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NAVFAC MO-321

FACILITIES MANAGEMENT

STATEMENT A
APPROVED FOR PUBLIC RELEASE
DISTRIBUTION UNLIMITED

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

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SEPTEMBER, 1985

ABSTRACT

This publication presents the Facilities Management System for controlling resources utilized for real property maintenance and repair and equipment maintenance under the responsibility of Public Works Departments. Incorporated into this manual are changes designed to emphasize overall resource prioritization, work control and long-range planning, increased emphasis on productivity, and discussions of contract impact on Public Works. A new organization for the Maintenance Control Division (revised to Facilities Management Engineering Division) is identified.

FOREWARD

One of the Naval Facilities Engineering Command's most important functions is providing advice and assistance to all levels of command regarding shore facilities operation, maintenance and repair practices, procedures, and management. The primary goal of this publication is to provide a system and recommended procedures to permit cost effective, quality, and responsive real property maintenance support within available resources. Although great 'latitude is permitted in the execution of facilities management responsibilities, the basic system presented in this publication is mandated by OPNAV Instruction 11000.16 of 25 April 1983.

This publication supersedes all earlier NAVFAC MO-321 publications and is certified as an official publication of the Command in accordance with Secretary of the Navy Instruction 5600.16.

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CHAPTER 1

FACILITIES MANAGEMENT SYSTEM

1. PURPOSE. This manual will assist the Public Works Officer (PWO) or Staff Civil Engineer (SCE) in controlling the resources directed to the maintenance, repair and minor construction of real property, and the operations of public works. The system, detailed in this publication, is broadly termed the Facilities Management System. The principles of the system are basic and not substantially different from those used by most people handling day-to-day personal business. You earn a salary out of which the fixed expenses are set aside. The remaining salary must be used to satisfy a number of needs. Chances are the needs are greater than the money that is available. Decisions must be made concerning relative importance and cost. An estimated price is placed against each desire, and priorities are placed against each need. This, in simple form, is facilities management--planning resources available against a listing of all public works needs.

The total system is used in many ways. For example, inspection of facilities not only generates work but also provides information concerning overall condition of shore activities which is reported annually through the command chain. Failure in any major part of the system can cause inadequate work input control, loss of shop productivity, poor specifications to contractors, or improper facility condition assessment. A system in full control of the workload could save 30 percent of direct costs over an inadequate or nonexistent system.

2. TOTAL RESOURCE CONCEPT. Although many of the techniques in this manual are directed to the in-house workforce, the real objective of the system is to control and plan total resources whether accomplished in-house, by contract, or other government components. Over the last 10 years there has been a transition from almost entire in-house public works effort to a mix of contract and in-house or entire contract effort. Public works management can be divided into two major elements; resource control and execution. All fund holders must exercise resource control which includes priority decisions. Execution can be accomplished by Public Works Departments (PWDs), Public Works Centers (PWCs), lead activities, contract or other agencies.

3. BASIC OBJECTIVE. As previously mentioned, the Facilities Management Systems' basic objective is optimum use of available resources directed to real property. Key management concepts are:

a. Separating work generation and long-range job planning from components responsible for work performance.

b. Planning and estimating job orders to a level of detail that clearly communicates to the executor of work the scope to be performed in a manner that can be properly scheduled.

c. Using Engineered Performance Standards (EPS) to provide accurate, consistent benchmarks to assist in developing realistic work schedules and to evaluate performance.

d. Planning of work over an extended period of time to permit maximum utilization of critical shop skills, to assure material availability, to allow for shop coordination, and to permit optimum contractor support.

e. Inspecting shore facilities to identify maintenance and repair deficiencies, establish facility condition and to permit the critical work items to be corrected at the appropriate time.

f. Utilizing inspection information to develop long-range repair plans.

g. Separating emergency and service work from continuing maintenance and repair work to minimize disruptions caused by small urgent jobs.

h. Scheduling work to the shops or authorizing work to contractors to accomplish assigned taskings in an orderly manner within time constraints.

i. Appraising management information to determine problem areas and taking prompt management actions to correct the problem.

Providing quality assurance whether work is accomplished in-house or by contract.

k. Utilizing information generated in the system to evaluate facility condition and to communicate this to all levels of command.

l. Planning resources available to assure acceptable public works support for the dollars available.

4. GOALS. Facilities management goals are to:

a. Per form maintenance on a scheduled, rather than on an intermittent, break-down basis.

b. Assure that resources are used in the most efficient manner.

c. Provide more direct control over maintenance work force performance.

d. Perform the proper level of maintenance.

e. Take corrective action before advanced deterioration necessitates major repairs.

f. Reduce administrative details that interfere with direct supervision of the maintenance work force.

g. Correlate the work force capacity of each work center with its work load.

h. Obtain optimum shop forces alignment by trade skills.

i. Provide realistic basis for comparing maintenance job cost estimates with actual costs.

j. Provide data indicative of trouble areas requiring corrective management action.

5. BENEFITS. The Facilities Management System has been successfully used at many activities. Some of the benefits that have been obtained are:

a. Decreased need for capital investment by using existing facilities to their full life expectancy.

b. Greater reliability and availability of essential utilities and services as a result of properly adjusted and maintained "vital" dynamic equipment.

c. Improved worker's morale through a logical division of functions and a clear definition of duties.

d. Increased work force productivity.

e. Availability of work-in-process information to facilitate management decisions.

f. Availability of data to develop and justify budgets.

6. ELEMENTS OF CONTROL. The facilities work control system procedures involve a concept easily adaptable to various sized Public Works Departments or Staff Civil Engineer (SCE) Offices. The Facilities Management System requires control of the 13 key elements identified in Table 1-1. If these items are managed as described in this manual, an effective and efficient public works organization will exist. A major factor influencing the ability of the public works function to execute effective control procedures is the large number of work requests flowing through the department. Automated Data Processing (ADP) support or word processing equipment provides major assistance in achieving control over the proper work flow. Appendix C contains information concerning the Base Engineering Support, Technical (BEST) system which is an automated system developed for PWDs.

7. CLASSIFICATION OF ACTIVITIES. Activities with less than 75 equivalent (in-house plus contractor) personnel in the Maintenance and Utilities Divisions, are classified as small activities and fall under the purview of NAVFAC MO-321.1, Maintenance Management of Shore Facilities for Small Activities. Activities with 75 to 250 equivalent personnel are classified as medium, and those with more than 250 equivalent personnel are considered large activities. The term equivalent personnel is used to identify the in-house workforce as well as contract support.

8. DETERMINATION OF SYSTEM INSTALLED. Administrative and supervisory controls, in varying degrees, are necessary to manage the funds expended for accomplishment of maintenance and repair. This rule applies whether work is done on a large or small scale.

a. COMPLETE SYSTEM. Complete control means that all of the methods and procedures described in this publication will be followed in principle and, for the most part, in detail. It is applicable to field activities with or without ADP support.

b. MODIFIED SYSTEM. The necessity to modify the system at the activity is based on complexity of operations, annual volume of business and the number of public works personnel available for its application. It does not mean

TABLE 1-1
Elements of Control

Elements	Functions
(1) Inventory	The first two elements are the foundation of the maintenance management system.
(2) Maintenance standards	They provide basic information on what is to be maintained and comprise a basis for evaluating (a) the condition of shore facilities and (b) the effectiveness of the maintenance effort.
(3) Work classification (4) Numerical identification for reporting	Elements 3 & 4 provide a system of classifying categories of work and a means of identifying work documents and work accomplishment.
(5) Work generation (6) Work reception (7) Work input control (8) Planning and estimating (9) Job authorization	Elements (5) through (9) provide a system to document, classify and maintain the status of all incoming work. They also provide the techniques to properly plan and estimate maintenance, repair and construction work with Engineered Performance Standards (EPS) or Unit Price Standards.
(10) Material coordination (11) Shop scheduling	Elements of control 10 & 11 are applied in direct support of work performance prior to, and during, the course of the job.
(12) Reports (13) Appraisal	Elements of control 12 & 13 provide a basis for making judgments and decisions, and in taking necessary action during job progress and after completion.

that the elements of control described need to be sacrificed or eliminated. What is required is a careful review of the methods and procedures contained in this manual with a view toward adaptation to Public Works Department size and local conditions. These changes should be minimized. Modifications are generally based on workload considerations. For example, a requirement for a part-time scheduler and part-time shop planner would lend itself to a combined position. A similar philosophy could occur in the planner/estimator and facility inspector positions.

c. FUNDAMENTAL REQUIREMENTS. Except at very small activities, organizational realignment should in no way violate a fundamental organizational design requirement, that is, separate and equal administrative control of work generation and work performance. Specifically, this means that personnel performing facilities management engineering duties such as inspection, job prioritization, job planning and estimating, and job authorization are not to be under the supervision of Maintenance Division personnel.

9. INVENTORY. A complete inventory of all facilities, systems, and equipment is required for accounting and planning purposes. This will help determine the magnitude and detail of the total program. The Commanding Officer and key staff officers should receive accurate, current, and complete information concerning the facilities and property for which they are held accountable. A knowledge of what is to be maintained is essential to effective management.

