BUILDING 32 INTO THREE OFFICE AREAS

Convert storehouse, Building 32 into three office areas (60'x38') by installing two partitions, each with center door, install new lighting with outlets, abandon old concealed wiring. Install steam radiators, install water coolers. Paint office surface including doors, sash and trim, two coats. Lay asphalt tile over present wood floor. Paint building exterior.

21 ESTIMATE

	01	Construct and erect 40 linear feet of 12' high full partition sheathed with gypsum wall board on both sides, 2"x4" frame. Studs 16" o.c. 5" baseboard with shoe moulding. Shoe moulding to be set loose. 3" cove ceiling moulding. Install 6'8"x2' 8" door (flush type) in center of new partition. 4" chair rail to be installed on wall.		02	300	647	484	1,131
				03	606	848	296	1,136
				07	29	68	835	895
				12	153	329	1372	1,201
				14	8	13	7	28
				15	26	161	125	336
				TOTAL	978	2050	3169	5,219

22 DISTRIBUTION

NCB	1	
ADP	1	
SHOP	12	

c. CONTINGENCY

e. GRAND TOTAL 5,129

U.A. MATCH

6 MAR 84

7312011

436

	01	Lay 5300 SQ. FT. of 9"x9" asphalt tile with 150 asphalt felt base on existing wood floor. Existing loose floor structure to be realigned and rough sanded before cementing 150 felt. Baseboard shoe moulding to be reset upon completion of tile application.	228"
	02	Prepare, prime and paint all partitions surfaces. Clean, prime and paint all interior original surfaces in office sections. Paint ceiling, sprinkler pipe, ceiling moulding, door, casing, and baseboard flat white. Walls above door, ceiling moulding, light areas. Paint all walls including chair rail, baseboard, shoe moulding doors, windows, caging and trim, etc. to be seal-gloss. Paint Paint exterior existing color.	406"
	21	Install and connect 52 stem mounted, 4 tube 48" louvered fluorescent light fixtures and 12 duplex convenience flush mounted outlets. Remove old lights, boxes capped, circuits disconnected and abandoned in place.	39"
	15	Install and connect four sectional type cast iron radiators. Provide traps.	11"
	11	Install and connect three water coolers. Provide traps on new waste lines and valves on new supply lines.	5"
	32	Remove and properly dispose of debris and extra material discarded in, around and under the building as a result of this work.	8"

95

FIGURE A-2
Work Authorization/Estimate

STEP	WORK CENTER	TOTAL HOURS	NO. IN CREW	NORMAL DURATION TIME (HOURS)	STEP DESCRIPTION
1	-	120	-	120	Fixtures, outside procurement time
2	-	56	-	56	Navy stock, lead-time
3	01	80	2	40	Build partitions
4	21	114	2	57	New panel, E.M.T., Wiring
5	15	63	2	31.5	Steam pipes (access area)
6	02	*87	3	29	Paint exterior building
7	11	24	1	24	Water pipes (access area)
8	01	228	2	114	Sand floor and lay tile
9	02	*128	3	42.7	Paint ceilings
10	02	*191	3	63.6	Paint walls
11	21	39	2	19.5	Install light fixtures
12	15	11	2	5.5	Install radiators
13	11	5	1	5	Install water coolers
14	32	8	1	8	Clean up

*This item is the proportion of the "job phase allowed time" that is prorated to this particular step reflected in the Job Phase Calculation Sheet.

FIGURE A-3
Initial Step List

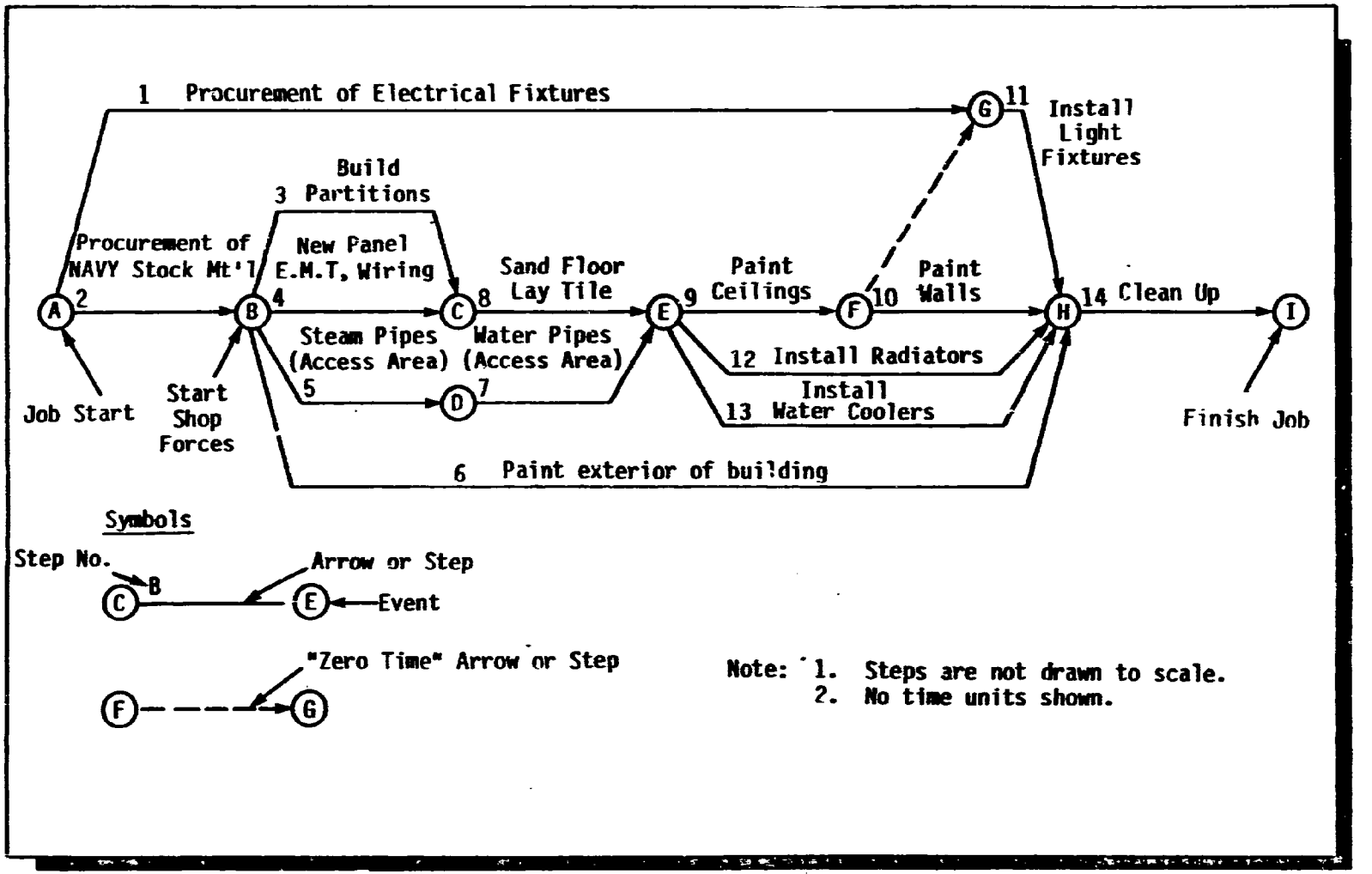


FIGURE 4-4
Arrow Diagram

(1) Arrows generally should point to the right so that the job begins at the left and ends at the right.

(2) Each arrow (step) is joined by circles that are usually lettered to identify an event, such as the completion of a step or steps, or the beginning of a step or steps.

(3) Arrows (steps) are numbered to agree with the step number shown in the step list. A brief description of the work involved may also be placed on the arrow.

(4) Arrows are joined in their logical sequence of work and the work represented by one arrow must be completed before the work represented by the next arrow can start; for example, in Figure A-4, arrow number 4 cannot start until arrow number 2 has been completed.

(5) Arrows with solid stems represent work that is to be accomplished, or measurable delay periods such as the time required for procurement of material. Arrows with dotted stems show the interrelationship of planned events and, as such, are not steps. For example, in Figure A-4 the dotted line arrow between events F and G means that step 11 should not start until step 9 has been completed.

(6) The numbers of the steps and the letters for the circles will not necessarily be in sequence from left to right on the complete arrow diagram. However, the arrows (steps) are placed in their logical sequence of work and arranged so that the interrelationships can be seen. In Figure A-4 steps 2, 4, 8, 9, 10 and 14 are one chain of steps, and steps 2, 5, 7, 12, and 14 are another chain of steps. Step 4 can be started as soon as step 2 has been completed, but step 8 cannot be started until steps 3 and 4 both have been completed. Step 11 could be started as soon as step 1 has been completed, but the job is such that step 11 cannot be started until step 9 has been completed. This latter situation is shown on the diagram by a dotted arrow of zero time value from the circle indicating the completion of step 9, event F, to the circle representing the start of step 11, event G.

2. DETERMINATION OF CRITICAL PATH. When the Master Scheduler is satisfied that the interrelationship of the job steps on the arrow diagram are truly represented, the duration time of each step is entered on the diagram. The "critical path" will be the chain of arrows (steps that result in the longest duration time for the job, because the total job cannot possibly be completed any earlier than the chain of steps with the longest duration time. The critical path is shown by a double line of arrows. Only by decreasing the duration time of one or more of those arrows (steps) on the critical path can the total job duration time be decreased. Indicating the duration times on the steps of the Arrow Diagram and determining the critical path completes its transition to a Critical Path Diagram. See Figure A-5 for the initial critical path for the job described in Figure A-2. Depending upon the time required for material procurement, there may be two critical paths, one for the total job including material procurement, and one for shop forces (or shop schedule) that covers only the shop labor required. In Figure A-5 the critical path for the total job includes steps 2, 4, 8, 9, 10, and 14 while the shop schedule includes steps 4, 8, 9, 10, and 14. Note that if step 1 took 360 hours to accomplish, then the critical path for the total job would be steps 1, 11, and 14.

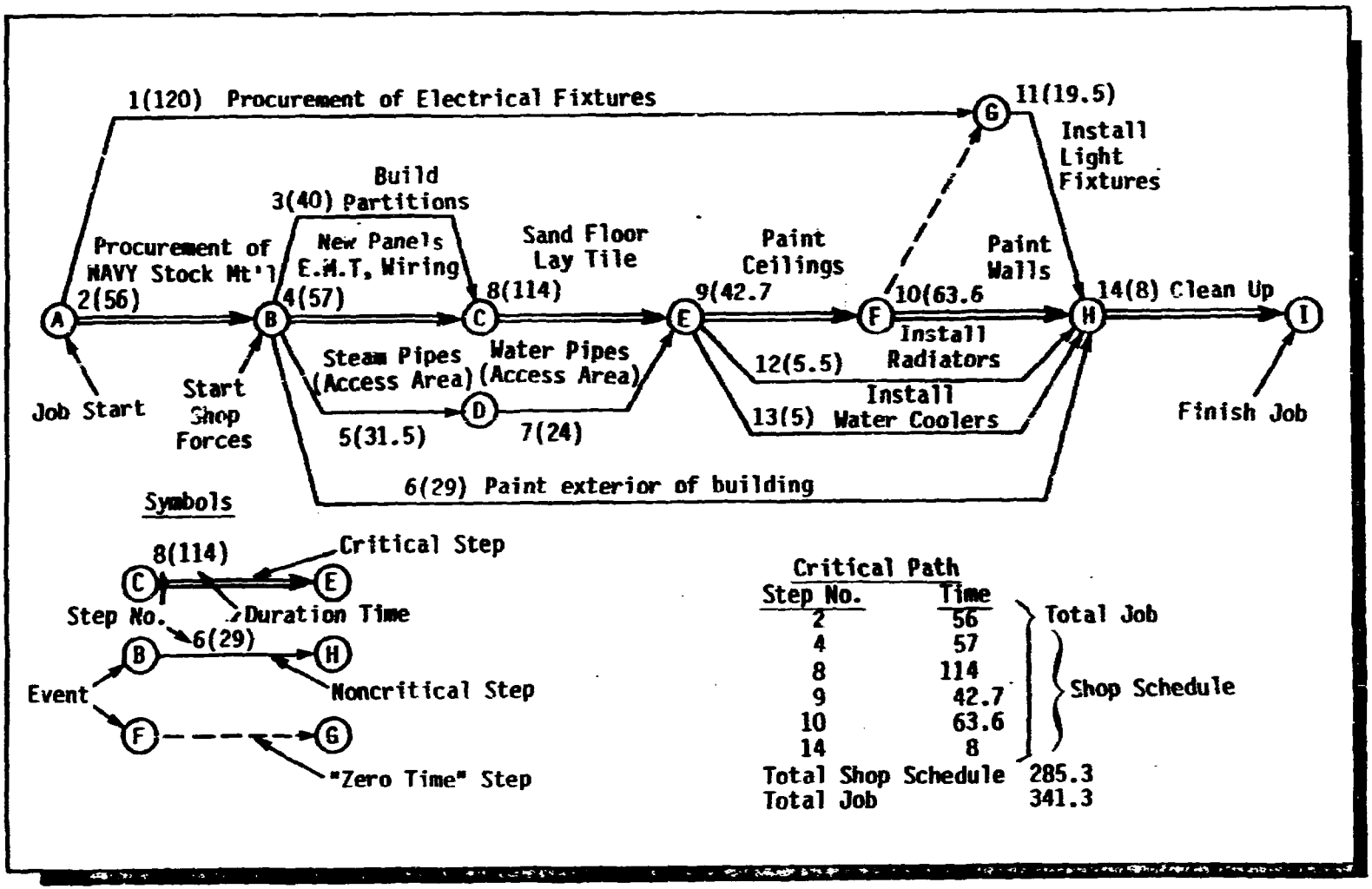


FIGURE A-5
Initial Critical Path

3. FLOAT. "Float" is the amount of slack time within which the starting point of an arrow that is not on the critical path can be moved without disturbing the critical path. Arrows (steps) with zero float (no slack time) are always on the critical path. The recognition of float allows the Master Scheduler to (a) analyze the effect on noncritical steps when the duration time of the critical path is reduced, and (b) either reduce the crew size (spread the work) to utilize the available float to balance the work force or vary the ultimate schedule starting date of the step within the float limitations. An example of float is seen when step 7 in Figure A-7 is scheduled. Since steps 5 and 7 are to be started and completed while steps 4 and 8 are being accomplished (see Figure A-6), an 11 hour float exists for steps 5 and 7. Because it was considered desirable to start work on step 5 at the beginning of the first week, along with steps 3, 4, and 6, step 7 can be started anytime after 4 P.M. (assuming an 8 to 4:30 workday with 30 minutes for lunch) on 4 May provided that the work is completed by 10:30 A.M. on 11 May. Because it would be uneconomical to have the craftsman start step 7 with only 30 minutes of working time left in the day, a later start is made. Also, because enough float exists for this work, step 7 is scheduled to start at 8:00 A.M. on 8 May, the beginning of the second week.