Data must be sufficiently extensive to answer detailed questions such as: What is to be maintained? Just how large is the job that must be done? How many electric motors, transformers, miles of track, and so forth must be maintained? What are their vital dimensions, specifications, locations, and characteristics?

Much of this information is readily available. It is essential that a complete inventory be established during the earliest stages of the installation or reinstallation of the Facility Management System. Existing plant account records must be kept up-to-date by reflecting facility additions, deletions, and/or alterations.

10. FACILITY HISTORY FILES. It is not only necessary to know what assets are to be maintained, but also to record a history of maintenance and repairs accomplished to date. These records need not be extensive, but should be of sufficient detail to provide managers with information required to make facilities management decisions. For example, numerous repairs to a distribution system over a period of time could indicate the need for system replacement instead of additional stop-gap measures. It is also important to have complete as-built drawings initially and updates as changes occur.

11. LEVEL OF MAINTENANCE. The level at which a facility should be maintained must be directly related to the basic facilities requirements of the activity and the applicable level of maintenance classification (see NAVFAC MO-322, Volume I, Inspection of Shore Activities). For example, a warehouse in excess of an activity's requirement, or scheduled for removal within several years after completion of a new warehouse, should not be maintained at the same level of maintenance as a warehouse scheduled for retention for 25 years.

CHAPTER 2

RESPONSIBILITY

1. RESPONSIBILITY. Responsibility for management of the Shore Establishment rests with the command chain. The Commanding Officer of a naval activity is responsible for maintaining adequate condition of real property and providing condition evaluations through the command chain.

2. READINESS. Increased emphasis has been directed to the condition of the Shore Establishment, particularly as this condition relates to readiness. Readiness relates to the ability of a shore installation to perform its mission within the constraints of personnel, equipment, facilities, and operating funds. The resources must be available in adequate quantities and balanced with each other to achieve and preserve shore base readiness. When resource levels are insufficient, or when one resource falls out of balance with the others, the result is reduced effectiveness of the activity performing its mission. Facilities management permits the evaluation of facility condition in relation to mission and resources assigned. Readiness factors are:

a. C1: Currently programmed resources will be fully adequate to support the mission element being assessed

b. C2: Currently programmed resources will be substantially adequate to support the assessed mission element with only minor deficiencies arising during execution.

c. C3: Currently programmed resources will be marginally adequate to support the assessed mission element.

d. C4: Currently programmed resources are inadequate and will prevent Command from performing the assessed mission element.

3. CONDITION. Facility readiness evaluation can only be determined by proper condition assessment. The Shore Facilities Inspection Program, as presented in NAVFAC MO-322, is the basis for determining facility condition. The activity program is supplemented by the Specialized Inspection Program. This Program involves services provided by the Naval Facilities Engineering Command to inspect facilities that require skills or equipment not normally available at the Public Works Department. Generally, these inspections involve evaluation of assets not easily inspected visually. Examples are moisture detection in roofing and underwater inspection of waterfront facilities. The geographic Engineering Field Divisions (EFDs) of the Naval Facilities Engineering Command (NAVFACENGCOM) are responsible for conducting or coordinating inspections in their areas of responsibility. Chapter 6 provides a synopsis of the inspection program.

4. SECDEF PROGRAM. The Deputy Secretary of Defense, by Department of Defense (DOD) Directive 4165.2, has directed, in part, that all services implement a program for maintaining and repairing, in the most cost effective manner, all active real property to a standard which will permit continued use for designated purposes; and inactive facilities to a standard commensurate with reactivation requirements. SECNAVINST 11014.11A directs the Chief of Naval Operations (CNO) to implement DOD Directive 4615.2, and to exercise

centralized and coordinated general management and control of the Real Property Maintenance Activities (RPMA) Program.

5. CNO. CNO provides implementing guidance to shore activities and evaluates overall condition and resource requirements. Current emphasis is to relate condition to readiness and to contain the Navy's growing backlog of maintenance and repair. Current concerns are productivity responsiveness of the public works function and base appearance. CNO Instruction 11000.16 identifies Command responsibility for shore activity land and facilities and mandates the use of the procedures in this manual.

6. MAJOR CLAIMANT. Major claimants are responsible for the following:

a. Exercise command direction over activities under their cognizance to assure implementation and continuation of Facilities Management System.

b. Program adequate resources to assure condition and tempo of operations commensurate with mission requirements.

Monitor activity plant condition through condition assessment such as reported on the Annual Inspection Summary (AIS).

d. Relate facility conditions to readiness.

e. Monitor Public Works (PW) Management program effectiveness.

7. NAVAL FACILITIES ENGINEERING COMMAND (NAVFACENGCOM). NAVFACENGCOM as CNO's agent will:

a. Provide navy-wide authoritative advice and guidance regarding maintenance and repair of grounds, buildings, and structures (Class I and Class II property) and related services assigned.

b. Provide navy-wide management systems for administration of the public works function.

c. Establish standards and procedures for specialized administrative and technical functions.

d. Provide professional and technical advice, guidance, and assistance to all levels of command.

e. Provide Facilities Evaluation and Assistance Team (FEAT) visits as requested through major claimants. FEAT visits are designed to provide assistance and technical evaluation of PW management, and facility condition.

8. ENGINEEERING FIELD DIVISIONS (EFDs). Engineering Field Division Commanders/Commanding Officers will provide shore activities with professional and technical assistance and guidance in Facilities Management System implementation and administration and assistance for solution of technical problems.

9. PUBLIC WORKS DEPARTMENT (PWD). Shore facilities operation and maintenance management is a Command responsibility. Authority is delegated by the

Commanding Officer to the Public Works Officer to execute these responsibilities. The Public Works Department is the shore facility organizational component designated to provide activity operation and maintenance support. Standard Public Works Department organizations are prescribed in NAVFAC P-318, Organization and Functions for Public Works Departments.

a. PUBLIC WORKS OFFICER AND ASSISTANT PUBLIC WORKS OFFICER. These two positions comprise the Public Works Departments' top management. Their active participation in maintenance management system application is essential to ensure that:

(1) Effective management practices are followed to efficiently utilize scarce resources in support of the Command's mission responsibilities.

(2) The Public. Works Department is responsive to Command maintenance and operational requirements.

(3) Plans, priorities, and accomplishment of maintenance work assure effective support of the Command's mission.

(4) Goals, targets, and standards are established and measured against actual performance.

(5) Cause analysis is initiated and variances in plan, schedule, or performance of maintenance work are corrected.

(6) Quality of work is commensurate with the type of construction, NAVFACENGCOM technical standards, and expected facility life.

(7) Costs are held to a minimum consistent with mission requirements.

(8) Department personnel are trained in, and thoroughly understand the maintenance management system.

b. FACILITIES MANAGEMENT ENGINEERING (FME) DIVISION. This is the one division in the Public Works Department whose entire effort is directed toward facilities management. Its existence is based on the premise that the functions of long-range planning inspection, work reception and control, job planning and estimating, work input control, and performance evaluation will be more successfully administered and will have a more positive managing effect on maintenance when they are assigned to a staff division rather than to the group concerned primarily with work-performance. This Division should be organized around two major functions; work management and work generation.

Work management includes:

(1) Resource management and budgeting
(2) Work input control
(3) Work reception
(4) Work status
(5) Management reports
(6) Quality assurance of in-house maintenance and utilities work
(7) Analysis of variances and trends
(8) Productivity enhancement

Work generation includes:

(1) Planning and estimating
(2) Inspection
(3) Material ordering

See NAVFAC P-318 for additional information on Facilities Management Engineering Division functions.

c. FACILITIES SUPPORT CONTRACT DIVISION. This Division is responsible for inspection and Public Works management of facility support contracts. It is normally staffed with a Facility Support Contract Manager (FSCM) and Quality Assurance Evaluators (QAE's). Duties are influenced by contract authority delegated to the Public Works Office. This office provides the interface between the Public Works Department and the NAVFACENGCOM Contracts Office.

d. ADMINISTRATIVE DIVISION. The Division is responsible for all administrative matters in the Public Works Department. These responsibilities include organization, civilian personnel, office services, reports and statistics, and budget and finance functions.

e. ENGINEERING DIVISION. The Engineering Division provides technical advice and support for maintenance matters pertaining to engineering studies and reports; preliminary designs and cost estimates for special repair and improvement projects; facilities planning; engineering designs, including development of plans and specifications; and contract document preparation.

f. SHOPS ENGINEER. The Shops Engineer generally directs and coordinates all matters pertaining to Maintenance, Utilities, and Transportation Divisions operations. This billet generally exists at large activities only.

g. MAINTENANCE DIVISION. This Division is responsible for the administration and operation of the in-house maintenance shops engaged in maintenance and repair of shore facilities. The Division's organization will vary with the size and type of the activity and local environmental conditions.

h. UTILITIES DIVISION. The Utilities Division is responsible for operating utility plants and distribution systems including the performance of operator inspections. Generally, maintenance and repair is accomplished by the Maintenance Shops. Exceptions are permissible where economically justified, such as boiler repairs by watch standers during the off-heating season. The Division determines the availability of equipment for overhauls, inspects, technically supervises the work, checks progress, and makes final acceptance inspections of the completed work regardless of the forces employed.

i. TRANSPORTATION DIVISION. The Transportation Division provides necessary transportation and construction equipment, and equipment operators to the Maintenance Division. The Facilities Management Engineering Division, Maintenance, and Transportation Division Directors should cooperate in programming and scheduling maintenance work requiring transportation support.

j. HOUSING DIVISION. The Housing Division is responsible for requesting accomplishment of work for the maintenance and operation of Family Housing or the work is accomplished by the maintenance work force contractor.

10. RELATIONSHIP OF OTHERS TO FACILITIES MANAGEMENT. The relationship and cooperation of the Utilities and Transportation Divisions, Supply Department, Fiscal Office, customers supported by public works, and others will determine to a great extent maintenance productivity and efficiency. The Facilities Management Engineering and Maintenance Division must maintain good relations with each of 'these components if it is to accomplish maximum production for resources expended.

11. SUPPLY DEPARTMENT SERVICES. The Supply Department performs vital services in support of the Facilities Management System. Most important of these services are procurement, stocking, issue, and delivery of materials needed for maintenance and repair work. The Supply Department also obtains local allotments of navy stock fund money to finance allowable items of nonstandard stock. The degree of effectiveness with which material procurement, stocking, issue, and delivery are accomplished varies directly with the cooperative interest, determination, and action shown by key personnel in the Supply and Public Works Departments. When material delivery problems are discussed at weekly scheduling meetings, first-hand knowledge by a Supply Department representative at the meeting can significantly improve support services.

12. FISCAL OFFICE. Services provided by the Fiscal Office include fund control, provision of cost data, maintenance of leave records, and similar accounting assistance including maintenance management reports preparation. An understanding of maintenance management procedures affecting the fiscal office will prove useful to key fiscal personnel in their relationship with the Public Works Department. Close liaison between the two organizations should be maintained. Establishment of the job order number structure, codes, and other report symbols should be mutually determined. Management reports should be prepared within the time limits established by NAVCOMPT.

13. CUSTOMERS SUPPORTED BY PUBLIC WORKS DEPARTMENT FUNDS. The relationship of customers supported by Public Works Department funds to the Facilities Management System is covered in detail in the Work Generation, Work Control, and Planning and Estimating Chapters. The following principles apply:

a. The number of persons authorized to submit work and cost estimate requests should be minimized. Preferably, one representative should be appointed by each customer to maintain liaison with the Public Works Department. To minimize confusion, it is advisable for the customers to publicize internally who their liaison representatives are and that contact with PWD must be through these representatives.

b. Designation of personnel authorized to submit work and cost estimate requests, as well as those officially authorized to sign and approve cost estimates and work requests, should be transmitted in writing to the Public Works Department. Records of such designations should be kept current.

c. Customers should have an understanding of facilities management. principles and policies and their affect on job performance. Shore facilities inspection should be understood, especially its effect in lessening the need for customer maintenance work generation. Customers should be informed regularly of the advantages of submitting accurate and complete data to assure timeliness of processing requests for estimates or work accomplishment. This could be accomplished through the preparation and distribution of an informative manual describing the PWD operations and the preferred methods of dealing with the PWD.

d. The point of contact for customers within the Public Works Department should be formally established and publicized. The Work Reception and Control Branch should normally be the first point of contact for all work requests.

e. Public Works Lead activities (PWLA's) should have an officially designated Activity Liaison Officer who should be the contact for communication of priorities and status of work. PWLAs are CNO-designated PWDs at Naval Shore Activities which provide a full spectrum of public works services. These services include assistance in facility planning, engineering consultation, design and other public works support functions, within a naval complex which is comprised of: (1) two or more contiguous activities; or (2) two or more naval activities located within close proximity to each other, as appropriate. The type and extent of services provided will be delineated in mutually agreeable Intra-Service Support Agreements (ISSAs) executed between the PWLA and supported activities.

f. Status of work requests should be periodically provided to customers.

14. CUSTOMERS SUPPORTED BY OTHER THAN PUBLIC WORKS DEPARTMENT FUNDS. For the most part, the principles covered in the preceding paragraph are also applicable to reimbursable customers. It is therefore important that all matters affecting funds citation be cleared as far in advance as possible. The need for periodic status in connection with funds expenditures and job completions may require extra Facilities Management Engineering Division effort. Also, periodic status reports of work requests should be provided to customers.

15. SELF HELP. Self Help programs should be established at Naval Activities to enhance the habitability of bachelor living quarters, and to improve personnel support, welfare, and recreational facilities. To ensure the work is accomplished in a professional and economic manner, reliance should be made on Civil Engineer Corps Officers and Public Works and Seabee resources for technical guidance of personnel unskilled in the maintenance or construction trades. This program can be an effective method of improving personnel support facilities and enhancing the living standards of military personnel ashore.

16. NAVAL CONSTRUCTION BATTALION UNITS (CBU's), CBU's are separate activities of the Naval Shore establishment tasked to ensure Seabees ashore attain and maintain military and construction skills. CBU's are employed for new construction, alterations, repair or nonrecurring maintenance projects which provide for attaining and maintaining technical proficiency or for projects restricted by security. CBU personnel shall not be used in competition with civilian labor and are not a general labor hour pool to augment Public Works Departments. It is the activities responsibility to provide the necessary resources over the CBU capability such as plans, specifications, materials, self help labor hour, and special tools and equipments.

CHAPTER 3

PUBLIC WORKS CONTRACTING

1. GENERAL. During the seventies, the trend for contracting public works functions began to increase. Many factors influenced this trend, but the primary ones were ceiling restrictions, economics, and requirements for specialized services. As contracting increased, some of the early doubts about the effectiveness of utilizing contractor support were reduced. In several cases, new bases embraced the concept of total base operating support by contract which includes public works functions as well as other support services. Other shore activities are considering placing substantial portions of the public works effort under contract. Recent high-level emphasis is directed to utilizing commercial sources when the functions are not inherently governmental and economics prevail. Currently, this emphasis is being directed by the Office of Management and Budget Circular A-76. Presently, OMB Circular A-76 does not apply to public works organizations located in foreign countries. Increased contracting has influenced the decision making process associated with the Facilities Management System, therefore, a general background of contracting and the Commercial Activities (CA) program is provided in this chapter.

2. OFFICE OF MANAGEMENT AND BUDGET CIRCULAR NO. A-76. The Office of Management and Budget (OMB) Circular No. A-76 specifies policy and conditions for determining private versus governmental operations. It reaffirms the government's general policy of reliance on the private sector for goods and services while recognizing that governmental functions must be performed by government personnel, and that proper attention must be given to relative cost.

a. The policy in A-76 is based on three precepts:

Achieve economy and enhance productivity,
Retain governmental functions in-house, and
Rely on the commercial sector.

b. There are four reasons why a function may be authorized for performance by in-house personnel:

No satisfactory commercial source available,
National defense,
Higher cost of contract, and
Function has been exempted.

c. Since the decision to contract is heavily influenced by OMB Circular A-76, key definitions are provided to assist in the understanding of the subject matter of this chapter.

(1) A Commercial Activity is one which is operated and managed by a federal executive agency and provides a product or service which could be obtained from a commercial source. Included in this definition are nearly all public works functions. A partial list appears below.

(a) Design, engineering, construction, modification, repair, and maintenance of buildings and structures.

(b) Minor construction, alteration, repair, and maintenance of roads and other surfaced areas.

(c) Landscaping, drainage, mowing, and care of grounds.

(d) Custodial and janitorial services.

(e) Refuse collection and processing.

(f) Transportation services.

(g) Generation, purchase, distribution, operation, maintenance, repair, construction, and alteration of utilities.

(2) A Governmental Function is a function which is so intimately related to the public interest as to mandate performance by government employees. These functions include those activities which require either the exercise of discretion in applying government authority or the use of value judgment in making decisions for the Government.

(3) Expansion is the modernization, replacement, upgrade, or expansion of a government commercial activity within certain cost criteria described in the supplement to the OMB Circular A-76.

(4) Conversion is the changeover of work from government performance to performance under contract by a commercial source.

(5) New Requirement is a newly established need for a commercial product or service.

(6) A Cost Comparison Procedure is the comparison of a contractor's cost against the government's cost to determine the most economical party to accomplish a function. Cost comparison procedures are included in DOD Instruction 4100.33. The firm bid/offer procedure is entered into with the understanding that the lowest acceptable bidder will be compared with the government in-house costs and that the Government will contract if more economical.

3. COMMERCIAL ACTIVITIES COST ANALYSIS. To evaluate the economic advantages of utilizing government or private sector services, it is necessary to accurately determine the cost of each. The government costs are based on a cost comparison which includes factors such as federal employee's retirement and insurance benefits and other overhead costs. The contractor cost figure must be based on a firm bid or proposal, solicited in accordance with pertinent procurement regulations. All significant government costs must be considered including cost of administering a contract. To ensure an equitable comparison, both cost estimates must be based on the same scope of work and include all identifiable costs associated with the service. OMB Circular A-76, Supplemental No. 1, (Cost Comparison Handbook) and subsequent changes provide the details and procedures to be used. All cost comparisons are reviewed by audit. Cost comparisons greater than 10 full-time equivalents (FTE) will be reviewed by the Naval Audit Service while cost comparisons less than 10 FTEs will be reviewed internally at the activity.