4. DECREASING JOB DURATION TIME. The initial critical path has been developed through analysis of normal operating procedures and working hours. Improving the critical path is the most important part of scheduling. The improvement amount will depend upon the management objective for scheduling this work, material procurement factors, available personnel, and the makeup of the job itself.

a. Management Objectives. Normally, management schedules jobs to obtain minimum effort and expense. However, management may dictate other objectives such as:

(1) A directed completion date
(2) A directed starting date
(3) A minimum or shortest time plan involving overtime or other crash methods
(4) Use of maximum numbers of personnel, with or without overtime
(5) Directed starting or completion dates for specific portions of the job.

b. Guidance and Assistance. The Master Scheduler should seek advice and assistance from appropriate supervisors regarding improved work methods, better job sequencing, the possibility of overtime use, additional personnel or shifts, special equipment, or more advantageous material.

c. Trial and Error. Any decrease in time of any arrow (step) on the critical path will decrease the total duration time for the job. As with the arrow diagram, a trial and error method is required before the final plan is developed. The initial critical path for shop forces consists of steps 4, 8, 9, 10, and 14. One way to shorten the time would be to increase the number of craftsmen on each step. Doubling the crew on steps 4 and 14 and tripling the crew on steps 8, 9, and 10 would reduce the time from 285.3 hours to 105.9 hours. This increase in crew size appears reasonable because of work space

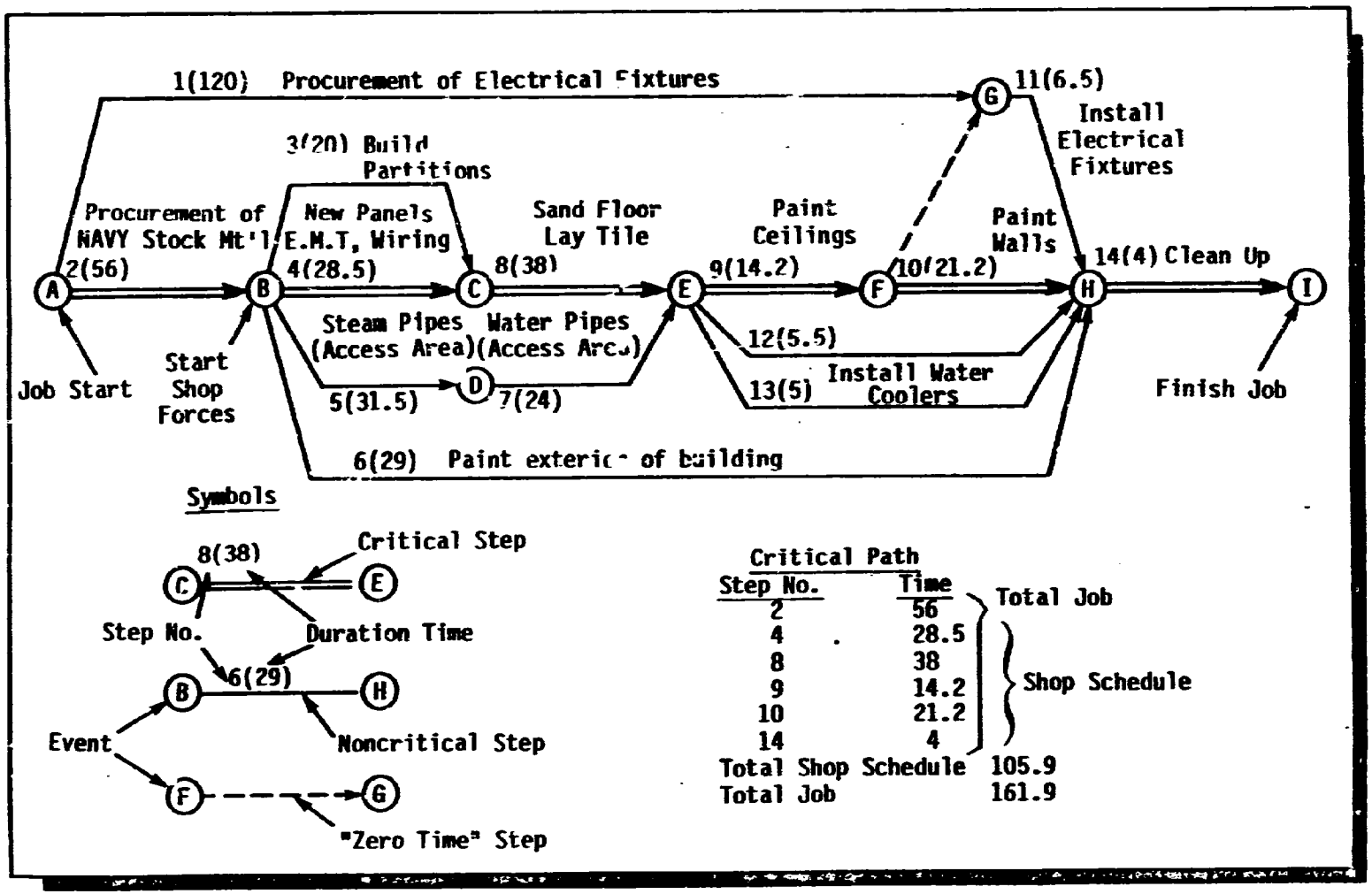


FIGURE A-6
Final Critical Path

and labor hour availability. However, step 3 now becomes critical rather than step 4; but by doubling the step 3 crew, step 4 would again become critical. Because step 11 cannot start until step 9 is completed, the initial time for step 11, 19.5 hours, is not critical compared to step 10 (when triple crewed) at 21.2 hours. However, because of the nature of operations such as light fixture installations and wall painting, some interference among personnel might occur. By tripling the crew on step 11 this difficulty would be avoided.

d. Variations. A more detailed study of steps 9, 10, 12, and 13 shows another possible variation. As shown in Figure A-6, radiators and water coolers (steps 12 and 13) are to be installed while ceiling and walls are being painted (steps 9 and 10). Questions involved here are:

(1) Are radiators to be painted?
(2) How can walls near radiators and water coolers be painted at the same time plumbers and pipefitters are working?
(3) Is it desirable to paint walls near water coolers and radiators prior to, or at the same time as, the ceilings?

As suggested in paragraph 1b, steps 9 and 10 might be subdivided and regrouped into: 9, prepare ceilings and walls; 9a, prime ceilings and walls; 9b, paint ceiling and sprinkler system; 9c, paint upper walls, and 10, paint dado. This arrangement would minimize spotting wall because different paint colors would be used. Also step 10 could be subdivided into two steps; 10a, paint dado behind radiators and water coolers; and 10b, paint balance of dado. This latter arrangement would, however, change the critical path and increase the total shop duration time. Another variation, which would not change the critical path or the shop duration time, would be to subdivide step 9c so that steps 9c and 10 would read: 9c, paint upper wall in area of radiators and water coolers; 9d, paint dado in area of radiators and water coolers; 9e, paint balance of upper wall; and 10, paint balance of dado. Electric fixtures, radiators, and water coolers would then be installed upon completion of step 9d.

e. Final Critical Path. Figure A-6 assumes that all improvements in the critical path have been made with minimum effort and expense.

f. Final Step List. When the Master Scheduler is satisfied that the best critical path has been developed, a Final Step List is prepared (see Figure A-8) with the final crew assignments, revised duration time for each step, and any applicable information for scheduling.

g. Preparation of Schedule. The transition from the Final Step List, Figure A-8 and final critical path, Figure A-6 to the Job Schedule, Figure A-9, is made by means of a Job Schedule Bar Chart, Figure A-7.

(1) Job Schedule Bar Chart. The chart is divided into weeks of five workdays. (If overtime is used in the critical path, the chart should be arranged to show the overtime effort). Steps may be listed in sequence of step numbers and each bar (step) measured in duration time (in hours) for each step as taken from the Final Step List, Figure A-8. Critical path steps should be plotted first and in critical path sequence. From the Final Critical Path, Figure A-6, step 4 would be plotted first because the job is

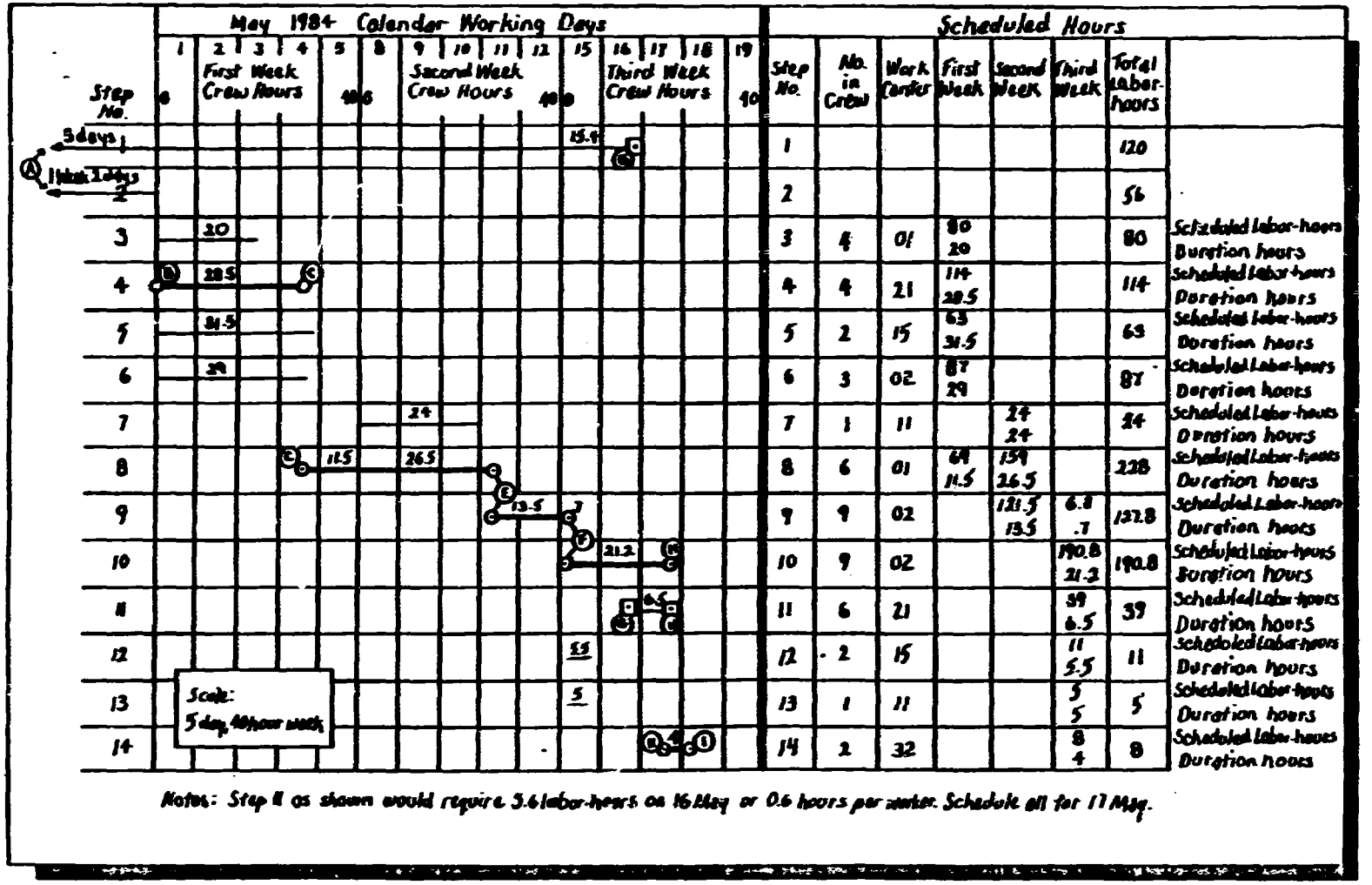


FIGURE A–7
Job Schedule Bar Chart

STEP	WORK CEN-TER	TOTAL HOURS	NO. IN CREW	NORMAL DURA-TION TIME (HOURS)	REV NO. IN CREW	REVISED DURA-TION TIME (HOURS)	STEP DESCRIPTION
1	-	120	-	120	-	120	Fixtures, outside procurement time
2	-	56	-	56	-	56	Navy stock, lead-time
3	01	80	2	40	4	20	Build partitions
4	21	114	2	57	4	28.5	New panel, E.M.T., Wiring
5	15	63	2	31.5	2	31.5	Steam pipes (access area)
6	02	87	3	29	3	29	Paint exterior building
7	11	24	1	24	1	24	Water pipes (access area)
8	01	228	2	114	6	38	Sand floor and lay tile
9	03	129	3	42.7	9	14.2	Paint ceilings
10	02	191	3	63.6	9	21.2	Paint walls
11	21	39	2	19.5	6	6.5	Install light fixtures
12	15	11	2	5.5	2	5.5	Install radiators
13	11	4.5	1	5	1	5	Install water coolers
14	32	8	1	8	2	4	Clean up

FIGURE A-8
Final Step List

committed to start on 1 May. Step 8 would be plotted second, followed by steps 9, 10, 14, 11, 1 and 2. In this example, steps 11, 1, and 2 are plotted right to left, because the right-hand time has been determined from the critical steps. Note that the start of steps 1 and 2 will be earlier than 1 May and that step 1, procurement of Navy stock material, should be by 25 April; and step 2, procurement of Navy stock material, should be initiated by 20 April. The appropriate duration time and the labor hours required for each step for each week should be shown in the Scheduled Hours Table on the Job Schedule Bar Chart. In like manner, the noncritical steps are placed on the chart; however, "float" will allow some freedom of choice in scheduling these steps in accordance with shop practice. The starting and finishing dates for each step may then be read from the completed chart.

(2) Job Schedule. A job schedule (see Figure A-9) is prepared from the Job Schedule Bar Chart. The Job Schedule should be prepared on a realistic basis. For example, the Job Schedule Bar Chart indicates that step 11, install light fixtures, has a duration time of 6.5 hours (39 manhours) during the third week. More specifically, it shows that this step would require 3.6 hours for each of the 6 member crew. As step 11 can be completed in a duration time of 6.5 hours, it is more economical to schedule this step to start on 17 May instead of 16 May. Transportation for the six-member crew would be required twice rather than four times, and the painters would be further along with their work, causing less potential interference. Similarly, step 14, clean up, could be scheduled for 18 May instead of a part of 17 and 18 May. However, job conditions could be such that satisfactory productive results could be obtained by working the clean-up crew on both days. Notes should be made on the Job Schedule Bar Chart to indicate such changes. A copy of the Job Schedule Bar Chart should be distributed with each copy of the Job Schedule.

(3) Shop Scheduling. Normal shop scheduling procedures will then be followed, and a thoroughly alerted group of supervisors will be better able to supervise and assist the work to its scheduled completion.

JOB SCHEDULE (MAINTENANCE MANAGEMENT)

☐ TENTATIVE SCHEDULE ☐ FINAL SCHEDULE

1 COMMITTED STARTING DATE: 5-1-84

2 JOB ORDER OR SHOP TRAVEL NO: 7312011

3 JOB DESCRIPTION: CONVERT STOREHOUSE BUILDING NO. 32 INTO THREE OFFICE AREAS

4 TOTAL ESTIMATE LABOR HOURS: 978

5 JOB ELEMENTS	6 WORK CENTER	7 WEEKLY LABOR HOUR SCHEDULE START	FINISH	5/6	5/13	5/20	WC	5/6	5/13	5/20
1. PROCURE FIXTURES	—	25 APR	16 MAY				02	149	159	
2. ORDER NAVY STOCK	—	20 APR	28 APR				03	87	122	197
3. BUILD PARTITIONS	01	1 MAY	3 MAY	80			07		24	5
4. NEW PANEL, E.M.T., WIRING	21	1 MAY	4 MAY	114			12	114		39
5. STEAM PIPES (ACCESS AREA)	15	1 MAY	4 MAY	63			14			8
6. PAINT EXTERIOR BUILDING	02	1 MAY	4 MAY	87			15	63		11
7. WATER PIPES (ACCESS AREA)	11	8 MAY	10 MAY		24					
8. SAND FLOOR, LAY TILE	01	4 MAY	4 MAY	69	159					
9. PAINT CEILINGS	02	11 MAY	15 MAY		122	6				
10. PAINT WALLS	02	15 MAY	17 MAY			191				
11. INSTALL LIGHT FIXTURES	21	17 MAY	17 MAY			39				
12. INSTALL RADIATORS	15	15 MAY	15 MAY			11				
13. INSTALL WATER COOLERS	11	15 MAY	15 MAY			5				
14. CLEAN UP	32	17 MAY	18 MAY			8				
8 SHEET OF	9 TOTAL LABOR HOURS WEEKLY / CUMULATIVE			413 / 413	305 / 718	260 / 978		413 / 413	305 / 718	260 / 978

FIGURE A-9
Job Schedule

Appendix E (3)

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-78)

Shop	Job Phase	Job Order No.	Date
1	1	8073456	1-3-84

Carpentry

Construct a partition 10' long, 12' high, 2" x 4" studs, 16" O-C
½"x4'x8' gyp. board, baseboard, shoe and ceiling cove-one
side only (leave studs open on inside of new office space for other craft work).

Reference	Task Description	Unit Hours a.	Quantity b.	Total c.	Non-EPS Estimated Time
43	install partition	16.0	1	16.0	
CT-222					
PMA-5	Additional material handling				
	24 studs 2"x4"x12' = 12 armloads	.06	17	.7	
	60 BF 2"x4"x10' plates = 3 armloads	.11	6	.7	
				17.4	
		Totals (Crafts & Estimated Time)		18	
		Total EPS from Paragraph			26*
		Total Job Phase Time			26

*NOTE: This form should be used for both EPS and non-EPS estimates.

Sheet 1 of 12

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-78)

Shop	Job Phase	Job Order No.	Date
1	2	8073456	1-3-84

Pipe

Install 1½" wasteline to water cooler, connect to existing wasteline in crawl space.
Install 1½" vent and connect to existing vent stack in attic. Install ½" cold water
supply line to cooler, connect to supply line in crawl space. Install valve at
cooler end. Use copper tubing.

Crew 2 Zone 4

Reference	Task Description	Unit Hours a.	Quantity b.	Total c.	Non-EPS Estimated Time
41-B	Install fitting in wasteline	.3	1	.3	
OT-191					
41-C	Install wasteline vent and tie in	.6	1	.6	
OT-190	vent in attic				
	32 LF 5 fittings/4 sections				
41-C	Install ½" cold water supply line	.6	1	.6	
OT-190	12 LF 4 fitting/3 sections				
PMA-5	Additional material handling	.04	5	.2	
	43 LF copper pipe-7sections = 4armloads				
	copper fittings = 1 armload				
				1.7	
		Totals (Crafts & Estimated Time)		2	
		Total EPS from Paragraph			5*
		Total Job Phase Time			5

*NOTE: This form should be used for both EPS and non-EPS estimates.