4. OMB CIRCULAR A-76 RESTRICTIONS. There are several restrictions significant to public works type operations. Activities cannot. enter into contracts for personal services which establish an employer-employee relationship between the Government and individual contract personnel. Also, the regulations shall not be used to justify a conversion to contract solely to meet personnel ceiling restrictions or to avoid salary limitations.

a. Personal Services. These services are defined as contracting for a service so that a contractor or contractor employee are, in effect, employees of the Government. Factors that indicate possible improper personal services are:

(I) Presence of contractor personnel working along side Navy (either military or civilian) personnel in spaces furnished by the Navy.

(2) Supervision or control of contractor personnel by Navy personnel.

(3) Undue emphasis or control of the methods employed in a contract rather than the end product itself.

(4) Use of contractor personnel to perform clerical duties directly for Navy personnel.

(5) Use of contractor personnel interchangeably with Navy personnel.

b. Ceiling Restrictions. Contracts for commercial activities that are justified for in-house performance based on cost comparisons will be allowed to expire (options will not be exercised) once in-house capability is established. If the required ceiling cannot be accommodated within the agency's personnel ceiling, a request for adjustment will be submitted to OMB in conjunction with the annual budget review.

5. PLANNING WORK TO BE CONTRACTED. There are two basic situations which influence planning of work to be contracted:

a. A commercial activities cost analysis identifies that contractor support is more economical than in-house support.

b. A commercial activities cost analysis identifies that in-house support is more economical, but workload peaks or some other factor necessitates contractor support. No existing personnel can be reduced under this category.

(1) Public Works Managers, in order to plan their long-range personnel requirements and distribution of skills, must anticipate functions where economics or practicality dictate contractor support. Assuming that the public works function is effectively managed and overhead requirements are within normally accepted levels, the following factors would influence economics and could tilt the balance in favor of contractor accomplishment:

(a) Cyclical Work - a portion or entire function is not performed uniformly over the entire year. Therefore, it would not be economical to retain personnel or to use personnel out of their specialty.

(b) Investment Costs - the frequency of work is not high enough to justify the cost of high priced equipment/tools required to accomplish the task.

(c) Availability of Skills - certain work requires an unusual or high degree of skill that is not possible to maintain in-house.

(d) Contractor Specialists - as a result of a high volume of business, in certain cases a contractor is able to provide a particular service more economically than government forces.

(e) Workload Peaks - funding variables and customer requests frequently result in workload peaks. Contractor effort may be used to maintain stable workload patterns.

(f) New construction, alteration, and repair that is not incident to maintenance.

6. FACTORS INFLUENCING IN-HOUSE ACCOMPLISHMENT. Many items of work in the facility support classifications lend themselves to contracting since the work is often repetitive and easily specified. This permits Navy personnel to concentrate on work in the following categories:

a. Workload Specification Difficulty. The nature of some work is so undefined, before the actual need arises, it is difficult to specify in a contract.

b. Time Factors. Certain categories of work require prompt attention. Unless the shore activity already has a contract in operation permitting negotiation or specifying this type of work, in-house performance is probably more timely. This is particularly true when workload specification might be vague as in the support to some types of research effort. However, the time factor criterion is only valid if the problem could not have been reasonably foreseen and planned for.

C. No Satisfactory Commercial Source Available. Either no commercial source is capable of providing the needed product or service, or use of such a source would cause unacceptable delay or disruption of an essential program.

d. Support to Other Functions. Functions such as direct fleet operational support could be such an integral part of other work requirements that it is not desirable to obtain the service by contract. Approval must be obtained from CNO to exempt studying work of this nature. All work classed as Commercial Activities under OMB A-74 must be studied eventually. No CA work currently accomplished by the in-house work force can be contracted without study. However, if the function is sufficiently small (10 labor years), a full-scale cost comparison study is not required. Under these circumstances, the function could be contracted using a limited cost comparison procedure which is simpler and quicker than the full procedure required for large functions.

e. The necessity for obtaining security clearances for contractor personnel would cause unacceptable delays.

f. The work must be performed intermittently to avoid disruption of other important operations.

7. ORDER OF CONTRACTING. Shore activities entering into contracting for the first time on a large scale should start with work items that are easy to specify and where substantial contracting experience exists at other activities or advice-can be provided by support commands. The impact of contracting on the manner of doing business must be considered. For example, functions where a minimum of interface occurs with other shop functions is preferable for initial contracting. Shore activity experience in contracting is necessary to effectively balance in-house and contract personnel for work that is normally accomplished on minor and specific work authorizations. The type of functions accomplished by standing work authorizations is generally easier to contract initially and has less impact on shop work force scheduling. It is not always possible to select the easiest items since review schedules are identified by CNO and major claimants.

8. PLANNING THE TIMING OF CONTRACT AWARDS. As the level of contracting increases, it becomes important that contract award dates be programmed throughout the year to minimize a heavy workload during any one period, particularly at the end of the fiscal year. Scheduling of award dates should also anticipate future plans which might require consolidation of contracts. Staggered award dates for similar type work would make this effort more complicated. Consideration should be given to minimizing the number of contracts and if this is not presently feasible, awarding similar contracts during the same period. Generally, shore activities enter into the contracting process on a gradual basis. As confidence increases, the contracting effort increases. Contract administration is complicated by a proliferation of contracts; therefore, it is recommended that the total contract workload, present and planned, be evaluated periodically with the intent of consolidating contracts. Be sure that contract consolidation does not preclude small business considerations.

9. CONTRACT TYPES. Two types of contracts generally cover public work functions.

a. Facility Support Contracts

(1) These contracts cover services normally performed under the Service Contract Act or opened-ended type construction contracts performed under the Davis-Bacon Act. Administration of these contracts is a shared responsibility between the PWD and NAVFACENGCOM. Typical delineation of responsibilities is inspection and Facility Support Contract Manager (FSCM) functions being performed by the PWD and procurement functions by NAVFACENGCOM field Contract Office.

b. Construction Contracts

(1) This type of contract covers fixed price repairs, maintenance and construction supporting public works requirements. These contracts are generally administered and inspected by NAVFACENGCOM.

10. BASE OPERATING SUPPORT CONTRACTS

a. Philosophy. Base Operating Support Contracts (BOS) have been used in recent years to contract for total base services. These contracts offer two substantially different characteristics that might be expected of a series of Facility Support Contracts, as follows:

(1) All base support services, not just functions normally considered to be public works functions, are included in the contract.

(2) Management functions such as maintenance control, shop overhead, and engineering may be included in the contract.

b. Usage. Originally, Navy usage of Base Operating Support (BOS) Contracts was for new base requirements. The success of these contracts has resulted in use on existing bases. As the contracting effort increases at shore activities to the level that substantial portions of base services are no longer performed by Navy personnel, consideration should be given to this type of contract. This is not a decision which can be made entirely at the Public Works Department level. Navy policy and economic analysis will more than likely be the driving force behind increased BOS contracting and a strong commitment from the shore activity Commanding Officer is necessary. The reluctance to permit packaging of functions that would reduce small business participation will undoubtedly limit the number of large BOS contracts.

11. CONTRACTING RESPONSIBILITIES. The knowledge of the contracting responsibilities of the Naval Facilities Engineering Command and Naval Supply Systems Command (NAVSUPSYSCOM) is necessary to minimize misunderstanding, confusion, and overlap of effort. Frequent dialogue at activity level concerning responsibilities is necessary to increase understanding of their respective roles. NAVFAC P-68 (Contracting Manual) identifies the responsibilities for contracting. A brief synopsis is provided in this publication to provide background only. Regulations and publications concerning contracting should be the basis of decision in this area, not the information provided in this chapter. The following division of responsibilities is provided to act as a guide to the acceptance of contracting requirements by the two Commands. This chapter only addresses the materials, equipment, and services that are procured by either NAVFACENGCOM or NAVSUPSYSCOM. Appendix D delineates areas of responsibility for both commands.

a. NAVFACENGCOM is responsible and authorized to contract for design, planning, development, procurement, construction, alteration, repair, and maintenance at all shore activities of the naval establishment for public works and public utilities, and to procure construction, transportation, and weight-handling equipment.

b. NAVSUPSYSCOM is responsible for the procurement of standard commercial materials, equipment, and services. NAVSUPSYSCOM receives, stores, and issues materials to the operating forces and to activities of the Shore Establishment. To perform this responsibility, NAVSUPSYSCOM is responsible for purchasing, cataloging, distributing, and disposing of excess equipment, equipage, repair parts, and consumables.