Sheet 2 of 12

FIGURE 8-1 (1 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)

*See NOTE below

1	3	6073456	4-3-84	

Electrical

Remove (8) existing incandescent light fixtures and 160' wire and conduit. Install new (8) circuit distribution panel. Install conduit. Outlet boxes for flourescent lights and receptacles and pull wires.

Crew 2 Zone 4

Reference 7	Task Description 8	a.	b.	c.	10
12-B	Remove fixtures	1.1	1	1.1	
CT-261					
58-C	Remove conduit, wire and boxes	.6	4	2.4	
CT-13b	(7 boxes per 30' wire/conduit)(240')				
41-F	Install conduit (using ladder)	2.9	3	8.7	
CT-82	(Includes boxes)(425'-24'boxes)(40LF=2 boxes)				
41-F	Install conduit (no ladder)(includes boxes)	2.9	1	2.9	
CT-81					
36-E	Install panel and connect 8 circuits	1.8	1	1.8	
CT-450					
75-C	Pull wires using ladder	.6	3	1.8	
CT-149	(3 wires - 30')				
75-B	Pull wires using ladder	.3	19	5.7	
CT-149	(2 wires-400') (Box-to-box)				

*NOTE: This form should be used for BOTH EPS and NON-EPS estimates.

Sheet 3 of 12

*See NOTE below

1	3	8073456	4-3-84	

Electrical-Sheet 2

Continued from sheet 1

Crew 2 Zone 4

Reference 7	Task Description 8	a.	b.	c.	10
PHA-5	Additional material handling	.04	35	1.4	
	8 incandescent light fixtures = 8 armloads				
	240' wire/conduit = 6 armloads				
	8 boxes = 4 armloads				
	425'conduit = 11 armloads				
	4 boxes wire = 2 armloads				
	1 panel with/circuits - 2 armloads				

TOTALS (Crafts & Estimated Time)	25.8
TOTAL (EPS from Paragraph)	36*
TOTAL JOB PHASE TIME	36

*NOTE: This form should be used for BOTH EPS and NON-EPS estimates.

Sheet 4 of 12

FIGURE 8-1 (2 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23

Shop no.: 2 | Job phase no.: 4 | Job order no.: 8073456 | Date: 4-3-84

Pipe

Install 2" steam supply and 1/4" condensate lines to radiators and cap off above floor. (Connect into existing lines in crawl space). (steel pipe). Insulate 2" steam supply line and fittings (fiberglass insulation).

Crew 2 Zone 4

Reference	Task description	Unit time a.	Quantity b.	Total c.	Non-EPS estimated time
20-B	Remove insulation - 2 sections	.3	1	.3	
QT-121					
42-E	Install (2"-2sections) steam supply	1.8	2	3.6	
QT-205	lines				
42-D	Install 3/4" condensation lines	1.1	1	1.1	
QT-205	(1 section)				
16-B	Insulate 2" steam line - 2 sections	.3	1	.3	
QT-112					
12-B	Insulate (2) fittings	.3	1	.3	
QT-102					
PMA-5	Additional material handling	.04	4	.2	
	3 sections pipe = 2 armloads				
	insulation = 2 armloads				
				5.8	
	Totals			6	
	Total EPS				9*
	Total job phase time				9

*NOTE: This form should be used for BOTH EPS and NON-EPS estimates.

Sheet 5 of 12

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23

Shop no.: 2 | Job phase no.: 5 | Job order no.: 8073456 | Date: 4-4-84

Carpentry

Install ½"x4'x8' gyp. board, baseboard, and ceiling cove on new partition inside. Install chair rail on all interior walls. Install prehung door and jamb. (Do not install shoe mold at this time.)

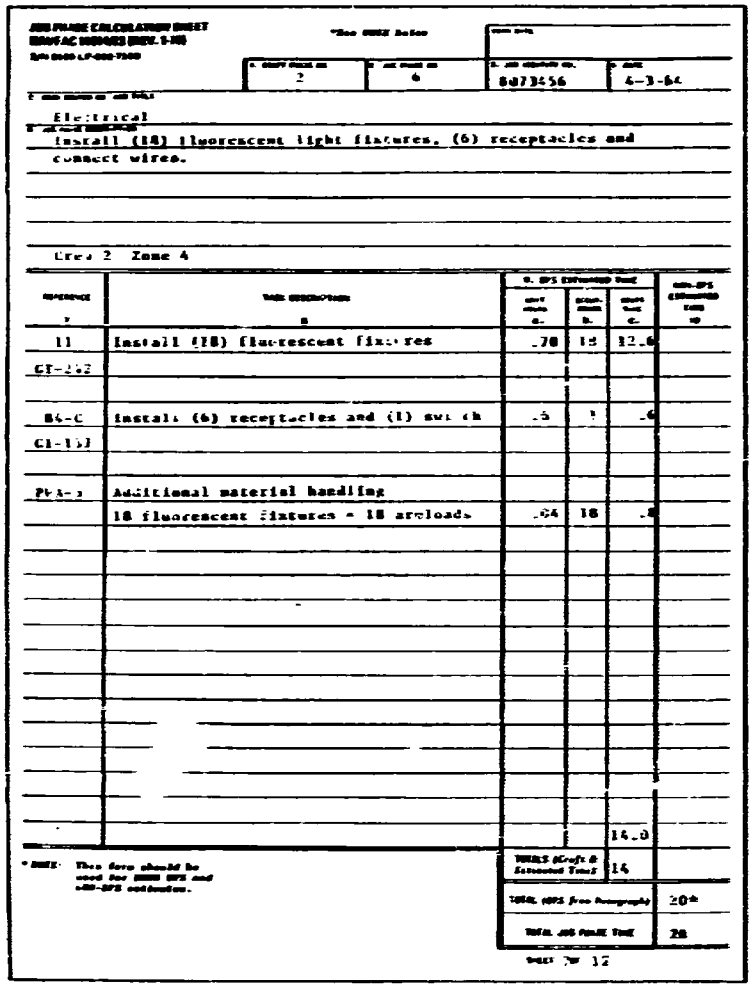
Crew 2 Zone 4

Reference	Task description	Unit time a.	Quantity b.	Total c.	Non-EPS estimated time
55-E	Install gyp. board	1.8	1	1.8	
CT-304	(30'w x 12'h = 360 sf)				
5-E	Install 30 LF ceiling cove	.3	1	.3	
CT-1					
55	Install 30 LF baseboard	1.1	1	1.1	
CT-309					
12	Install door/jamb	2.9	1	2.9	
CT-45					
55-F	Install (180 LF) chair rail	2.9	1	2.9	
CT-307					
PMA-5	Additional material handling	.11	7	.8	
	12 shts. gyp. board-2 men-6 loads	.04	8	.4	
	30 LF ceiling cove = 1 armload				
	30 LF baseboard = 1 armload				
	180 LF chair molding-6 armloads				
	1 door/jamb assy. = 2 men-1 load			10.2	
	Totals			11	
	Total EPS				16*
	Total job phase time				16

*NOTE: This form should be used for BOTH EPS and NON-EPS estimates.

Sheet 6 of 12

FIGURE 8-1 (3 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)



JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 9-80)

1. CREW CHART NO.	2. JOB CHART NO.	3. JOB SEQUENCE NO.	4. DATE
2	6	8073456	4-3-84

Electrical

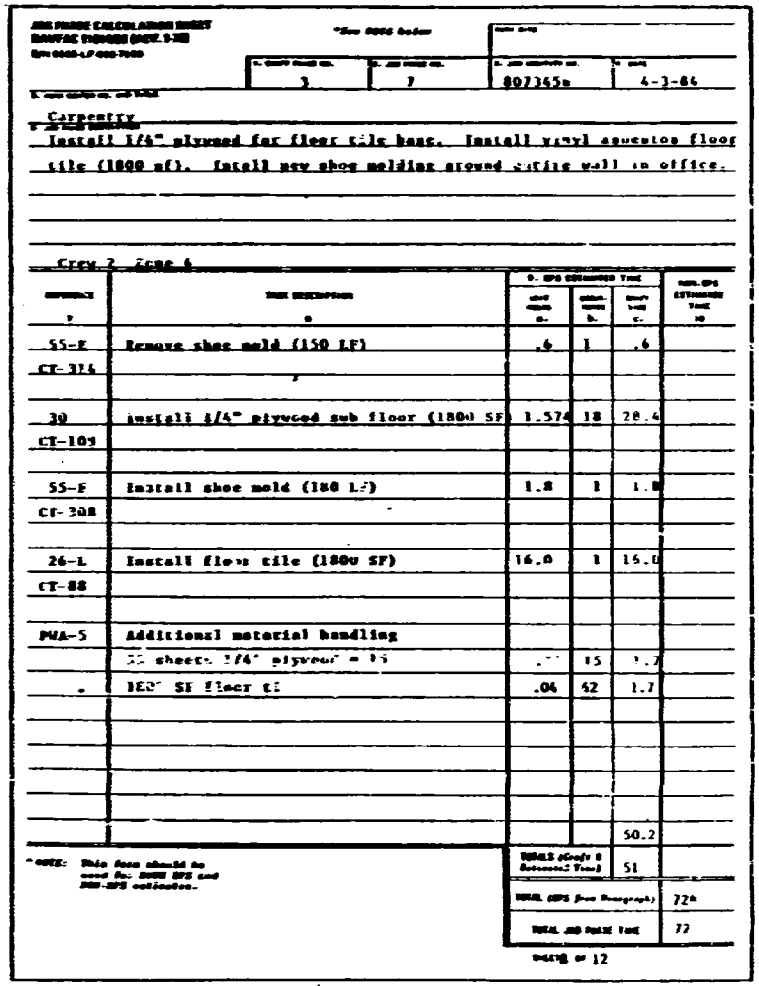
Install (18) fluorescent light fixtures, (6) receptacles and connect wires.

Crew 2 Zone 4

REFERENCE	TASK DESCRIPTION	a. UFS ESTIMATED TIME: short cycle a.	labor-hours b.	short task c.	non-UFS ESTIMATED TIME d.
11	Install (18) fluorescent fixtures	.70	18	12.6	
CT-202					
84-C	Install (6) receptacles and (1) switch	.5	1	.6	
CT-153					
PMA-5	Additional material handling				
	18 fluorescent fixtures = 18 areloads	.04	18	.8	
				14.0	
		TOTALS (Crafts & Estimated Time)		14	
		TOTAL UFS from Paragraph		20*	
		TOTAL JOB TASK TIME		28	

* NOTE: This form should be used for both UFS and non-UFS estimates.

SHEET 2 OF 12



JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 9-80)

1. CREW CHART NO.	2. JOB CHART NO.	3. JOB SEQUENCE NO.	4. DATE
3	7	8073458	4-3-84

Carpentry

Install 1/4" plywood for floor tile base. Install vinyl aqueous floor tile (1800 sf). Install new shoe molding around entire wall in office.

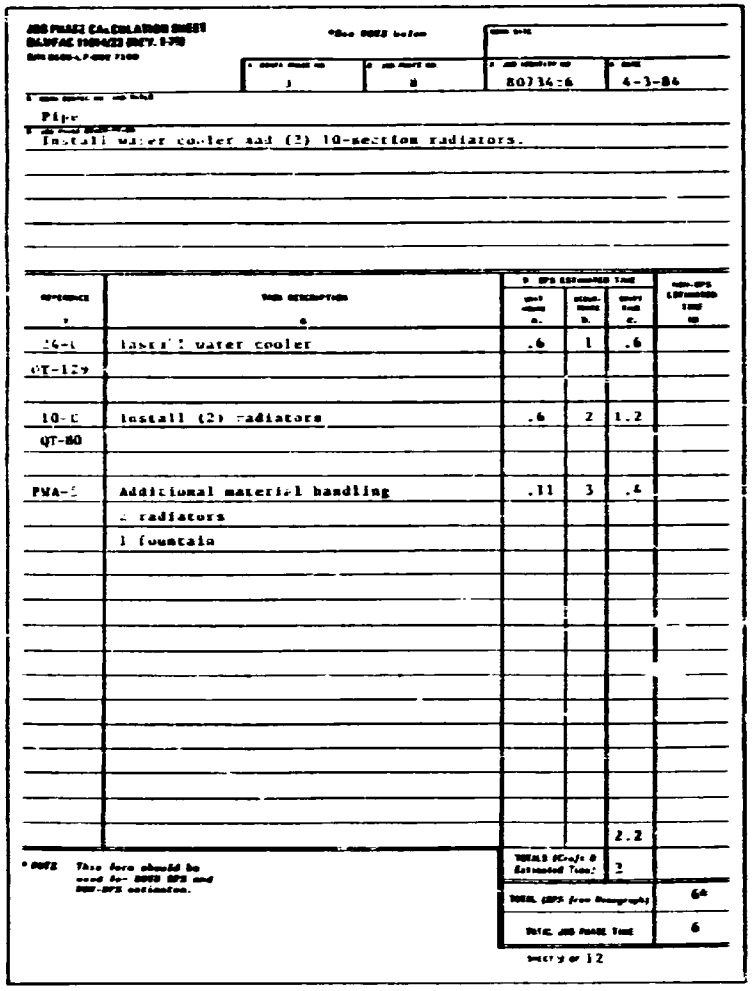
Crew 2 Zone 6

REFERENCE	TASK DESCRIPTION	a. UFS ESTIMATED TIME: short cycle a.	labor-hours b.	short task c.	non-UFS ESTIMATED TIME d.
55-E	Remove shoe mold (150 LF)	.6	1	.6	
CT-324					
30	Install 1/4" plywood sub floor (1800 SF)	1.574	18	28.4	
CT-109					
55-F	Install shoe mold (180 LF)	1.8	1	1.8	
CT-308					
26-L	Install floor tile (1800 SF)	16.0	1	16.0	
CT-88					
PMA-5	Additional material handling				
	30 sheets 1/4" plywood = 15	.1	15	1.7	
	1800 SF floor tile	.04	42	1.7	
				50.2	
		TOTALS (Crafts & Estimated Time)		51	
		TOTAL UFS from Paragraph		72*	
		TOTAL JOB TASK TIME		72	

* NOTE: This form should be used for both UFS and non-UFS estimates.

SHEET 3 OF 12

FIGURE 8-1 (4 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)



JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 REV. 5-78

a. SHEET PAGE NO.	b. JOB PHASE NO.	c. JOB IDENTIFY NO	d. DATE
1	8	80734-6	4-3-84

e. WORK CENTER OR CREW

Pipe

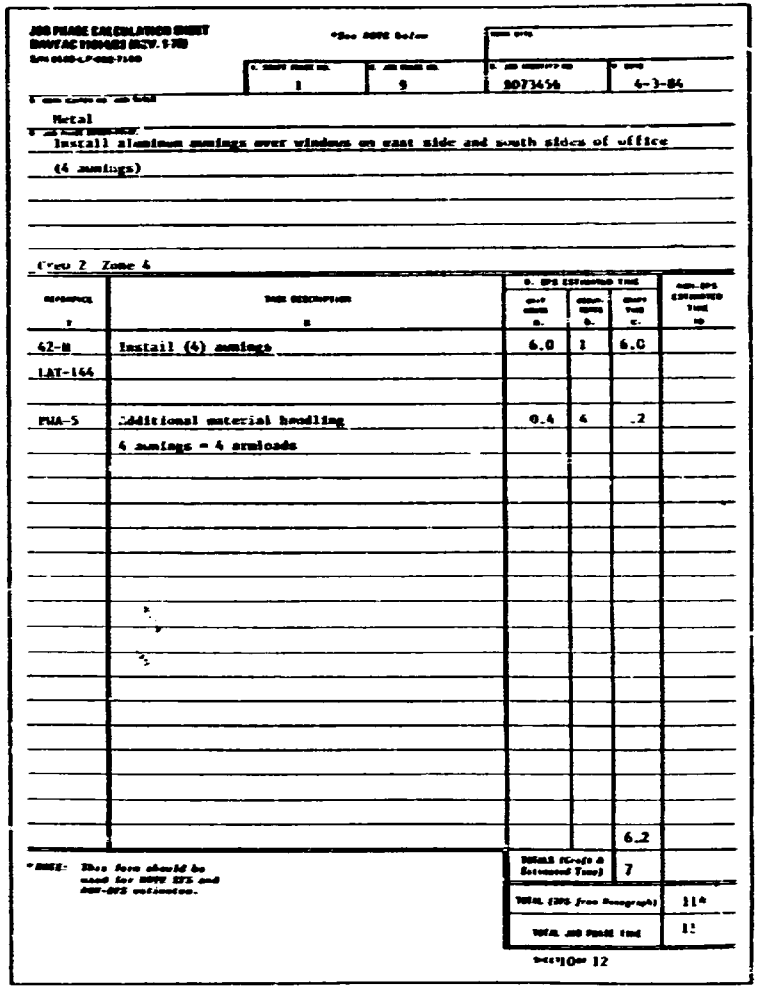
f. JOB PHASE DESCRIPTION

Install water cooler and (2) 10-section radiators.