12. CONTRACTING SUPPORT. Frequently, there is a reluctance to contract. Previous unsatisfactory experiences with contracts, knowledge of other activities problems, perceived difficulties in preparing specifications, and the concern for losing flexibility often cause shore activities to be hesitant in embracing the contract concept.

a. Support is available to assist shore activities prepare economic analysis, prepare the specifications required, or advice concerning staffing requirements that pertain to the contract administration function. Other activities with experience in the type of contract being considered can provide valuable do's and don't's.

b. The Engineering Field Divisions (EFDs) of the Naval Facilities Engineering Command have valuable experience in contract administration matters and in Commercial Activities economic considerations. Also the EFDs maintain a library of technical provisions and have available information concerning the performance of contractors. Shore activities should contact the Facilities Division (Code 10) at the EFD serving their geographical area.

C. Good contract specifications require thought and time. These factors, as well as a heavy workload navy-wide, require that adequate advance planning be provided well before the desired contract date. Contract maintenance often requires that the scope of work to be performed should be specified in greater detail than normally would be required for in-house accomplishment. Contractor personnel are initially unfamiliar with the facilities involved, Navy operations, and activity requirements. The contract specification must provide this information.

d. Guideline Performance Work Statements (PWS) have been developed for the major areas of public works. How to adapt the standard specifications and develop Quality Assurance (QA) plans for inspection are covered in MO-327 (Service Contracts: Specifications and Surveillance). Both the PWS and MO-327 emphasize that specifications should minimize the use of "how to" clauses and maximize performance requirements whereby the contractor is simply told to deliver an acceptable end product.

13. STAFFING FOR INSPECTION AND ADMINISTRATION

a. General. The two most important elements for successful contract administration are good specifications and adequate inspection by qualified personnel. Contract inspection for Maintenance Service Contracts and open ended Maintenance Construction Contracts rests with the shore activity responsible for providing the service. Occasionally support is received from other organizations; but generally it is provided by the cognizant Public Works Department.

b. Responsibilities. Standard Navy organization (P-318) identifies a Facility Support Contract Division Public Works Department. This Division is responsible for preparation, administration, inspection, and certification of all Service Contracts as well as any Officer in Charge of Construction (OICC), Officer in Charge (OIC), or Resident Officer in Charge of Construction (ROICC) functions assigned. The OICC/ROICC is normally assigned the following responsibilities unless they are specifically delegated to the Facilities Support Contract Branch.

(a) Receive and open bids.
(b) Prepare and issue Invitation for Bids.
(c) Evaluate bids.
(d) Award contract.
(e) Process payments.
(f) Negotiate change orders.
(g) Evaluate contractor performance.

c. Staffing. The staffing requirements for a PWD Facility Support Contract Division should include an engineer or technical specification writer, fiscal accountant, procurement clerk, inspectors, and typing capability. The number of personnel required is dependent on the dollar volume of contracts, complexity, as well as on the number of contracts handled. An individual staffing analysis and quality assurance plan are required to determine personnel levels; however, a general guideline is one person per $400,000 - $500,000 of contracts for medium to large contracting efforts. The current guideline is 2 percent of the contract price to a maximum of 10 percent when justified.

14. CONTRACT FUNDING. Facility Support Contracts are funded by the organization having budgeting responsibility for the services contracted. Facility Support Contracts are generally entered into for one year performance with an option to extend for two additional one-year periods. With very few exceptions, Public law permits the contract to commence at anytime in the fiscal year, and be fully funded out of funds from the fiscal year of award, providing work commences on the contract in that year.

15. CHECKLIST. Before the decision to contract is made, the following items should be considered:

a. Have the requirements of the Office of Management and Budget (OMB) Circular A-76, pertinent Navy regulations and current Congressional requirements been considered?

b. Has the difference between governmental functions and other functions been determined? Is the function critical to national defense and, therefore, not subject to OMB Circular A-76?

C. Is i t more economical to contract? Has a commercial activity analysis been prepared?

d. If more economical in-house, but in-house personnel are not available, has an attempt been made to obtain ceiling adjustments?

e. Have you considered impact on shops caused by contract effort?

f. Are you organized to handle the contracting effort?

g. Have you made provisions for increasing staffing levels for the contract inspection, Facility Support Contract Manager (FSCM) functions, etc. to keep pace with contract growth?

h. Have you developed contract technical provisions that are clear and enforceable? Have standard Performance Work Statements been used?

i. Have the units of work been clearly defined?

j. Have you considered the timing of a contract award to spread the workload, as well as permitting future consolidation of contracts?

k. Have inspectors been trained in contractual requirements and do the inspectors have the type of expertise needed?

l. Have quality assurance plans been developed and utilized?

m. Have you discussed your contracting desires with other shore activities experienced in contracting or the geographical EFD serving your area?

n. Have you conducted a study of the area to be studied for contract to assure that it is operated as efficiently as possible (Most Efficient Organization (MEO).

16. SUMMARY. The decision to contract involves a myriad of factors and decisions. Be sure that all aspects of contracting have been considered and that the impact on the Public Works Department has been evaluated. Organizational changes necessitated by increased contracting must be initiated to complement the contracting effort.

CHAPTER 4

WORK CLASSIFICATION

1. FUNCTIONS AND FACTORS. Work Classification is a type of control that channels and prescribes the handling and management of each type of work from inception to completion and review and appraisal. Among the factors that determine appropriate work classification are the fund types involved; the probable job duration; the urgency, repetitive nature, or purpose of the work; and the customer type.

2. WORK CATEGORIES. The six work categories used are: (a) emergency work; (b) service work; (c) minor work; (d) specific jobs; (e) standing jobs; and (f) rework. These categories relate to labor class codes detailed in Chapter 5.

3. EMERGENCY WORK. This category of work (labor class code 02) covers emergency situations which require immediate action to:

a. Prevent loss or damage to government property.
b. Restore essential services that have been disrupted.
c. Eliminate hazard to personnel.

The category emergency is assigned to the work until the emergency situation has been alleviated. Generally this work will be charged against a job order number established for emergency work when charges are under 16 hours and against appropriate facility cost account numbers when over 16 hours. If the work can be planned and estimated prior to completion of the job, minors or specifics should be used for work over 16 hours. Generally this is not the case. Regardless of the document used to authorize the work, it should be coded emergency (LCC02). This includes all work required to cover the emergency. Work required to correct the situation after the emergency has been corrected should be processed according to the type of work involved. Emergency work is initially authorized on an Emergency/Service Work Authorization.

4. SERVICE WORK. Service Work (labor class code 01) is relatively minor in scope, can be accomplished within 16 labor hours, is not emergency work by nature, and does not exceed the established dollar limitation. Service Work is authorized on an Emergency/Service Work Authorization. For service calls with low labor hour requirements and high material requirements that exceed the Work Control Desk authority, the PWO/Staff Civil Engineer must decide the relative benefits of handling the work as a service call where the charges do not get placed against the end use cost account vice authorizing as a minor work order where the charges do get costed against the end account. It is also possible to issue the work as an E/S ticket with instruction to charge to an end use account number.

5. MINOR WORK AUTHORIZATIONS. Minor Work (labor class code 06) is work in excess of that authorized by an Emergency/Service Work Authorization, and less than that authorized by a Specific Job Order. Minor Work Authorizations are processed as described in Appendix B Procedure Charts 5 and 6. Minor Work is planned and estimated, using Engineered Performance Standards (EPS) where applicable, and scheduled on the Work Center Schedule Board. Costs are not collected on individual jobs, but are accumulated against a job order number

for each appropriate functional or cost account. If full job accounting is received, the work classification Minor Work is not used. This does not preclude the term scheduling minor described in Chapter 9.

6. SPECIFIC JOB ORDERS. Specific Job Orders (labor class code 07) authorize accomplishment of a specific amount of work. They are planned and estimated, scheduled, and individually cost accounted for financial and performance evaluation.

a. Processing. A Specific Job Order is processed as described in Appendix A, Procedure Charts 5, 7, and 8, A change in scope of work requiring either an increase or decrease will be processed in the same manner as the original Specific Job Order (See paragraph 13) specifically referencing the original order.

b. Types of Work. Specific Job Orders will be issued for the following types of work:

(1) Each job performed for another department, or field activity, that is individually authorized by a Request for Performance of Work (NAVCOMPT Form 2275). or its equivalent.

(2) All work on Harried Officers' Quarters where expenditure limitations require individual job cost accumulation (See NAVFAC P-930, Navy Family Housing Manual).

(3) Each job order issued to correct faulty work when, in the judgment of the Public Works Officer, the necessity for such work arose from faulty workmanship by Public Works Department Personnel. (see paragraph 8b)

(4) Jobs in excess of the Minor Work Authorization cut-off point. (See paragraph 6.c. below)

(5) Each job funded from other than Public Works funds for which separate accumulation of costs has been requested by the customer.

C. Cut-Off Point for Specific Job Orders. Specific Job Order minimum cut-off point must be determined by analysis that considers both the percentage of the work to be accounted for in detail and the relative administrative costs of processing individual Specific Job Orders. One objective is to establish adequate work force control at minimum cost. If the number of jobs in excess of the Emergency/Service Work Authorization cut-off point is not excessive, all of these jobs should be processed as Specific Job Orders, provided a heavy administrative workload is not created for the Fiscal. Office. If minor work authorizations are used, the cut-off point should not exceed 80 labor hours except under very unusual circumstances. It has been generally determined that, after deducting for emergency/service work, fixed assignments, leave, and other overhead elements, approximately 75 percent of the remaining work force should be subjected to the controls provided by individual job cost reporting procedures. This means that the larger jobs will be classified as Specific Job Orders. The remaining 25 percent of the work force will be used on smaller jobs classified as Minor Work Authorizations.