REFERENCE e	TASK DESCRIPTION a	g. UPS ESTIMATED TIME: UNIT MINS a.	ACCUM. MINS b.	SHEET TOTAL c.	NON-UPS ESTIMATED TIME hh
26-C	Install water cooler	.6	1	.6	
QT-129					
10-C	Install (2) radiators	.6	2	1.2	
QT-80					
PMA-5	Additional material handling	.11	3	.4	
	2 radiators				
	1 fountain				
				2.2	
			TOTALS (Cols a & Estimated Time):	3	
			TOTAL UPS from Paragraph		66
			TOTAL JOB PHASE TIME		6

* NOTE: This form should be used for both UPS and non-UPS estimates.

SHEET 9 OF 12



JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 REV. 5-78

a. SHEET PAGE NO.	b. JOB PHASE NO.	c. JOB IDENTIFY NO	d. DATE
1	9	8073456	4-3-84

e. WORK CENTER OR CREW

Metal

f. JOB PHASE DESCRIPTION

Install aluminum awnings over windows on east side and south sides of office (4 awnings)

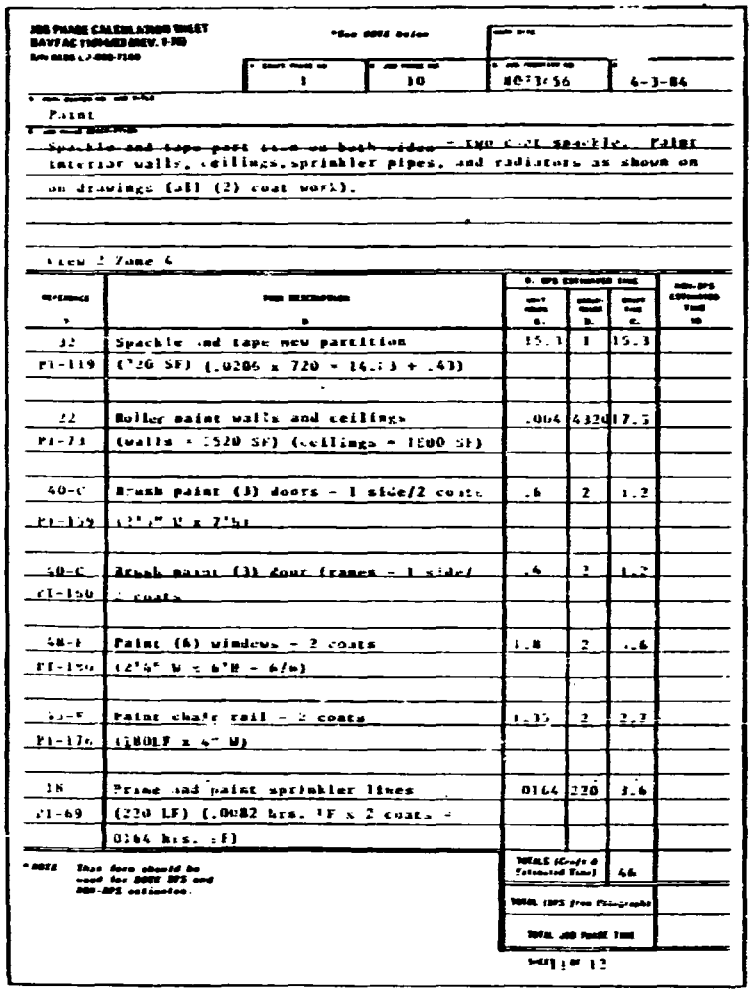
Crew 2 Zone 4

REFERENCE f	TASK DESCRIPTION g	g. UPS ESTIMATED TIME: UNIT MINS a.	ACCUM. MINS b.	SHEET TOTAL c.	NON-UPS ESTIMATED TIME hh
62-B	Install (4) awnings	6.0	1	6.0	
LAT-164					
PMA-5	Additional material handling	0.4	4	.2	
	4 awnings = 4 armloads				
				6.2	
			TOTALS (Cols a & Estimated Time)	7	
			TOTAL UPS from Paragraph		114
			TOTAL JOB PHASE TIME		12

* NOTE: This form should be used for both UPS and non-UPS estimates.

SHEET 10 OF 12

FIGURE 8-1 (5 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)



JOB PHASE CALCULATION SHEET
DAVFAC 11014/23 (REV. 9-80)

1	10	807356	6-3-84

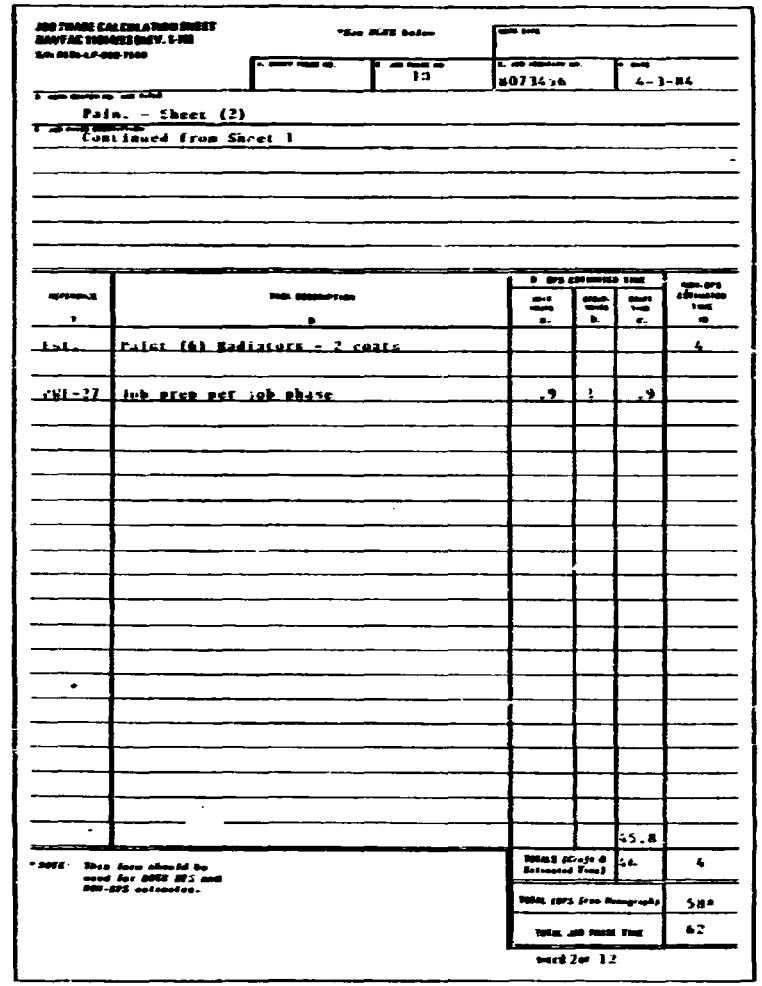
Paint

Spackle and tape post item on both sides - two coat spackle. Paint interior walls, ceilings, sprinkler pipes, and radiators as shown on on drawings (all (2) coat work).

Area 2 Zone 6

Reference a	Item Description b	O. OPS Estimated Time: Unit Hours a.	Crew Size b.	Unit Time c.	Non-OPS Estimated Time hr
32	Spackle and tape new partition	15.3	1	15.3	
PI-119	(720 SF) (.0206 x 720 = 14.83 + .43)				
22	Roller paint walls and ceilings	.004	4320	17.3	
PI-73	(walls = 3520 SF) (ceilings = 1800 SF)				
40-C	Brush paint (3) doors - 1 side/2 coats	.6	2	1.2	
PI-159	(3'-0" W x 7'H)				
40-C	Brush paint (3) door frames - 1 side/	.6	2	1.2	
PI-160	2 coats				
48-1	Paint (6) windows - 2 coats	1.8	2	3.6	
PI-170	(2'-6" W x 6'H - 6/w)				
44-C	Paint chair rail - 2 coats	1.35	2	2.7	
PI-176	(180LF x 4" W)				
18	Prime and paint sprinkler lines	0164	220	3.6	
PI-69	(220 LF) (.0082 hrs. /LF x 2 coats =				
	0164 hrs. /LF)				
* NOTE	These items should be used for BOTH OPS and NON-OPS estimates.	TOTALS (Craft & Estimated Time)		46	
		TOTAL OPS from Paragraphs			
		TOTAL JOB PHASE TIME			

Sheet 1 of 12



JOB PHASE CALCULATION SHEET
DAVFAC 11014/23 (REV. 9-80)

	13	807356	4-3-84

Paint - Sheet (2)

Continued from Sheet 1

Reference a	Item Description b	O. OPS Estimated Time: Unit Hours a.	Crew Size b.	Unit Time c.	Non-OPS Estimated Time hr
Est.	Paint (6) Radiators - 2 coats				4
PWI-27	Job prep per job phase	.9	1	.9	
				45.8	
* NOTE	These items should be used for BOTH OPS and NON-OPS estimates.	TOTALS (Craft & Estimated Time)		46	4
		TOTAL OPS from Paragraphs			58
		TOTAL JOB PHASE TIME			62

Sheet 2 of 12

FIGURE 8-1 (6 of 6)
Job Phase Calculation Sheet (NAVFAC 11014/23)

Appendix E (4)

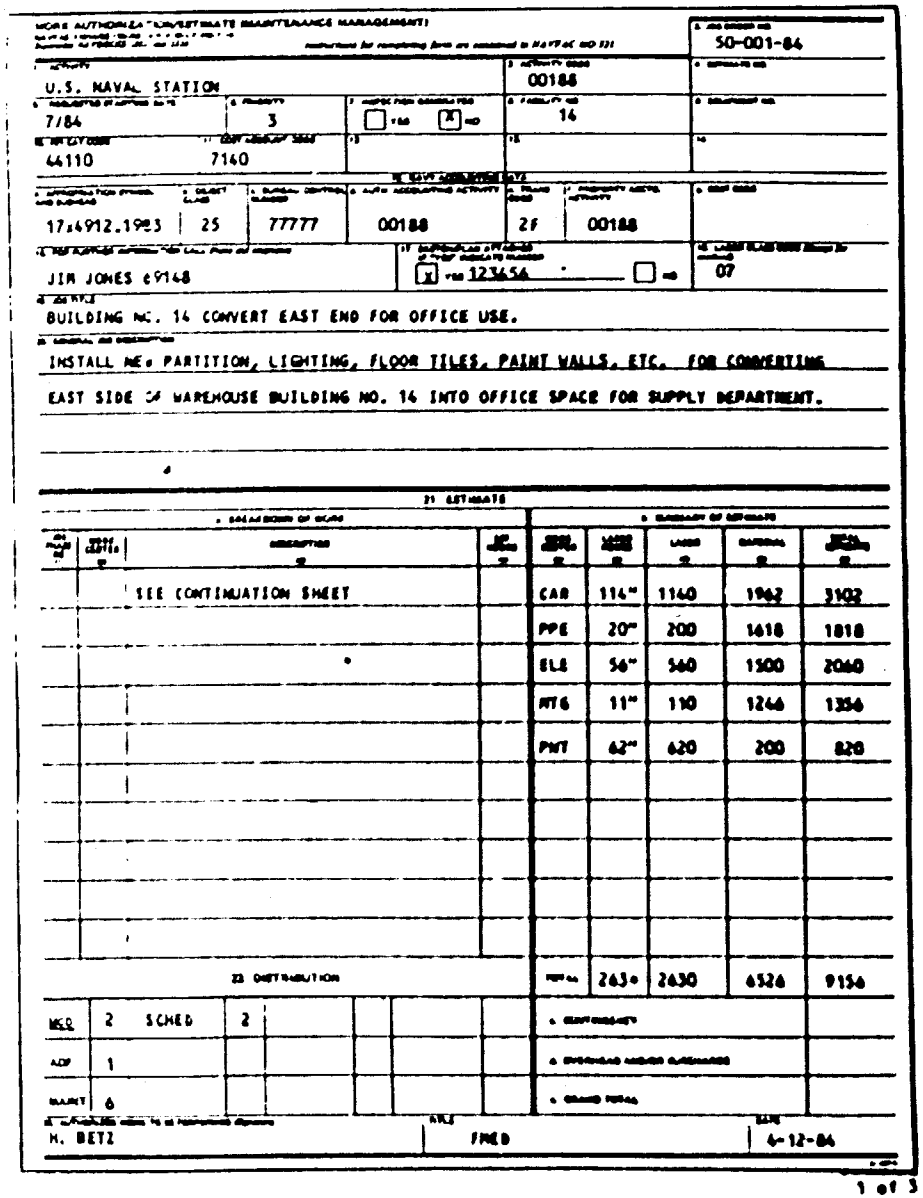
Instructions For Completing The Job Order Form (NAVFAC 11014/22)

Refer to the attached copy of the form 11014/22 and 22A for the corresponding blocks described below.

Block 6. PRIORITY- This is the priority designator assigned by the PWO or MCD.
Block 9. EQUIPMENT- Enter the plant account no., minor property no., or local station assigned no.
Block 10. RPI CAT. CODE (Real Property Inventory Category Code)- Enter the cat. code as shown on the plant account records. These codes are found in the NAVFAC P-72, Naval Facility Category Codes.
Block 11. COST ACCOUNT CODE- Enter the applicable data from the NAVCOMPT Manual, Vol. 2.
Block 16. FOR FURTHER INFORMATION, CALL- Enter the name of the person to be contacted if a problem arises.
Block 21. ESTIMATE-
(1) WORK BREAKDOWN. This part is a small continuation sheet used for jobs that have only one or two shops and where the work description can be completed in the allotted space.
(2) ESTIMATE SUMMARY. Entered here is each work center listed on the work authorization with summary figures for labor hours, labor dollars, material dollars, and the total cost estimate. The totals are indicated on the bottom line. EPS estimates are used where possible.

NAVFAC 11014/22A- INSTRUCTIONS FOR PREPARATION

Block 3. JOB PHASE NUMBER- All jobs are phased; that is, each shop has listed only that portion of work which can be done before another shop must do another phase.
Block 4. WORK CENTER- The work center no. or an abbreviation is entered here for the center doing that particular phase.
Block 5. DESCRIPTION- The job phase description is entered here as written in BLOCK 6 of the Job Phase Calculation Sheet, Appendix E(3). Statements must be clear and concise in detailing the scope of work. Statements such as "accomplish work as required" or "see Fred Flintstone for work scope" are not acceptable. The shops must know what is to be done and not kept guessing.



WORK AUTHORIZATION/ESTIMATE MAINTENANCE MANAGEMENT

50-001-84

U.S. NAVAL STATION

00188

7/84 | 3 | ☐ YES ☒ NO | 14

44110 | 7140

17x4912.1983 | 25 | 77777 | 00188 | 2F | 00188

JIM JONES 69148 | ☒ YES 123654 ☐ NO | 07

BUILDING NO. 14 CONVERT EAST END FOR OFFICE USE.

INSTALL NEW PARTITION, LIGHTING, FLOOR TILES, PAINT WALLS, ETC. FOR CONVERTING EAST SIDE OF WAREHOUSE BUILDING NO. 14 INTO OFFICE SPACE FOR SUPPLY DEPARTMENT.