TABLE 4-1
Job Analysis

Activity A		
Percentage of hours and percentage of jobs in each range		
Labor hour range	Percent of total jobs	Percent of hours used
0 to 8	6.0	2.0
9 to 16	18.0	3.0
17 to 24	14.0	6.0
25 to 32	9.0	5.0
33 to 40	11.0	4.0
41 to 48	5.0	6.0
49 to 56	1.0	4.0
57 to 64	6.0	2.0
65 to 72	4.0	2.0
73 to 80	6.0	1.0
Over 80	20.0	65.0
	100.0	100.0
Cummulative percentages of number of jobs and force used on jobs requiring more than the designated hours listed in Column 1		
Labor hours	Cumulative percentage of jobs	Cumulative percentage of hours
Over 0	100.0	100.0
Over 8	94.0	98.0
Over 16	76.0	95.0
Over 24	62.0	89.0
Over 32	53.0	84.0
Over 40	42.0	80.0
Over 48	37.0	74.0
Over 56	36.0	70.0
Over 64	30.0	68.0
Over 72	26.0	66.0
Over 80	20.0	65.0
Activity B		
Labor hours	Cumulative percentage of jobs	Cumulative percentage of hours
Over 0	100	100
Over 8	95	99
Over 16	86	98
Over 24	72	96
Over 32	58	94
Over 40	53	91
Over 48	45	89
Over 56	42	86
Over 64	36	84
Over 72	34	80
Over 80	29	78
Over 88	25	76
Over 96	22	73

Table 4-1, Job Analysis, is a method of determining the cutoff point. It is based on an analysis of past workload. The amount of labor hours and number of jobs in each category are accumulated. This should provide sufficient data to determine a cutoff point lower than 80, if justified.

7. STANDING JOB ORDERS. Standing Job Orders (labor class codes 04 and 05) include all work that is highly repetitive and on which accumulated costs are desired. These job orders should include:

- Complete specification of work by job phase. (A job phase is the work which can be performed by one trade or craft without having to stop for work to be performed by another trade or craft,
- Frequency of the work listed,
- Exact location of work area,
- Type of equipment considered in the estimate,
- Estimate of labor hours by job phase,
- Time interval covered (such as month and quarter),
- Any pertinent information describing how the work was planned and estimated, and
- Proper accounting data, including add-on costs such as acceleration and contingency.

There are two types of Standing Job Orders: estimated (labor class code 05) and unestimated (labor class code 04).

a. Estimated. Examples of this type of work include janitorial service, trash and garbage disposal, and power plant watch standing. Estimated Standing Job Orders should include an exact work description, a clearly specified frequency cycle, and precise time and cost estimates.

It is cost advantageous to develop realistic labor and material estimates for these highly repetitive functions, based on Engineered Performance

Standards, when available, and job-site analysis. Estimated Standing Job Orders are usually issued on a quarterly basis but may be issued on a more or less frequent basis.

b. Unestimated. Unestimated Standing Job Orders cover repetitive work for which estimates cannot be prepared. Unestimated Standing Job Orders are usually issued on an annual basis. They are issued primarily as fiscal documents for accumulating total annual charges. Work should not be authorized for an Unestimated Standing Job Order that is basically service work in nature. For instance, individual Standing Job Orders should not be written for replacing window glass, replacing light bulbs, emergency repairs, or eliminating plumbing leaks. Charges against the work category Unestimated Standing Job Orders should be minimal.

All Standing Job Orders should be reviewed periodically by Public Works Management to determine:

- Necessity of the work authorized,
- Completeness of specification of work involved,
- Adequate frequency for type of functions performed,
- Reasons for labor hour variation from the estimate*, and
- Total maintenance force labor hour requirements.

8. REWORK. Rework (labor class code 40) is work necessary to correct faulty work. Rework requests may be initiated by any Public Works Department supervisor as well as by customers, and are routed to the Director, Facilities Management Engineering (FME) Division.

a. Approval. The Director, FME Division, and the Directors, Maintenance and Utilities Divisions, will jointly investigate the job or work in question and collect and submit all data, with their recommendations, to the Public Works Officer. The Public Works Officer will review all information available, decide the cause of the faulty work, and take -appropriate action if possible to prevent recurrence of the problem.'

b. Processing Rework Authorizations. Upon approval of the Public Works Officer, the FME Division will prepare a Specific Job Order to perform the rework. This Specific Job Order will be charged to the appropriate Division overhead account and should read, "Labor Class Code 40 except for other overhead." Processing of rework Specific Job Orders is identical to that for other Specific Job Orders.

9. OVERHEAD. Job Orders and/or Shop Control Numbers shall be issued to accumulate charges under the various overhead categories such as supervision, leave, and training. Functional, or cost account numbers, listed in the following paragraphs indicate those accounts for which overhead job orders are normally required. Further description and detail on these accounts is contained in Volume 2, Navy Comptroller Manual. Additional information regarding the cost and type of labor hour expenditures, for each of these job orders is obtainable through the use of Work Center Codes. Field activities requiring more detailed cost data than provided by these accounts, and by use of the codes mentioned, may issue additional job orders to identify segments of charges to each expenditure account.

10. JOB ORDERS FOR PUBLIC WORKS COST ACCOUNTS. At a minimum, a separate job order should be used for each of the following overhead items:

Cost Account	Description
7920-	Public works planning, estimating, scheduling, and inspection.
9120-	Public works engineering.
9130-	Administration of family housing.
9110-	Public works direction and general administration.
7910-	Public works maintenance shop overhead.
92AO-	Public works service shop overhead.
8810-	Utilities shop overhead.

11. TRANSPORTATION DIVISION WORK. All Maintenance Division work performed on transportation equipment will be charged against the specific type of equipment, and reported as soon as the work is completed. The following procedures will be used when the Maintenance Division accomplishes work for the Transportation Division.

a. Service Work. When transportation equipment work requires less than 16 labor hours, a Shop Repair Order (SRO) will be submitted to the Work Reception Clerk. The clerk will prepare an Emergency/Service Work Authorization, attach the SRO, and forward both to the proper work center. Upon completion of the work, the work center supervisor will enter the labor hours, and quantity of material used on the reverse side of the SRO and forward it to the shop planner. The shop planner will indicate the cost of labor and material and forward the SRO to the Transportation Division. The Emergency/Service Work Authorization will be processed as though it had no reference to transportation support.

b. Specific Job Orders. When Specific Job Order work (such as Transportation Division work requiring more than 16 labor hours) is involved, SROs for each piece of equipment will be submitted to the FME Division. When programming the work on the work input control charts, the FME Division Director should bear in mind that equipment downtime is expensive and is unfavorably reflected in transportation management reports. The FME Division and the Director, Transportation Division, should maintain a good working relationship to enable quick response to transportation needs without disrupting other maintenance work. Upon completion of work on each Specific Job Order, the SRO for the piece of equipment will be processed as outlined under Service Work. Upon completion of the Specific Job Order, it will be processed as indicated in Procedure Chart No. 9.

c. Reporting Labor Distribution Time. Labor costs for work performed on an Emergency/Service Work Authorization will be charged against the transportation standing job order number that appears on the SRO, and against Labor Class Code 01. Labor costs for Specific Job Orders will be charged, as usual, against the Specific Job Order number issued by Maintenance Control Division and on Labor Class Code 07. At activities where shop control numbers are assigned to Specific Job Orders for control purposes, the Transportation Division Standing Job Order Number appearing on the SRO will be used. At activities where shop control numbers are not used for control purposes, a Specific Job Order number will be assigned from a block which has previously been set aside for transportation equipment, and furnished to the Comptroller or Fiscal Division as appropriate.

12. SUPPLEMENTS TO AUTHORIZED WORK. A supplementary job order is issued for any portion of the work under a basic job order that is to be initially

charged to an accounting classification other than that shown on the basic job order. A supplementary job order may be issued under a specific or standing job order. A supplementary job order will contain a notation that it is "supplementary to job order number (basic job order number)." Thus, the fiscal office can relate costs under the supplementary job order to the basic job order to obtain the total cost.

13. AMENDMENTS TO AUTHORIZED WORK. Job order amendments should be restricted. An amendment reopening a closed job order will state that the original job order has been closed and the purpose for reopening, such as continuing work under the original job order, or accepting additional charges for work previously performed. An amendment that increases the dollar estimate will show the change by listing the previous total estimate, the amount of the increase or decrease, and the amended total estimate. Adjust only incorrect work center estimates so performance integrity is maintained.

When additional work exceeds-the financial limitation of the job and the work is customer financed, an amendment should reflect an increase in the contingency costs as well as the additional work costs. This maintains individual job order financial integrity. An amendment that changes the accounting classifications may be issued only if all charges, including charges previously recorded, are to be made to the new classification. If only some element of the work is to be charged to the new classification, a supplementary job order will be issued. If all future charges are to be made to the new classification, with no change required in previous charges, a new job order will be issued. A specific, standing, or supplementary job order may be amended for various reasons, including:

a. Reopening a closed job order.
b. Modifying the technical provisions.
c. Increasing or decreasing the scope.
d. Increasing or decreasing the dollar estimate.
e. Changing the accounting classification.

14. REQUESTING AMENDMENTS. Requests for amendments may be initiated at any level of supervision in the Maintenance or Utilities Divisions. They shall be channeled through the Director of the Maintenance or Utilities Division to the Facilities Management Engineering Division. The request should present all essential facts so that the amendment can be issued with the least investigation necessary. Work input on an important job in progress should not be interrupted; oral approval should be obtained in such instances, and the required paper work accomplished as soon as possible thereafter.

15. APPROVAL. The Director, Facilities Management Engineering Division, shall review all amendment requests. The Director shall also approve, if so authorized, or recommend that the Public Works Officer approve, requests for amendments when the facts justify this action.

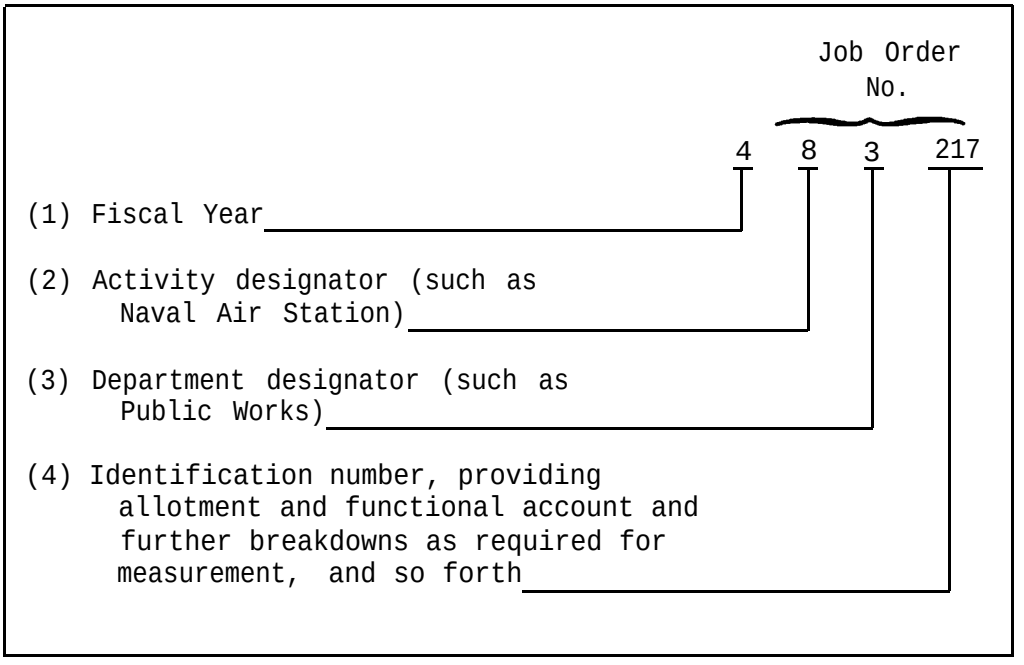
16. AMENDMENTS PREPARATION AND AUTHORIZATION. When amendments are approved, a new job order shall be prepared using the original job order number. To indicate that a revision has been made and to permit the Fiscal Office to change records accordingly, the new job order shall be marked with the letter A, after the original job order number, and shall be followed by the sequence number of the amendment; for example, 624-2032-A1. The suffix A1 is not used for job identification in any of the reporting procedures. It is used only to indicate the first revision to previously authorized work.

CHAPTER 5

JOB ORDER IDENTIFICATION AND CODING

1. JOB ORDER NUMBERS AND FISCAL REQUIREMENTS. Every Specific and Standing Job Order must be identified by a Job Order Number. The Navy Comptroller Manual states in part, "It is desirable to keep the number of digits in a job order to the minimum actually required in order to minimize the possibility of error and save time in writing the job order number or expenditure documents and in sorting such documents." This statement also applies when job order numbers are entered on the labor job time card, material requests, and other expenditure documents. For facilities management purposes more than seven digits are cumbersome. The Navy Comptroller Manual also states in part, "No navy-wide plan of numbering job orders is prescribed because of the variations of requirements in the various naval activities . . . Generally, all that is required fiscally is a number that will distinguish a job order from all other job orders at the activity and provide an index to the job order itself or to the master card that contains all of the detailed accounting information. Therefore, the number will include in its structure a serial number which by itself or in combination with other codes in the number will satisfy fiscal needs ..." (See Table 5-1).

TABLE 5-1
Make-up of Job Order Number



2. LABOR CLASS CODES. Labor Class Codes are two-digit numbers that represent various categories of overhead and productive work. The following Labor Class Code designations are standard:

a. Productive. The following Labor Class Codes are designated productive labor:

(1) 01 Service Work
(2) 02 Emergency Work
(3) 03 Preventive Maintenance Inspection
(4) 04 Standing Job Orders - Not Estimated
(5) 05 Standing Job Orders - Estimated
(6) 06 Minor Work Authorizations
(7) 07 Specific Job Orders

b. Direct Shop Overhead. The following Labor Class Codes are designated overhead:

(1) 40 Rework
(2) 41 Supervision
(3) 42 Shop Indirect
(4) 43 Allowed Time
(5) 44 General Office and Clerical
(6) 45 Leave

c. Indirect Overhead. The following Labor Class Codes are designated indirect overhead:

(1) 60 Facilities Management Engineering Division (less facilities support contracting if assigned)
(2) 61 Engineering Support
(3) 62 Administration Support
(4) 63 Indirect Overhead Leave (Statistical 15 percent of 60, 61, & 62)
(5) 64 Facilities Support Contract Administration
(6) 65 Special Project Development
(7) 66 Miscellaneous

3. LABOR CLASS CODE DEFINITIONS/DESCRIPTION

a. Productive

(1) 01 Service Work. This code is applied to all productive nonemergency work performed under Emergency/Service Work Authorizations.

(2) 02 Emergency Work. This code identifies all labor required to correct or repair a condition caused by a breakdown or an emergency. It is not restricted to that portion accomplished under an Emergency/Service Work Authorization, but includes all labor subsequently authorized on other work documents.

(3) 03 Preventive Maintenance Inspection (PMI). This code identifies time expended performing preventive maintenance inspections as defined in NAVFAC MO-322, Volume I. The job orders authorizing this work are a form of standing job orders.

(4) 04 Standing Job Orders - Not Estimated. This code identifies all productive work authorized on a Standing Job Order that has not been estimated, as defined in paragraph 7.b of Chapter 4.

(5) 05 Standing Job Orders - Estimated. This code identifies all productive work authorized on Standing Job Orders and that has been planned, estimated, and scheduled. Emergency/Service Work Authorizations, PMI, and Minor Work Authorizations are not included in this code.

(6) 06 Minor Work Authorizations. This code identifies al.1 productive labor authorizations as defined in paragraph 5, Chapter 4.

(7) 07 Specific Job Orders. This code identifies all productive labor authorizations as defined in paragraph 6, Chapter 4.

b. Direct Shop Overhead

(1) 40 Rework. This is all labor used to correct faulty Public Works Department work regardless of the code previously applied. Faulty work includes not only such items as faulty craftsmanship, but also such things as a design error on the part of the PWD Engineering Division. If the faulty design was made by someone other than the PWD, then Labor Class Code 40 would not be appropriate.

(2) 41 Supervision. This includes all supervisory personnel and that part of a leader's time while on supervision.

(3) 42 Shop Indirect. This code identifies the following types of labor:

(a) Productive personnel not directly chargeable to productive work, including shop planners.

(b) Time spent by work center personnel on the maintenance and repair of Public Works Department shop equipment and power tools.

(c) Time expended by Public Works Department personnel in materials handling duties. Included is the time spent by non-supervisory and clerical personnel who store and issue materials.

(d) Productive personnel time when cleaning their work areas. It does not include work assigned to a regular janitorial force.

(4) 43 Allowed Time. This code identifies the following labor types:

(a) Nonproductive time required for official business. It includes such items as training classes, safety meetings, medical attention, physical examinations, blood donations, participation in charity and bond campaigns, shop committee meetings, and appointments concerning personnel problems.

(b) All time of 0.2 hours (12 minutes) or more required to cover time lost by personnel waiting for materials, tools, parts, equipment (including equipment breakdown), transportation, completion of work by other crafts, and security or safety clearance.

(c) Nonproductive time such as administrative leave, excused tardiness, and time lost in excess of 0.2 hours as a result of inclement weather when in a pay status. This code also includes mandatory pay time for employees reporting for duty but sent home because of inclement weather.