21 ESTIMATE

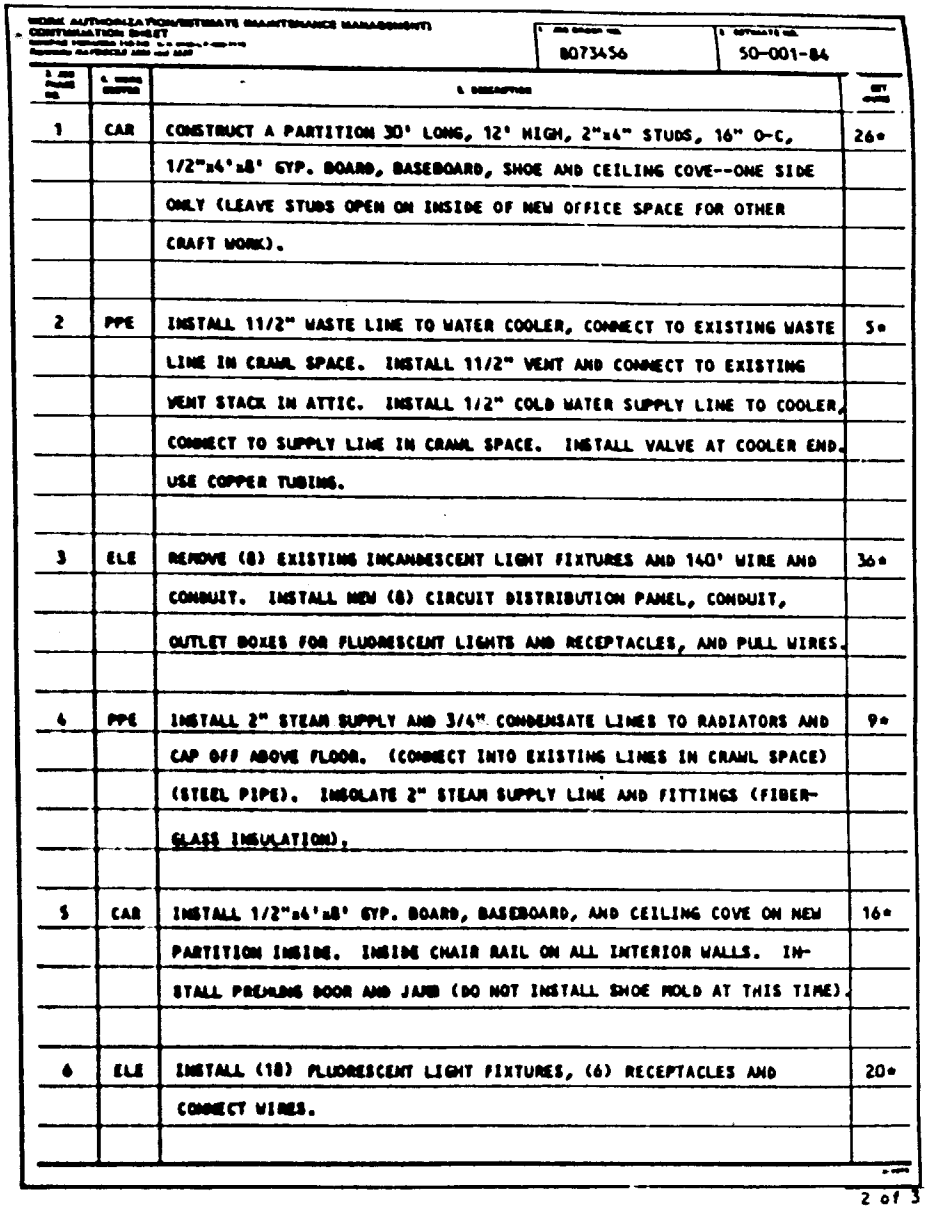
		DESCRIPTION						
		SEE CONTINUATION SHEET		CAR	114*	1140	1962	3102
				PPE	20*	200	1618	1818
				ELE	56*	560	1500	2060
				MTG	11*	110	1246	1356
				PNT	62*	620	200	820
				TOTAL	263*	2630	6526	9156

22 DISTRIBUTION

MGR	2	SCHED	2				
ADP	1						
MAINT	6						

H. BETZ | FMED | 4-12-84

1 of 3



WORK AUTHORIZATION/ESTIMATE MAINTENANCE MANAGEMENT
CONTINUATION SHEET

8073456 | 50-001-84

		DESCRIPTION	
1	CAR	CONSTRUCT A PARTITION 30' LONG, 12' HIGH, 2"x4" STUDS, 16" O-C, 1/2"x4'x8' GYP. BOARD, BASEBOARD, SHOE AND CEILING COVE--ONE SIDE ONLY (LEAVE STUDS OPEN ON INSIDE OF NEW OFFICE SPACE FOR OTHER CRAFT WORK).	26*
2	PPE	INSTALL 11/2" WASTE LINE TO WATER COOLER, CONNECT TO EXISTING WASTE LINE IN CRAWL SPACE. INSTALL 11/2" VENT AND CONNECT TO EXISTING VENT STACK IN ATTIC. INSTALL 1/2" COLD WATER SUPPLY LINE TO COOLER, CONNECT TO SUPPLY LINE IN CRAWL SPACE. INSTALL VALVE AT COOLER END. USE COPPER TUBING.	5*
3	ELE	REMOVE (8) EXISTING INCANDESCENT LIGHT FIXTURES AND 140' WIRE AND CONDUIT. INSTALL NEW (8) CIRCUIT DISTRIBUTION PANEL, CONDUIT, OUTLET BOXES FOR FLUORESCENT LIGHTS AND RECEPTACLES, AND PULL WIRES.	36*
4	PPE	INSTALL 2" STEAM SUPPLY AND 3/4" CONDENSATE LINES TO RADIATORS AND CAP OFF ABOVE FLOOR. (CONNECT INTO EXISTING LINES IN CRAWL SPACE) (STEEL PIPE). INSOLATE 2" STEAM SUPPLY LINE AND FITTINGS (FIBER-GLASS INSULATION).	9*
5	CAR	INSTALL 1/2"x4'x8' GYP. BOARD, BASEBOARD, AND CEILING COVE ON NEW PARTITION INSIDE. INSIDE CHAIR RAIL ON ALL INTERIOR WALLS. INSTALL PREHUNG DOOR AND JAMB (DO NOT INSTALL SHOE MOLD AT THIS TIME).	16*
6	ELE	INSTALL (18) FLUORESCENT LIGHT FIXTURES, (6) RECEPTACLES AND CONNECT WIRES.	20*

2 of 3

FIGURE 5-2
Work Authorization/Estimate

APPENDIX F

F(1). JOB SCHEDULE

F(2). WORK CENTER LABOR HOUR AVAILABILITY LOG

F(3). MASTER SCHEDULE BOARD

Appendix F (1)

JOB SCHEDULE (MAINTENANCE MANAGEMENT)

☒ TENTATIVE SCHEDULE ☒ FINAL SCHEDULE

2 JOB ORDER OR SHOP CONTROL NO: 7242032

3 JOB DESCRIPTION: REPAIRS TO BUILDING NO. 77

4 TOTAL ESTIMATED LABOR HOURS: 500

5 JOB ELEMENTS	6 WORK CENTER	7 WEEKLY LABOR HOUR SCHEDULE 8/16	8/25	8/30	9/7
SHORE FLOOR JOISTS, LEVEL	01	64	8		
STRUCTURE, REPLACE BEAMS					
DISCONNECT WATER AND WASTE LINES	11	4			
OBTAIN SHORING MATERIALS AND ASSIST	32	64	4		
WC 02 IN SHORING, LEVELING AND BEAM					
REPLACEMENT					
CONSTRUCT FOOTING AND COLUMN FORMS	01		56		
SET AND REINFORCE					
POUR FOOTINGS AND COLUMNS AND ASSIST	32		36		
WC02 IN STRIPPING					
REM					
SUMMARY CARPENTER	01	64	64	120	4
PAINT	02			16	32
PLUMBING & PIPE	11	4			8
LABOR	32	64	40	40	44
8 SHEET 1 OF 1 — 9 TOTAL LABOR HOURS: WEEKLY		132	104	176	88
CUMULATIVE		132	236	412	308

The Job Schedule is prepared by the Master Scheduler.

1. Upon receipt of a job order to be master scheduled:
   a. Notes month scheduled on Shop Load Plan.
   b. Completes items 1 thru 4.
   c. Lists components of job, in sequence to be accomplished, in item 5. Identifies Work Centers involved in item 6.
   d. Enters labor hours to be expended each week, until job is completed, in appropriate columns of item 7. Determines weekly labor hour requirements from job sequence and economical crew size.
   e. Totals labor hours for each Work Center for each week. Enters the weekly and cumulative job totals in item 9.
   f. Checks "Tentative Schedule."
2. Upon notification that material is available and job is activated by Division Director:
   a. Researches the Work Center Labor Hour Availability Log (Figure 9-2); to determine the consecutive weeks in which sufficient labor hours will be available in all Work Centers to perform the work without interruption. Enters these dates in item 7.
   b. Distributes copy to appropriate Branch Managers for review prior to weekly scheduling meeting.
3. At weekly scheduling meeting, collects all "Tentative" Job Schedules.
4. After weekly scheduling meeting:
   a. Makes necessary corrections, or prepares new job schedule.
   b. Checks "Final Schedule" and crosses out "Tentative Schedule."
   c. Distributes to appropriate Work Center Supervisors, via Branch Manager, with Work Center Schedule.

FIGURE 9-1
Job Schedule

WORK CENTER	FOR WEEK			ENDING	
	9/9	9/16	9/23	11/25	12/2
AVAILABLE LH	456	570	570	570	570
01 CARP.	160 120 40 44 364 Bal 92 32 32 12 440 Bal 10 24 464 Bal (-8)	160 120 43 86 409 Bal 161 144 553 Bal 17	88 80 157 63 388 Bal 182 52 440 Bal 130		
AVAILABLE LH	336	420	420	420	420
02 PAINT	56 23 115 37 231 Bal 106 46 58 335 Bal (1)	200 64 8 24 296 Bal 124 80 48 424 Bal (-4)	200 150 350 Bal 70		
AVAILABLE LH	144	180	180	180	180
04	48 73 121 Bal 23 19 140 Bal (4)	84 24 36 144 Bal 36	54 40 94 Bal 86		
AVAILABLE LH	456	570	570	570	570
32 LABOR	161 8 48 36 248 Bal 208 152 57 457 Bal (-1)	120 8 74 60 262 Bal 308 100 48 60 470 Bal 100 52 28 550 Bal 20	120 48 26 124 318 Bal 252 40 135 493 Bal 77		

FIGURE 9-2
Work Center Labor Hour Availability Log

Appendix F (2)

WORK CENTER	FOR WEEK 9/9	9/16	9/23	ENDING 11/25	12/2
AVAILABLE LH	456	570	570	570	570
01 CARP.	160 120 40 44 364 Bal 92 32 32 12 440 Bal 10 24 464 Bal (-8)	160 120 43 86 409 Bal 161 144 553 Bal 17	88 80 157 63 388 Bal 182 52 440 Bal 130		
AVAILABLE LH	336	420	420	420	420
02 PAINT	56 23 115 37 231 Bal 105 46 58 335 Bal (1)	200 64 8 24 296 Bal 124 80 48 424 Bal (-4)	200 150 350 Bal 70		
AVAILABLE LH	144	180	180	180	180
04	48 73 121 Bal 23 19 140 Bal (4)	84 24 36 144 Bal 36	54 40 94 Bal 86		
AVAILABLE LH	456	570	570	570	570
32 LABOR	161 8 43 36 248 Bal 208 152 57 457 Bal (-1)	120 8 74 60 262 Bal 308 100 48 60 470 Bal 100 52 28 550 Bal 20	120 48 26 124 318 Bal 252 40 135 493 Bal 77		

FIGURE 9-2
Work Center Labor Hour Availability Log

Appendix F (3)

MASTER SCHEDULE BOARD

AWAITING MATERIAL SECTION

FOR WORK CENTER CODES SEE ACTIVE SECTION

JOB ORDER OR SHOP CONTROL NUMBER	DESCRIPTION	DATE ISSUED TO SHOPS	COMMITTED STARTING DATE	REMARKS	TOTAL LABOR HOURS ESTIMATED										
					01	02	04	06	11	13	15	21	23	32	TOTAL
7242146	Install (1) Town Post Vehicle Lift, Area No. 2	8/16					88	18	13		10			60	181
7242144	Install Fans and Louvers N. End Bldg. No. 56	8/16			14	32	8			4		56		12	124
7242148	Center Car : Block Vault & Steel Door Bldg. No. 56	8/17	9/11			24	58	12			8	16		20	138
7242151	Conversion of Barracks Bldg. No. 172	8/31			1334	387	212		387	85		265		694	3334
7242154	Repair Bumper System Bldgs. Nos. 104 108,106	8/1			50										50
7242159	Rehabilitate Corr Storage Room, Misuhan	9/3			48	48				38		10	120	16	264
7242158	Move and Install 308'-12" Water Ma. - K St.	8/16			24		24	108	24					234	411
7242161	Replace (1) Post & (3) Truss Tres - Bldg. No. 106	8/21			98						8			12	114
7242165	Remove & Install Roofing Eaves & Vent Pipe, Bldg. No. 107	8/31			126					24				24	174
TOTAL LABOR HOURS AWAITING MATERIAL BACKLOG					2988	1910	728		7712	887	341	3372	197	2736	16563

FIGURE 9-3
Master Schedule Board - Awaiting Material Section

MASTER SCHEDULE BOARD

AWAITING SCHEDULING SECTION

FOR WORK CENTER CODES SEE ACTIVE SECTION

JOB ORDER OR SHOP CONTROL NUMBER	DESCRIPTION	DATE ISSUED TO SHOPS	COMMITTED STARTING DATE	REMARKS	TOTAL LABOR HOURS ESTIMATED										
					01	02	04	06	11	13	15	21	23	32	TOTAL
7242143	Peripheral Road Flood Repair	7/20												224	224
7242147	Alterations in Hallway Bldg. No. 8	8/10			32	32		24		24		35		8	155
7242150	Convert E. End Storehouse No. 101 for Office	8/14			116	126			36			51		4	333
7242152	Install Overhead Crane Bldg. No. 62	8/16				16		32			94	40		16	198
7242153	Enlarge Doorway to Recreation Room, Bldg. No. 42	8/17			52	8									60
7242156	Paint Exterior Bldg. No. 22	7/26			6	68									74
7242157	Construct & Install 3 Metal Degreasing Tanks, Bldg. No. 62	7/27	9/27							88					88
7242160	Relocate Exaust Fans Dispensary	7/31			16	16						24		4	60
7242163	Replace Wooden Ramp by Concrete Ramp, Dispensary	8/18			80		117							40	237
TOTAL LABOR HOURS AWAITING SCHEDULING BACKLOG					334	472	117	64	248	197	98	278	21	314	2141

FIGURE 9-4
Master Schedule Board - Awaiting Scheduling Section

MASTER SCHEDULE

WORK CENTER COLOR CODES ⇨ CARP. 01 | PAINT 02 | MASONRY 04 | RIGGER 06

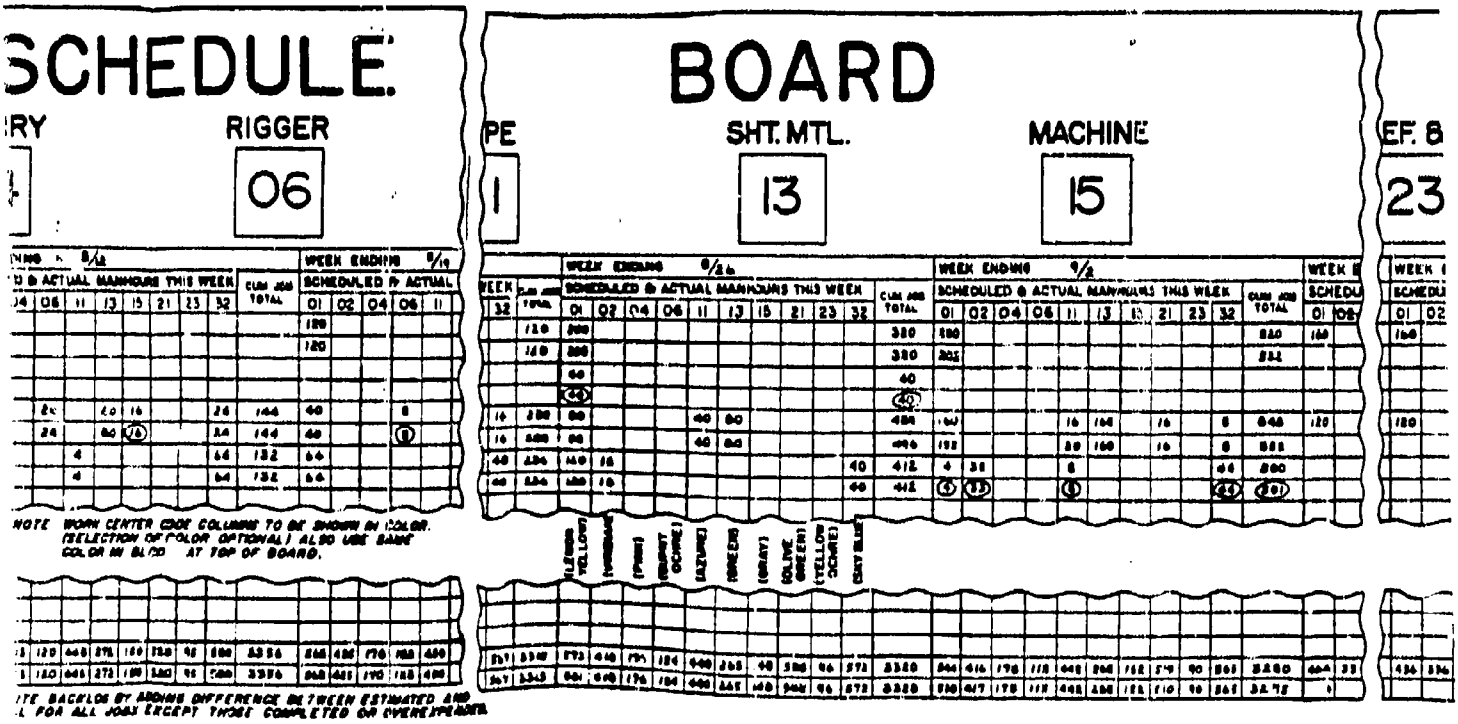
JOB ORDER OR SHOP CONTROL NUMBER	DESCRIPTION						TOTAL MANHOURS ESTIMATED AND TOTAL MANHOURS ACTUAL TO DATE													WEEK ENDING 9/12 — SCHEDULED & ACTUAL MANHOURS THIS WEEK											CUM JOB TOTAL	WEEK END: SCHEDULED		
								01	02	04	06	11	12	15	21	23	32	TOTAL		01	02	04	06	11	13	15	21	23	32		01	02	04
7242012	Replace Siding Bldg. Nos. 54,55	7/19		8/14			E	428										428	SCHED												120		
							A	522										522	ACTUAL												120		
7212014	Secure Bldg. No. 102	8/15	8/17	8/17	8/24		E	(40)										(40)	SCHED														
							A	(40)										(40)	ACTUAL														
7242015	Alterations Bldg. No. 71	7/3		8/7			E	640	64		(16)	56	736	(16)	48		72	1864	SCHED				24		80	16			24	144	40		
							A	280			(32)	60	400	(16)	16		48	852	ACTUAL				24		80	(16)			24	144	40		
7242032	Repair West Side Bldg. No. 77	7/5		8/7			E	(240)	(40)			(48)					(88)	(500)	SCHED	64				4					64	132	64		
							A	(232)	(41)			(43)					(85)	(501)	ACTUAL	64				4					64	132	64		
							E												SCHED														

NOTE: (CIRCLED NUMBERS INDICATE WORK CENTERS THAT HAVE COMPLETED THEIR PORTION OF THE JOB.

NOTE: WORK CENTER CODE COLUMNS TO BE SHOWN IN (SELECTION OF COLOR OPTIONAL) ALSO USE S... COLOR IN BLOCK AT TOP OF BOARD.

							Overextended					4						4																			
TOTALS - SCHEDULED MAJOR JOBS		ESTIMATED MANHOURS																																		
		ACTUAL MANHOURS TO DATE																																		
BACKLOG - SCHEDULED MAJOR JOBS FOR WEEK ENDING			9/2 *																																

* NOTE: COMPUTE BACKLOG BY ADDING DIFFERENCE BETWEEN ... ACTUAL FOR ALL JOBS EXCEPT THOSE COMPLETED ...


SCHEDULE
RIGGER
06
BOARD
SHT. MTL.
13
MACHINE
15
23
NOTE WORK CENTER CODE COLUMNS TO BE SHOWN IN COLOR. (SELECTION OF COLOR OPTIONAL) ALSO USE SAME COLOR IN BLDG AT TOP OF BOARD.

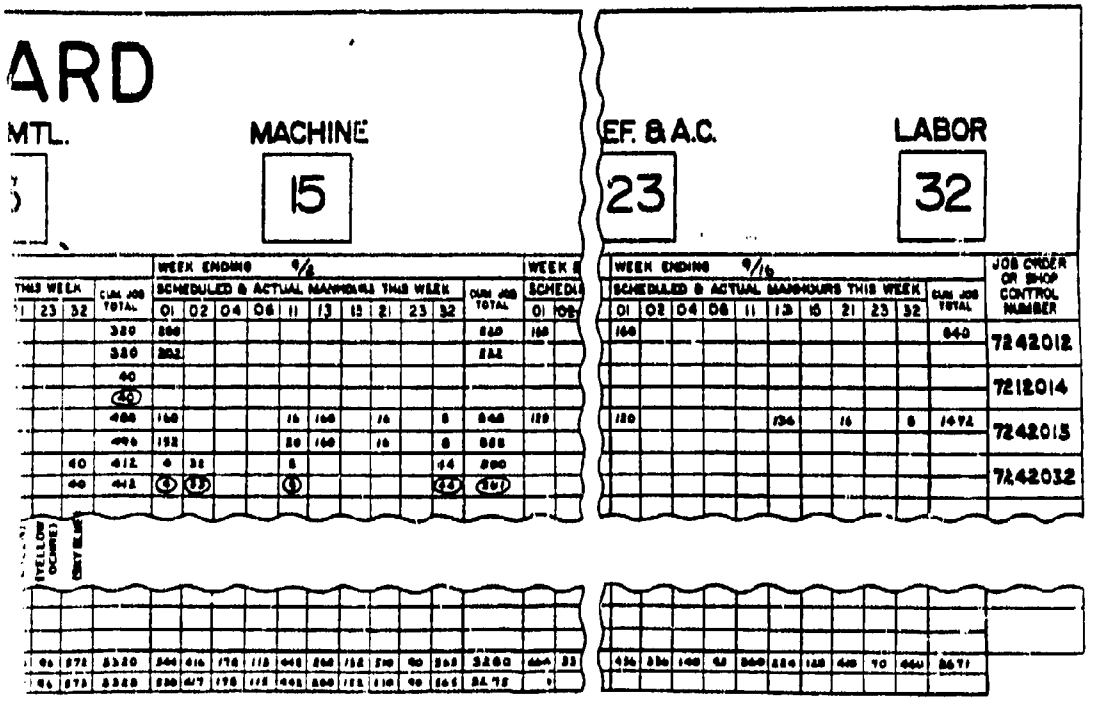


FIGURE 9-5
Master Schedule Board

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APPENDIX G

REPORT REQUIREMENTS

(CHAPTER 10, MO-321)

CHAPTER 10

REPORT REQUIREMENTS

1. PURPOSE. The tabulated and management reports shown are considered necessary to assist public works managers in controlling and measuring public works resources.

2. SUPPLEMENTAL TREND CHARTS. As a supplement to required management reports, activities are encouraged to develop and maintain trend charts to meet their specific needs. Examples of trend chart types developed and maintained by various activities, and suggested for consideration, are those showing productive effort, labor performance - EPS, productive labor hour control, etc. One period's report does not provide complete information; it is only when information is drawn from successive reports that the management effectiveness of the work center, branch, division, or department can be determined. Reports do not, by themselves, exercise management control. Reports only provide facts needed by maintenance managers to pinpoint deficient areas that require corrective management action.

3. REPORTS ANALYSES. To become an effective management tool, reports must be analyzed to determine the true causes of individual index variations. Many variation condition corrections require firm management action. Each report analysis should contain a brief narrative statement outlining reasons for variations warranting reporting, or the lack of improvement. The required management action should also be noted.

4. OBJECTIVES. Following are Facility Management reports objectives:

a. Provide a source for determining variations from estimates on jobs, or phases of jobs, accomplished; and a basis for investigation, if such variations are beyond stated limitations.

b. Inform management of each Branch's overall performance on all completed job orders.

c. Inform management of the Maintenance and Utilities Divisions overall performance on all completed job orders.

d. Inform management of the way in which each Branch has utilized its manpower during the report period.

f. Inform management of the type of work accomplished.

5. ACCURATE REPORTING. Obtaining accurate data is a problem not easily solved. Progress in obtaining more accurate reporting can be achieved by using the following procedures:

a. Educating Work Center supervisors as to their responsibilities and their relation to overall management problems.

b. Prompt closing out all completed Job Orders.

c. Assuring proper personnel craftsmen job time reporting through periodic field checks.

d. Maximizing EPS utilization.

e. Acting quickly and firmly in all cases where improper reporting has been revealed.

6. REPORTS. All activities with 75 or more personnel in the Maintenance and Utilities Divisions combined will prepare Tabulated Reports A and B, and Maintenance/Utilities Labor Control Reports. Activities with 30, but less than 75 personnel, will also prepare these reports if they are using Engineered Performance Standards.

7. TABULATED REPORT "A" (TAB A) - FEEDER FOR THE LABOR CONTROL REPORT. This is a monthly report (see Table 10-1) that provides information on labor hour expenditures by the various work categories in each Maintenance and Utilities Division Work Center and Branch. This is due within 10 working days after the last day of the period reported.

a. REPORT PREPARATION. The report is formatted as follows:

(1) Work Centers.
(2) Labor class codes.
(3) Actual labor hours for month.
(4) Actual labor hours - fiscal year-to-date.
(5) Branch summary by labor class codes.
(6) Division summary by labor class codes.

NOTE: At smaller field activities where trade branches are not organizationally established, Work Centers should be combined with Branches.

b. DISTRIBUTION AND USE. Two copies of this report will be distributed to the Work Management Branch, and one copy to any Branch or Division specified. The report informs management whether:

(1) The maximum number of labor hours is being used in productive work categories.

(2) Labor hours used on overhead functions are reduced to a minimum.

(3) A maximum number of labor hours are within the target range planned and programmed.

(4) Basic data are available for compilation of the Maintenance/Utilities Labor Control Report.

(5) Detailed information is available for variance investigation.

(6) Detailed Work Center information is available to program work and to help forecast labor hour availability in conjunction with Work Input Control and personnel utilization reports.

8. TABULATED REPORT "B" (TAB B) - COMPLETED JOB ORDERS. This report (see Table 10-2 and Procedure Chart 9) provides final cost data on completed and cancelled job orders.

TABLE 10-1
Tabulated Report A, Feeder Report for Labor Control Report

PUBLIC WORKS DEPARTMENT, TABULATED REPORT A - FEEDER FOR MAINTENANCE/UTILITIES DIVISIONS LABOR CONTROL REPORT

Work Center	Labor Class Code	Actual Labor Hours-Month	Actual Labor Hours-Fiscal Year-to-Date
11	01	74.9	638.2
	02	33.4	397.7
	03	119.0	1438.9
	04	59.6	752.6
	05	218.7	1988.0
	06	175.3	1941.5
	07	788.2	7864.4
		1465.1	14122.3
	40	5.5	91.2
	41	152.0	1820.0
	42	89.6	732.1
	43	38.0	551.0
	44		
	45	178.0	1962.0
		485.1	5116.3
		1948.2	21238.0
12	01	79.0	831.2
	02	16.0	194.8
	03	81.0	754.2
	04		215.6
	05	495.0	5318.1
	06	51.6	436.2
	07	115.0	1830.2
		837.6	9580.1
	40		91.2
	41	120.0	1432.0
	42	94.6	756.0
	43	45 0	421.8
	44		
	45	129.0	1936.0
		388.6	4177.0
		1226.2	13557.1
Branch (A) Summary	01	153.9	1469.4
	02	49.4	592.5
	03	196.0	2193.1
	04	59.6	968.2
	05	713.7	7306.1
	06	226.9	2378.7
	07	903.2	10994.6
		2302.7	25502.4
	40	5.5	82.4
	41	272.0	3252.0
	42	184.2	1508.1
	43	103.0	952.8
	44		
	45	307.0	3498.0
		871.7	9293.3
		3174.4	34795.1
Maintenance Division Summary	01	369.0	3241.0
	02	218.6	2002.1
	03	594.0	5634.0
	04	421.0	4437.2
	05	2411.6	25333.2
	06	1896.4	2070.4
	07	6945.2	73931.6
		12875.8	11664.9
	40	27.8	115.2
	41	624.5	7211.4
	42	231.2	1974.8
	43	189.6	1438.0
	44	160.0	1337.0
	45	1452.0	18334.2
		2685.1	30813.6
		15560.9	147462.1
Utilities Division Summary	01	79.0	833.2
	02	38.7	311.7
	03	104.6	1512.2
	04	29.8	347.2
	45	738.0	9334.0
		1279.3	13321.8
		7341.8	67519.2

TABLE 10-2
Tabulated Report B, Completed Job Orders

PUBLIC WORKS DEPARTMENT TABULATED REPORT B - COMPLETED JOB ORDERS

Trade Branch or Work Center	Job Order Number	Estimated Hours	Actual Hours	Estimated Labor Cost	Actual Labor Cost	Estimated Material Cost	Actual Material Cost	Estimated Total Cost	Actual Total Cost	Variation Total Cost
12	7212010	7	8.5	16	18.45	5	5.05	21	23.50	2.50
24	7212010	32	39.8	67	82.72	21	20.15	88	102.87	16.57
33	7212010	16	14.9	32	30.15	12	11.15	44	41.30	2.70
41	7212010	8	8.0	13	12.96			13	12.96	.04
		63	71.2	128	144.28	38	36.35	166	180.63	17.93
14	7242032	252	252.0	529	529.20	346	361.27	875	880.47	5.47
23	7242032	48	52.3	100	108.26	30	27.12	130	135.38	11.14
32	7242032	12	12.12	25	25.25	4	3.65	29	28.90	.60
42	7242032	188	188.3	305	305.09	7	30.83	312	335.92	23.92
		500	504.7	959	967.80	387	412.87	1346	1380.67	34.67
13	7272036	24	22.0	50	45.76	23	21.05	73	66.81	6.19
14	7272036	24	27.7	48	56.28	14	13.85	62	70.13	8.43
51	7272036	16	17.1	33	35.19	10	9.16	43	44.35	3.03
		64	66.8	131	137.23	47	44.06	175	181.29	9.17
12	7272062	265	283.5	548	585.85	187	172.25	735	759.10	53.60
33	7272062	79	74.3	161	150.75	65	59.95	226	210.70	15.30
41	7272062	61	110.1	125	225.72	30	49.33	155	275.05	120.05
		405	467.9	834	963.32	282	281.53	1116	1244.85	129.79
10	TRADE BRANCH A	780	758.2	1870	1819.68	1045	1078.73	2915	2898.41	84.05
20	TRADE BRANCH B	1650	1631.7	4290	4242.42	2580	2231.95	6870	6474.37	395.63
30	TRADE BRANCH C	1324	1280.0	3310	3200.00	1895	2017.51	5205	5217.51	232.51
40	TRADE BRANCH D	942	959.6	1885	1918.00	950	943.75	2835	2861.75	39.25
50	TRADE BRANCH E	631	652.0	1580	1630.00	870	891.15	2450	2521.15	71.15
	MAIN. DIV. SUMMARY	4696	4628.9	11355	11180.10	6470	6271.94	17825	17452.04	372.96
	UTIL. DIV. SUMMARY	631	652.0	1580	1630.00	870	891.15	2456	2521.15	71.15

NOTE: "cents" and decimal hours may be eliminated, if desired.

a. REPORTING FREQUENCY. The report is prepared weekly or bi-weekly as necessary and includes completed and cancelled job order data. The cancelled job orders should be listed separately.

b. PREPARATION. The report covers all specific and estimated standing job orders that have been reported to the fiscal office as completed or cancelled during the period covered by the report.

NOTE: The cost variance is not the difference between the estimated and actual total costs, but rather the sum of the labor and material variance. That is, if the labor variance is (-) $500 and the material variance is (+) $250, the cost variance is $750, not $250. Use an asterisk (*) to differentiate manhours estimated with EPS from labor hours estimated with other methods. The totals in Part II should total both EPS labor hours and non-EPS labor hours if Engineered Performance Standards have been installed. (This is not reflected in Table 10-2). The upper part of the report shows information on each completed job order, by Work Center, with a total for each job order. Cancelled job orders are shown in the same manner in a separate list. The lower part of the report shows one line summaries for all completed job orders for:

(1) Each Trade Branch.
(2) Maintenance Division.
(3) Utilities Division.

c. DISTRIBUTION. Distribute one copy each to the Work Management Branch, and the Directors of the Maintenance, Utilities, and Facilities Management Engineering Divisions.

d. USE OF REPORT. This report provides data for preparation of NAVFAC 9-11014/30 (Figure 10-1) Variances on Completed Job Orders. See Paragraph 24 for instructions on Job Order Variation investigations.

9. LABOR PERFORMANCE INDICES. Data from Tabulated Report "B" are used to compute the Labor Performance Indices, items 22 and 23 of the Maintenance/Utilities Labor Control Report. To obtain the Labor Performance Index for Work Center, Trade Branch, or Division, divide the total estimated hours by the total actual hours for the period concerned.

10. MAINTENANCE/UTILITIES LABOR CONTROL REPORT, NAVFAC 9-11014/29. This monthly report (Figure 10-2) provides data on what was planned, actual results, and variances from the plan. This report also provides:

(1) A plan for full labor hour utilization within each trade branch.

(2) Yardsticks to measure plan effectiveness.

(3) A means of comparing actual to accepted standards of personnel utilization.

a. REPORT PREPARATION. Prepare this report on NAVFAC 9-11014/29 for each Trade Branch, a summary of Trade Branches within the Maintenance Division, and a summary of Trade Branches within the Utilities Division. When the Maintenance and Utilities Divisions are organizationally combined, separate

NAVFAC 9-11514/28 (6-67)
Supersedes NAVDOCKS 2372

REPORT ON VARIATIONS ON COMPLETED JOB ORDERS

For Instructions on use of Form see NAVFAC P-323

DATE: 14 AUGUST 1984

JOB ORDER NO.	BRIEF DESCRIPTION OF JOB	ESTIMATE		ACTUAL		REASON FOR VARIATION AND ACTION TAKEN (If more space is needed use supplemental sheets)
		LABOR (MH)	MAT'L ($)	LABOR (MH)	MAT'L ($)	
1	2	3	4	5	6	7
724184	REPAIR BUILDING #14	1000	1000	1200	1100	
	WC02 Carpenter Shop	250	250	300	400	Change in scope of job: Failed To Request Amendment, when old siding was Removed, Evidence of termite infestation necessitated the Removal of 250 sq. FT of Sheathing and studs Instead of only Replacement of 60 sq FT. of sheathing

FIGURE 10-1
Report on Variations on Completed Job Orders

MAINTENANCE/UTILITIES LABOR CONTROL REPORT

NAVFAC 9-11014/29 (10-84)

☒ MAINTENANCE DIVISION ☐ UTILITIES DIVISION

1. ACTIVITY: U.S. NAVAL STATION, ANYWHERE

2. BRANCH NAME:

☒ SUMMARY REPORT ☐ BRANCH REPORT

4. TOTAL PERSONNEL: 328

5. PERIOD (From-To): 1-30 April 1984

6 LINE ITEM	7 LABOR CLASS CODE	8 CONTROL ELEMENT	9. CURRENT MONTH MAN-HOURS a PLANNED	b ACTUAL	c VARIANCE	10. YEAR-TO-DATE MAN-HOURS a PLANNED	b ACTUAL	c VARIANCE	d % DIST.	11 ACCEPTABLE RANGE
1	40	REWORK	0	0	0	0	0	0	0	0.3-0.6%
2	41	SUPERVISION	2350	2094	-256	26590	23470	-3120	4.5	6.7.8%
3	42	SHOP INDIRECT	1600	1532	-68	16750	16671	-79	3.2	5.6%
4	43	ALLOWED TIME	1810	303	-507	18585	16575	-2010	3.2	2-3%
5	44	GENERAL OFFICE & CLERICAL	704	671	-33	8244	7605	-639	1.5	1.5-2.5%
6	45	LEAVE	10640	10555	-85	68755	66933	-1822	12.9	14-18%
7										
8										
9		TOTAL INDIRECT AND OVERHEAD MAN-HOURS	17104	16155	-949	138924	131244	-7680	26.3	28-32%
10	01	SERVICE	6700	5937	-763	67790	62518	-5272	12.1	6-8%
11	02	EMERGENCY WORK	2900	2495	-405	30395	29157	-1238	5.6	1.5-2.5%
12	03	DYNAMIC EQUIPMENT	106	157	51	4110	3866	-244	0.7	1.5-3%
13	04	STANDING JOB ORDERS NOT ESTIMATED	2885	3110	225	37410	32401	-5008	6.2	
14	05	STANDING JOB ORDERS ESTIMATED	3500	3917	417	46350	41129	-5221	7.9	
15	06	MINOR WORK	5788	4649	-1139	66294	52995	-13299	10.2	
16	07	SPECIFIC JOB ORDERS	18551	14533	-4018	201683	165384	-42299	31.9	
17										
18										
19		TOTAL PRODUCTIVE MAN-HOURS	40624	34798	-5826	460642	387661	72981	74.3	68-72%
20	GRAND TOTAL MAN-HOURS		57728	50953	-6775	599566	518905	-80661		
21	PRODUCTIVE EFFORT (Line 19/Line 20)		70.4%	68.3%		76.8%	74.7%			68-72%
22	LABOR PERFORMANCE - EPS[1]			96%			103%			98-105%
23	LABOR PERFORMANCE - NON-EPS[2]			108%			101%			98-103%
24	PRODUCTIVE MAN-HOUR CONTROL (Line 12 + 14 + 18 + 19 / Line 19)		69.3%	66.8%		70.5%	67.9%			60-65%

[1] LINE 22 EPS $\frac{\text{EST HRS}}{\text{ACT HRS}}$ FOR SPECIFIC JOB ORDER

FIGURE 10-2
Labor Control Report (NAVFAC 9-11014/29)

summaries based on Trade Branches performing primarily maintenance functions should be prepared. This report provides both planned and actual labor hour data and is presented in two parts, current month and fiscal year-to-date.

(1) Planned. For the current month, this is the same information as is on the Workforce Availability Summary and Work Plan Summary for the current month. For fiscal year-to-date, add current month data to the previous month's fiscal year-to-date information.

(2) Actual. For the current month, Tabulated Report A provides the information for lines 1 through 20. Fiscal year-to-date information is obtained by adding current month data to the previous month's fiscal year-to-date data.

(3) Control Indices. The information on lines 21 through 24 is obtained as follows: Line 21 is obtained by dividing line 19 by line 20 and multiplying the result by 100 to convert to percent. Line 22 is obtained by dividing EPS-estimated hours on job orders by actual hours on the same work (the Completed Job Order Report contains this information) and multiplying the result by 100 to convert to percent. Line 23 is obtained by dividing non-EPS-estimated hours on job orders by actual hours on the same work (the Completed Job Order Report contains this information) and multiplying the result by 100 to convert to percent. Line 24 is obtained by dividing the total of hours for labor class codes 03, 05, 06, and 07 by line 19 and multiplying the result by 100 to convert to percent (labor class code 03 hours are include only to extent that the work was planned, estimated, and scheduled). Lines 21 and 24 are computed for both planned and actual hours; lines 22 and 23 are computed for actual hours only.

(4) Variance. This is obtained by subtracting the planned hours from the actual hours. Therefore, a positive (+) variance means that the shops used more time than was estimated; a negative (-) variance means that the shops used less time than was estimated. Significant differences should be investigated to determine the causes.

b. DISTRIBUTION. This report is distributed in sets. A set consists of one report for each trade Branch in the Maintenance and Utilities Divisions, one report summarizing all trade Branches in the Maintenance Division, and one report summarizing all trade Branches in the Utilities Division. The distribution is as follows:

(1) One complete set each to the Public Works Officer or Assistant Public Works Officer, the Shops Engineer, the Director, Facilities Management Engineering Division and any public works component responsible for analysis.

(2) A complete set of all trade Branches in the Maintenance Division and the division summary to the Director, Maintenance Division.

(3) A complete set of all trade Branches in the Utilities Division and the Division summary to the Director, Utilities Division.

(4) One report of each trade Branch to appropriate Branch Managers.

(5) Engineering Field Divisions of the Naval Facilities Engineering Command for special studies as requested. Such requests will be on a case basis for a definite period.

c. REPORT USE. The report can inform management whether:

(1) The maximum number of labor hours is being used in productive work categories.

(2) Labor hours used on overhead functions are realistic to the productive base.

(3) A maximum number of labor hours are programmed on work input control charts and accomplished as approved.

(4) Target Ranges for each supervisory level are being established, targets are being met, and corrective action taken where warranted.

d. REPORT ANALYSIS. Except for overtime hours, the total labor hours shown for each Branch, Division or component on this report should be equivalent to the number of personnel shown on the Workforce Availability and Work Plan Summary.

(1) Analysis of Productive Time. Analysis of productive codes (01 through 07) will assure that labor hours available for productive-type work are used efficiently. Analysis of productive time requires that many variables be considered. No fixed allowable percentage can be stated which will apply to all shops regardless of size or function. Target ranges are indicated for totals of all Branches (Maintenance and Utilities Divisions combined) with respect to total labor hours reported. These ranges are based on a Navy-wide "average" or "normal" condition, and must be used judiciously. The extent of contracting can influence the targets. Therefore, each supervisory level should establish a reasonable Target Range that can be met under local conditions. Each supervisory level then can readily determine if target ranges are being met, and where corrective action need be applied.

(a) Emergency and Service Work. (Labor Class Codes 01 and 02). These classifications should be observed in relation to Preventive Maintenance Inspection (Labor Class Code 03). Keep labor hours in all three classifications to a minimum. For PMI, this means not accomplishing service order scope repair jobs under the guise of PMI. Change only true PMI work to this labor class code (03). A decrease in all three is a favorable trend. These three indices should also be watched for inter-relationship. A good Preventive Maintenance Inspection Program should reduce service and emergency work. A decrease in Service and Emergency work and no decrease, or an increase in Preventive Maintenance Inspection may indicate over-inspection. An increase in Service and Emergency work and a decrease in Preventive Maintenance Inspection may indicate under-inspection. An analysis of how much Emergency and Service work is being accomplished by the various Work Centers or Branches, should be made. If an Emergency/Service Work Center is established and is not performing 50 percent or more of the Labor Class Codes 01 and 02 work, review the other Work Centers to ascertain which are doing relatively large percentages of the Emergency and Service work, and determine if some of this work could have been done by the E/S Work Center. By

concentrating as much Emergency/Service work as possible in the E/S Work Center, the other Work Centers are freed for additional programmed and scheduled work. However, judgment must be used because support shops, such as Sheetmetal and Machine Shops, do many small jobs independently as well as work for other Work Centers. These jobs require large and expensive equipment, and the transfer of such work to the E/S Work Center would require equipment duplication. In general, the E/S Work Center should be performing work requiring portable hand tools and equipment. Work requiring large shop equipment or special skills not available in the E/S Work Center, regardless of the size of the job, should be accomplished by the parent shop.

(b) Productive Effort. The desirable percentage of productive effort to total labor hours for Maintenance and Utilities Divisions combined is in the range of 68 to 72. Although some variances should be expected during periods of abnormal leave, usually the summer months and December, any indices of less than 68 percent for protracted periods should be investigated for excessive overhead assignments.

(c) Labor Performance. This provides an indicator of how well shop forces were able to meet allowed time for work that was planned, estimated, and scheduled. Labor performance may be monitored from information obtained from the Report on Variations on Completed Job Orders. Trends should be monitored. For example, if a current month's Branch performance is 96, performance would appear satisfactory. Conversely, an index of 85 would appear to require immediate corrective action. However, if the index of 96 is a steady drop from 99, and the 85 a steady rise from 75, the opposite would be true. Also, a performance rate of 90 on work amounting to only 30 labor hours is not as important to management as a 90 percent performance rate on work amounting to 3,000 labor hours.

(d) Productive Labor Hour Control. The desirable percentage for the Maintenance and Utilities Division, separately or combined, is in the range of 80 to 85. Variances from this range should be expected in Work Centers such as Emergency/Service or Pest Control. Productive labor hour control shows the shop's total productive labor hour percentage expended on work that was programmed, planned, estimated, and scheduled. To help obtain maximum control, management should regularly review the Standing Job Orders - Not Estimated percentage with a view of reducing it to the minimum.

(2) Indirect and Overhead Labor hours. The desirable range of total Overhead to total Productive labor hours for Maintenance and Utilities Divisions combined is 28 to 32 percent. Although some variances from this range should be expected during periods of abnormal leave, any Maintenance and Utilities Divisions combined percentage higher than 32 for protracted periods should be investigated for excessive overhead assignments. For individual Work Centers and Branches the range is variable, depending upon the type of work accomplished. Work Centers with highly repetitive work such as janitorial, refuse, and trash collection, should have less than 28 percent. Only under unusual circumstances should a Work Center's overhead exceed 35 percent. Frequently a high overhead rate is caused by a dwindling productive workforce without a compensating adjustment in supervision.

11. REVIEW AND CORRECTIVE ACTION - EACH SUPERVISORY LEVEL. Each Branch and Division supervisor is responsible for taking corrective action, where

warranted, on all planned work not completed as directed. The Work Input Control Charts reflect the planned column of this report, and Tabulated Report "A" reflects actual accomplishment. If a Branch or Division is not meeting provided plans, then the Branch or Division supervisor must take corrective action. Deficiencies noted and corrective action taken or recommended should accompany the Summary Report submitted to the Public Works Officer or Assistant Public Works Officer.

12. REPORT ON VARIATIONS ON COMPLETED JOB ORDERS, NAVFAC 9-11014/30. An analysis shall be prepared on NAVFAC 9-11014/30 (Figure 10-1) when variances on the Tabulated Report B, Completed Job Order Report meet the following criteria:

a. On Work Centers, or jobs, totaling less than $1,000, a variance of $100 or more shall be investigated. Only that portion of the work accomplished by the Work Center primarily responsible for the variance will be investigated.

b. On Work Centers, or jobs, totaling more than $2,000 and less than $10,000, a variance of 10 percent or more should be investigated. Only the portions of the work accomplished by a Work Center having a variance of 10 percent or more than $200 will be investigated.

c. On Work Centers, or jobs, totaling more than $10,000, a variance of five percent should be investigated. Only the portions of the work accomplished by a Work Center having a variance of five percent or more than $200 will be investigated.

a. INVESTIGATOR. The Public Works Officer should delegate authority and responsibility for variance investigation to a senior supervisor. The Work Management Branch or equivalent function should coordinate the variance review.

b. PROCEDURE. In the formal procedure the investigator designated as described in the preceding paragraph shall review each Tabulated Report B, Completed Job Order Report and determine which, if any, jobs have significant variances. A variance is considered significant if it exceeds the limitations shown in Paragraph 24, or if, in the opinion of the investigator, it represents an unhealthy trend in any work center. For each job with a significant variance, a Report on Variations on Completed Job Orders, NAVFAC 9-11014/30, shall be prepared. Findings will be reported in column 7, including any corrective action that has been taken or that the investigator recommends be taken to prevent recurrence in the future. Copies of the completed report are sent to the Director, Maintenance and/or Utilities Division (dependent on the shops involved), the Facilities Management Engineering Director and the Public Works Officer for their information and appropriate action. This is the appropriate procedure to use when Tabulated Report B, Completed Job Order Report is both accurate and timely. If this is not the case, another procedure may have to be used but variance analysis should be performed. One method is to have the shops identify the reasons for variation at the time the job is completed. The information is forwarded with the closeout copy of the job order. The best variance analysis occurs when the latter procedure is utilized.

c. PRIOR ACTION. Certain personnel are in a position to identify and initiate action on variances or impending variances before preparation of the Tabulated Report B, Completed Job Order Report. The Master Scheduler should review the Planned and Actual labor hours on the Master Schedule and report any impending variance to the Facilities Management Engineering Division Director for action. The Work Center or Branch Supervisor should follow progress on all jobs and, on noticing any impending variance, take action to prevent or minimize the variance. If the variance cannot be prevented, a written record of the circumstances should be made for use by the investigator. The Work Center supervisor should log the actual hours used on all job orders.

d. INVESTIGATION. If the job is over-expended, look for a change in job scope. Also look for poor planning, or poor job descriptions, by Planners and Estimators. It is also possible that Planners and Estimators estimated on the basis of a better method of accomplishment than that used by the shop. Among the causes of under-expenditures are loose estimates, improved methods, and changes on the job during performance (two coats of paint specified; one coat applied). Whatever the variance cause, the facts must be determined and appropriate action taken. Periodically, amendments should be investigated to assure that there is a true change in scope and that they are not being issued to make reports "look good".

13. BASE ENGINEERING SUPPORT TECHNICAL SYSTEM (BEST). (See Appendix L for greater detail). Activities implementing pertinent BEST modules should refer to installation materials to determine data available for review. The BEST system consists of management information modules to aid the PWO and his staff. Each of the seven modules provide techniques, procedures and control indicators for improved and effective management of facilities, maintenance, transportation, and utilities systems. The seven modules are:

a. Emergency/Service (E/S)
b. Shore Facilities Inspection (SFI)
c. Work Input Control (WIC)
d. Facilities Engineering Job Estimation (FEJE)
e. Transportation
f. Utilities
g. Family Housing

APPENDIX H

MAINTENANCE MANAGEMENT APPRAISAL QUESTIONNAIRE

5. QUALITY ASSURANCE FOR IN-HOUSE OPERATIONS.

a. Discussion. Substantial emphasis has been directed to quality assurance for contracting. Under the Commercial Activities (CA) Program, the government is obligated to operate under the same terms of the contract if done in-house. A feature of many in-house contract specifications are performance factors relating to quality and response. Even for non-CA work it is good business practice to monitor performance. For work items with performance factors, data should be collected and analyzed as if the work was accomplished by contract. A modified form of the Quality Assurance Plan prepared for a Facility Support Contract and detailed in MO-327 should be utilized. Since the inspection is for in-house personnel and the government, it is recommended that inspections be made on a bi-monthly or monthly basis unless persistent problem areas require more frequent inspections. Random inspection is a desirable method to assure objectivity and to assure sufficient readings are taken to accurately measure the desired performance.

b. Organization. The Quality Assurance (QA) responsibilities will vary from activity to activity depending on the type of work remaining in-house. The Work Management Branch of the Facilities Management Engineering Division would be assigned in-house QA inspection responsibility. This in-house function would relate solely to performance factors, quality of end product, and responsiveness of service--not to direct supervision of the function. The end product would be specified in terms of quality, improved customer relationships, and cost effective services. Integrated with the Facilities Management Program, this function would provide management feedback for all key areas of public works effort.

TABLE 11-1 (Section 1)
MAINTENANCE MANAGEMENT APPRAISAL QUESTIONNAIRE
Shore Facilities Inspection
Function

	QUESTIONS	TARGET ANSWERS
1.1.	Does the Facilities Management Engineering (FME) Division Director maintain, or have access to, an up-to-date inventory of Class I and Class II property?	Yes
1.2.	Are all changes caused by new construction, demolition, etc., reflected on facility cards, or an acceptable substitute?	Yes
1.3.	Is there a Control Inspection Schedule?	Yes
1.4.	Are all facilities reflected on the schedule?	Yes
1.5.	Are Control Inspections on schedule?	Yes
1.6.	Are all Class II facilities inspected in accordance with the frequencies shown in MO-322, Volume 1?	Yes

1.7.	Do Control Inspectors use appropriate inspection guides while conducting Control Inspections? (MO-322, Volume 2)	Yes
1.8.	Are the Facilities Management Engineering Division Director and Public Works Officer/ Assistant Public Works Officer aware of deficiencies in the inspection schedule (failure to provide a complete inspection of <u>all</u> facilities at least once per triannum)? (Suggested: FME Division - evaluate monthly; PWO/APWO - evaluate quarterly)	Yes
1.9.	Are corrective actions being taken to insure that the inspection schedule will be met? How frequently?	Yes Quarterly
1.10.	Are old inspection reports and job orders purged from facility inspection files after a new inspection has been conducted?	Yes
1.11.	Do Planners and Estimators perform Control Inspections in addition to their normal duties?	Information
1.12.	Are Preventive Maintenance Inspections scheduled?	Yes
1.13.	Is the Preventive Maintenance Inspection System administered by the FME Division?	Yes
1.14.	Is the PMI equipment inventory up-to-date?	Yes
1.15.	Are PMI check-off cards or other adequate documentation maintained? Are they used by shop craftsmen performing the inspections? Are the inspection/check-off cards, with attendant craftsmen remarks, analyzed and/or reviewed?	Yes
1.16.	Are PMI standing job orders planned and estimated, and does the scope of work outlined adequately describe the equipment to be serviced?	Yes
1.17.	Are PM inspections on schedule?	Yes
1.18.	Are discrepancies revealed by PMI reported when the required maintenance is beyond PMI scope? How?	Yes
1.19	Is there an Operator Inspection Program?	Yes
1.20.	Does the FME Division receive "feedback" of discrepancies disclosed by operator inspections? How?	Yes

1.21.	Are measures currently in effect which are designed to minimize the number of miscellaneous or unscheduled inspections conducted by Control Inspectors and/or Planners and Estimators?	Yes
1.22.	Is the Work Reception and Control function provided a copy of monthly Control Inspection and PMI schedules?	Yes
1.23.	Are tenants of facilities scheduled for Control Inspections advised in advance of forthcoming inspections, and are they encouraged to provide lists of known discrepancies?	Yes
1.24.	Do personnel receiving, approving and issuing Emergency/Service Work Authorizations screen all incoming calls which apply to facilities included on the Control Inspection Schedule and attempt to discourage service calls on facilities scheduled for inspection in the "near future"?	Yes
1.25.	What percent of the specific job order maintenance and repair work is generated by Control Inspection?	65%
1.26.	Are inspection reports reviewed to determine items to be programmed for accomplishment; to be included as an essential unfunded deficiency; or deferred as desirable, but not essential?	Yes
1.27.	Is the Public Works Department organized in accordance with NAVFAC P-318, Organization and Functions for Public Works Departments?	Yes
1.28.	Is an organization chart and personnel listing available and maintained current?	Yes
1.29.	Is there a plan for cross-training Planners and Estimators in the FME Division and from Craftsmen from the Maintenance Division?	Yes
1.30.	Does the Public Works Department have a current training program?	Yes
1.31.	Are customers surveyed for response problem areas?	Yes
1.32	Is turn around time measured for customer work, priority work, routine work?	Yes
1.33	Is routine feedback provided to customers concerning status of jobs?	Yes

TABLE 11-1 (Section 2)
Work Input Control and Planning and Estimating Functions)

	QUESTIONS	TARGET ANSWERS
2.1.	Is an up-to-date station directive in effect which specifies the personnel authorized to request services from the Public Works Department, and does it provide a procedure for submitting work requests?	Yes
2.2.	Is all known Minor Work and Specific Job Order work programmed on the shopload plans and/or job requirements and status chart?	Yes
2.3.	Is there a short-range shopload plan? (1-3 months)	Yes
2.4.	Is there a long-range shopload plan? (4-12 months)	Yes
2.5.	Is there a Workforce Availability/Work Plan Summary for a projected 3 month period?	Yes
2.6.	Is there a yearly Standing Job Order Summary, which includes labor hour estimates by work center, and labor and material dollar cost estimates programmed quarterly? Is the information concerning action to be taken, and frequencies, sent to the shops?	Yes
2.7.	What is the percent of Specific Job Order loading on the shopload plan? (Specific labor hours programmed vs total labor hours available. If Minor Work Authorizations are programmed on the shopload plan, include these job orders also).	
	Month 1	100%
	Month 2	70-90%
	Month 3	60-80%
	Month 4-12	40-70%
2.8.	Is the work programmed on the shopload plan, and/or job requirements and status chart, in accordance with the OP-PLAN, resource availability, and annual maintenance plan?	Yes
2.9.	Does the Maintenance and the Utilities Division provide periodic (weekly and monthly) input to Work Management regarding jobs status, material availability, planned leave, etc.?	Yes

2.10.	Is there a joint meeting between Facilities Management Engineering Division and Maintenance Division personnel prior to final shopload plan preparation (month one) to critically appraise and obtain a mutually acceptable and workable shopload plan?	Yes
2.11.	Is the shopload plan reviewed and formally approved by the PWO/APWO prior to its submission to the Maintenance Division?	Yes
2.12.	Are only the jobs reflected on the short range (3 months) shopload plan released to the shops for accomplishment? (Exceptions include emergency-urgent jobs, or jobs requiring long lead times for material procurement).	Yes
2.13.	Are changes to the current approved shopload plan (urgent jobs) controlled and approved by the PWO/APWO?	Yes
2.14.	Is the EPS Program installed?	Yes
2.15.	Have <u>all</u> Planners and Estimators received initial EPS training and/or been retrained in the last two years?	Yes
2.16.	Have <u>all</u> Control Inspectors received initial EPS training and/or been retrained in the last three years?	Yes
2.17.	Has the Facilities Management Engineering Division Director received initial EPS training?	Yes
2.18.	Are copies of current Engineered Performance Standards manuals available? Are copies of current MO manuals available? (NAVFAC P-349 provides listing of manuals with current changes)	Yes
2.19.	What is the percent EPS utilization?	75% minimum
2.20.	Were the jobs on the last month's shopload plan accomplished as programmed; i.e., at least 90% of the jobs scheduled were started, and at least 80% of the labor hours scheduled on the jobs started were accomplished as planned? If not, what percentages were started and/or accomplished?	Yes
2.21.	How many jobs on last month's shopload plan were not started at all? Why?	Information
2.22.	Are reasons documented when programmed jobs were not started?	Yes

2.23.	What percentage of the maintenance force is assigned to standing job order effort? (Obtain from latest Maintenance/Utilities Labor Control Report, Division Summary FY To-Date, Labor Class Codes 04 and 05)	Variable dependent on what efforts have been contracted
2.24.	Have all maintenance and repair projects been submitted, or are in process for early submission?	Yes
2.25.	How many job order amendments were written last month?	Information
2.26.	Are all job order amendments planned and estimated?	Yes
2.27.	Are all job order amendments issued in accordance with an established Public Works Department procedure?	Yes
2.28.	Is turnaround time measured (elapsed time from work receipt to work completion)? Does it appear reasonable?	Yes

TABLE 11-1 (Section 3)
Facility Maintenance Resources)

	QUESTIONS	TARGET ANSWERS
3.1.	What is the current annual planning figure for:	
	M1 (Maintenance and Repair) M2 (Special Projects) R (Minor Construction) P1 (Operations) L7 (Transportation) N (Utilities)	Information
3.2.	Is there an operating plan for each major fund source:	
	Monthly?	Yes
	Quarterly?	Yes
	Annually?	Yes
3.3.	To what extent does the Public Works Officer control the current annual planning figures?	Total
3.4.	Is the FME Division Director formally advised of annual and quarterly planning figures and reimbursables to enable programming work to the Maintenance Division within fund limitations?	Yes

3.5.	Is the total identified workload, as illustrated on the job requirements and status chart, shop load plans, and standing job order summary, separated into groups by fund source?	Yes
3.6.	Has an annual maintenance plan been established?	Yes
3.7.	Have controls been established as a means of preventing funds over-obligation/over-expenditure?	Yes
3.8.	Are narrative reports prepared explaining trends and variances in planned versus actual performance?	Yes
3.9.	Are meetings held with division heads to familiarize them with the financial reports?	Yes
3.10.	What is the current plant replacement value (less family housing) of Class II property?	Information
3.11.	Are the items which constitute unfunded nondeferrable backlog noted on the job requirements and status chart, or an acceptable work input control chart?	Yes
3.12.	What percent of the nondeferrable backlog is supported by inspection reports?	100%
3.13.	What is the total validated Nondeferable Backlog of Maintenance and Repair (NMAR)?	Information
3.14.	Was the NMAR amount reduced during the last fiscal year? If reduced, by what amount? If increased, by what amount?	Information
3.15.	Is the PWO provided with maintenance unit cost information?	Yes
3.16.	Have Maintenance unit expenditures increased or decreased from last fiscal year?	Information
3.17.	What has caused changes in maintenance unit expenditures?	Information
3.18.	What percent of real property maintenance funds are used for alterations and improvements?	7.5% of M1 + R1
3.19.	Is there a station planning board to determine priorities of alterations and improvements?	Yes
3.20.	Do budget plans include maintenance of facilities not shown in the BFR (Basic Facilities Requirements)?	No

3.21.	Are quantities reported in the budget forms based on the quantities shown in the inventory of Military Real Property, NAVFAC P-164 as of the beginning of the past fiscal year, adjusted for planned additions, expansions or deletions?	Yes

TABLE 11-1 (Section 4)
Shop Scheduling and Work Accomplishment Functions

	QUESTIONS	TARGET ANSWERS
4.1.	What is the percent of productive effort (Maintenance Division)?	68-72%
4.2.	What is the labor performance?	EPS/NON EPS
	Building Trades	95-105%
	Mechanical Trades	95-105%
	Electrical Trades	95-105%
	General Services	95-105%
4.3.	Is the maintenance scheduler provided copies of the short range shopload plan? (months 1-3)	Yes
4.4.	Is the maintenance scheduler provided a copy of the current personnel availability/work plan summary?	Yes
4.5.	Is there a master schedule? Is it correlated with the current shopload plan?	Yes
4.6.	Does the maintenance scheduler base the master schedule on monthly shopload plans?	Yes
4.7.	Does the maintenance master scheduler program work to each shop committing approximately 75% of the shop forces "available" for Specific Job Orders and Minor Work Authorizations?	Yes
4.8.	Is each Work Center supervisor provided with a copy of the weekly schedule prior to the beginning of each new work week?	Yes
4.9.	Does the Work Center supervisor prepare an advance daily-work plan at the beginning of each week using the weekly schedule as a basis?	Yes
4.10.	Are all Work Center personnel scheduled and accounted for on work center schedules?	Yes

4.11.	Are Work Center schedules correlated with the master schedule (100% of jobs and hours on master schedule for the week are also scheduled on appropriate work center schedules)?	100%
4.12.	Is work being accomplished on schedule?	Yes
4.13.	Does the Work Center supervisor appraise schedule performance by comparing actual labor hours expended daily with the daily work plan?	Yes
4.14.	Is the Work Center supervisor told what jobs are not to be worked when it becomes necessary to accomplish jobs which were not scheduled (emergency or urgent jobs)?	Yes
4.15.	Following job completion by a Work Center, is the completed job returned to the Branch Manager, or Maintenance Scheduler, within 24 hours of completion?	Yes
4.16.	Are reasons for variances noted on completed job orders by Work Center supervisors?	Yes
4.17.	Are causes for schedule carry-over reconciled with the Master Scheduler as they occur?	Yes
4.18.	Does the Work Center supervisor initiate action to obtain amendments before the job exceeds the estimated labor and material costs (oral approval acceptable on urgent jobs in process)?	Yes
4.19.	When amendments are requested, is it mandatory that documented justification accompany the request? Are any justifications unacceptable?	Yes
4.20.	Are amendment requests reviewed and approved by the Director, Maintenance or Utilities Division prior to submission to the Facilities Management Engineering Division Director?	Yes
4.21.	Does the FME Director review and approve (or recommend approval of) all amendment requests?	Yes
4.22.	Are all amended job orders so annotated?	Yes
4.23.	Is there an Emergency/Service Work Center?	Information
4.24.	What percent of the total Emergency/Service workload is accomplished by the E/S Work Center?	50%

4.25.	What percent of the total Maintenance effort is expended on Emergency/Service work?	Variable - Analysis should be made to determine % at activity level
4.26.	Does the E/S Work Center perform work which is not Emergency/Service type work (LCC 03, 04, 05, 06, 07)? How much? Why?	Information
4.27.	Is the Emergency/Service Work Center staffed with proper crafts to facilitate efficient workload accomplishment? What crafts are needed?	Yes
4.28.	Are E/S truck radio dispatched?	Yes
4.29.	Is supply support responsive to need?	Yes
4.30.	Does public works have supply purchase authority? If not, would it improve responsiveness?	Yes
4.31.	Are material staging or storage areas adequate?	Yes
4.32.	Are surplus materials returned to supply promptly?	Yes
4.33.	Are on-hand supplies limited to 60 days?	Yes

TABLE 11-1 (Section 5)
Management Reports Function

	QUESTIONS	TARGET ANSWERS
5.1.	Is the TAB "A" Report - Feeder for Labor Control Report - received on time? (Monthly; due 10 working days after the reporting period)	Yes
5.2.	Is the Tabulated "A" Report, Feeder Report for the Maintenance/Utilities Labor Control Report prescribed in NAVCOMPT Manual Volume 3, paragraph 037221, reconciled with the Workforce Availability Summary and Work Plan Summary prescribed in NAVFAC MO-321? Is the report accurate?	Yes
5.3.	Is the Maintenance/Utilities Labor Control Report received on time? (Monthly; due 15 working days after the reporting period)	Yes

5.4.	Is the Maintenance/Utilities Labor Control Report accurate?	Yes
5.5.	Is the TAB "B" Report - Completed Job Orders - received on time? (Weekly or bi-weekly; due 5 working days after reporting period)	Yes
5.6.	Is the TAB "B" report accurate?	Yes
5.7.	Is the Job Order Variance Investigation Report - NAVFAC 9-11014/30 - prepared for jobs outside the accepted criteria?	Yes
5.8.	Are formal internal "feedback" reports required from appropriate Division Heads relative to corrective action taken in problem areas indicated by: Maintenance/Utilities Labor Control Report and Completed Job Order Report?	Yes
5.9.	Is corrective action taken as recommended?	Yes

TABLE 11-1 (Section 6)
Miscellaneous

	QUESTIONS	TARGET ANSWERS
6.1.	Are safety measures acceptable relative to OSHA requirements, e.g.:	
	Safety guards for equipment?	Yes
	Eye hazardous area clearly marked?	Yes
	Eye protective warnings observed by all employees?	Yes
	Flammable storage adequate, clean, and precautionary measures observed?	Yes
	Stripping for safety lanes and working areas in shops?	Yes
	Hearing protection used?	Yes
	Asbestos handling (procedures & equipment)?	Yes
6.2.	Is work performed by the Maintenance Division of acceptable quality?	Yes
6.3.	Is there a formalized system to measure quality?	Yes
6.4.	Are all working spaces clean?	Yes
6.5.	Are all working spaces adequately lighted?	Yes

6.6.	Does the shop equipment layout afford optimum work flow?	Yes
6.7.	Is shop space available?	Yes
6.8.	Does the office space layout afford optimum work flow?	Yes
6.9.	Is office space adequate?	Yes
6.10.	Is the end-use material staging area adequate?	Yes
6.11.	Is transportation readily available for:	
	Personnel to and from jobsites?	Yes
	Material to jobsites?	Yes
	Control Inspectors?	Yes
	Planners and Estimators?	Yes
	Shop Supervisors?	Yes
6.12.	Do all pest control personnel have valid certificates, or only work under direct supervision of personnel with valid certification?	Yes