(d) All productive time in excess of 0.2 hours that is lost while employees are waiting work assignment. Also the time lost during the course of a job while waiting clarification of, or changes in, the scope of the work caused by errors of omission or commission by the public Works Department. Delays caused by changes requested by customers shall be charged to the customer's job and recorded as productive time.

(5) 44 General Office and Clerical. This code will be used by Maintenance or Utilities Divisions to identify graded personnel who are on the roster of the Maintenance or Utilities Divisions, but not those personnel assigned to the Maintenance or Utilities Divisions who are on the roster of the Administrative Division.

(6) 45 Leave. This code identifies all approved absences for annual, terminal, sick, and military leave, holiday pay, jury duty, and all other leave for which pay is received.

C. Indirect Overhead

(1) 60 Facilities Management Engineering Division. This includes all FME Division effort supporting the direct maintenance/utilities forces and facilities control function. It does not include effort relating to facility support contracts, special project development or productivity analysis.

(2) 61 Engineering Support. Engineering effort supporting maintenance control function and maintenance/utilities shop forces.

(3) 62 Administrative Support. Effort related to administrative actions supporting FME function and maintenance/utilities shop forces. This can be a statistical entry based on workload study if accounting is a problem.

(4) 63 Indirect Overhead Leave. Statistical entry for labor control report based on 15 percent of hours included in codes 60, 61, and 62 or actual charges if readily available.

(5) 64 Facility Support Contract Administration. Effort related to preparing and administering facility support contracts.

(6) 65 Special Project Development. Effort related to preparing Special Projects.

(7) 66 Miscellaneous. Effort accomplished by engineering/facilities management engineering not included in items 60-65.

The inclusion of indirect overhead in the review process gives public works managers a truer picture of the cost of doing business. This information is critical in determining overall efficiency. Indirect overhead can have a major impact on public works competitiveness under the commercial activities program. The labor class codes have been provided to permit full

accountability of the engineering and facilities maintenance engineering function. Additional labor class codes could be established to determine administrative support provided. For simplicity it is recommended that a one time study updated annually be conducted to determine anticipated monthly charges.

4. APPLICATION. The Labor Class Code is recorded on the Daily Time and Labor Distribution Card, NAVFAC Form 7400/1 (See Figure 5-1 and Procedure Chart 9, or other appropriate daily records). The Labor-Class Code must be entered each time a Job Order Number or Shop Control Number is entered on the time cards.

5. INITIAL WORK AUTHORIZATION. Assistance in determining proper Labor Class Codes will be provided by the FME Division. The FME Division will indicate codes to be used for all productive work, and for rework, on the face of the work authorization document. Figure 5-2 is an example of a Work Authorization/Estimate.

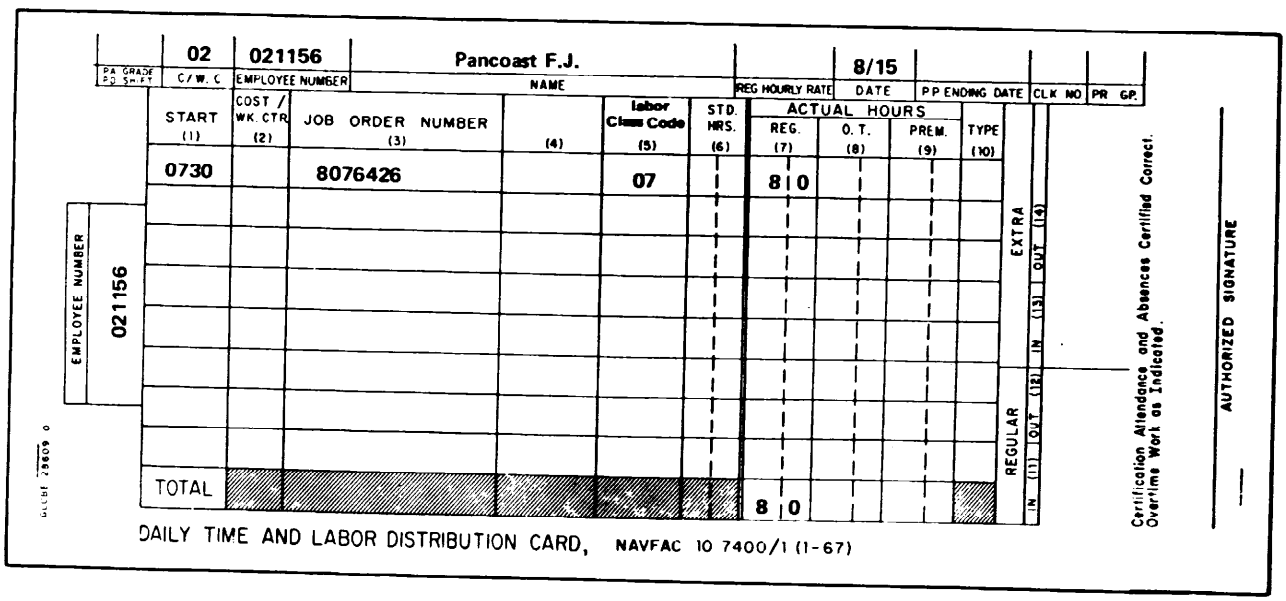
6. MASTER JOB ORDERS FOR HOUSING. Where costs must be accumulated by functional accounts and/or group classification of work (for example, certain types of quarters for which NAVFAC P-930, Navy Family Housing Manual, establishes expenditure limitations), some job order paper work can be reduced to a single master job order. This job order will cover several functional accounts performed simultaneously, or which are based on the same work request or inspection report. For example, all of the work shown in Table 5-2 normally would be written up as seven separate job orders, but may be combined into one job order as follows:

a. Issue one master job order with two digits reserved for group classification (group code) in the master job order number.

b. An additional column (See Figure 5-3) should then be drawn on the job order so that the two-digit group code (See Table 5-2) can be entered opposite each item of work.

NOTE: The shops would thus receive one document specifying all the work to be accomplished and identifying the particular job order number and functional account to be used for each job. All labor and materials for a particular job would be reported by the master job order number (Table 5-3) adjusted for the particular group classification code for the 00 digits reserved in the master job order number for this purpose. For example, the job order number for "roof repair" would be 48042122; similarly, the job order number for "trimming shrubs" would be 48043222. Only one Labor Class Code should be applied to the master job order and the component jobs. This should be the labor class code of the predominant job. Activities may adapt all or portions of this method provided it is compatible with the local fiscal office accounting capabilities.

7. SUPERSEDING WORK AUTHORIZATIONS. Emergency/Service Work Authorizations have a 16 labor hour limitation. If work time exceeds this limitation, the original Emergency/Service Work Authorization is to be superseded by other appropriate authorizations. In assigning Labor Class Codes, the superseding work authorization for an emergency must be coded 02-Emergency. and not OS-Estimated Standing, 06-Minor, or 07-Specific, because it is essential to accumulate the total hours expended in correcting conditions classified as emergency as defined in paragraph 3, Chapter 4.



PA GRADE PO SHIFT	C/W. C	EMPLOYEE NUMBER	NAME	REG HOURLY RATE	DATE	PP ENDING DATE	CLK NO	PR GP.
	02	021156	Pancoast F.J.		8/15			

START (1)	COST / WK. CTR (2)	JOB ORDER NUMBER (3)	(4)	Labor Class Code (5)	STD. HRS. (6)	ACTUAL HOURS REG. (7)	O. T. (8)	PREM. (9)	TYPE (10)
0730		8076426		07		8 0			
TOTAL						8 0			

EMPLOYEE NUMBER 021156

REGULAR: IN (11) OUT (12) IN (13) OUT (14)

EXTRA

Certification Attendance and Absences Certified Correct. Overtime Work as Indicated.

AUTHORIZED SIGNATURE

DAILY TIME AND LABOR DISTRIBUTION CARD, NAVFAC 10 7400/1 (1-67)

FIGURE 5-1
Daily Time and Labor Distribution Card (NAVFAC 7400/1)

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)

NAVFAC 1100/4(Rev 10-70) S/N 0105-LF-000-7110
Supersedes NAVFDOCES 3333 and 3336

Instructions for completing form are contained in NAVFAC MO-321

1. JOB ORDER NO.: 50-001-84

1. ACTIVITY: U.S. NAVAL STATION

2. ACTIVITY CODE: 00188

4. ESTIMATE NO.:

5. REQUESTED STARTING DATE: 7/84

6. PRIORITY: 3

7. INSPECTION DESIGNATED: [ ] YES [X] NO

8. FACILITY NO: 14

9. EQUIPMENT NO.:

10. MPI CAT CODE: 44110

11. COST ACCOUNT CODE: 7140

12.

13.

14.

15. NAVY ACCOUNTING DATA

a. APPROPRIATION SYMBOL AND SUBHEAD	b. OBJECT CLASS	c. BUREAU CONTROL NUMBER	d. AUTH. ACCOUNTING ACTIVITY	e. TRANS CODE	f. PROPERTY ACCTS. ACTIVITY	g. COST CODE
17x4912.1983	25	77777	00188	2F	00188	

16. FOR FURTHER INFORMATION CALL (Name and telephone): JIM JONES 69148

17. SKETCH/PLAN ATTACHED IF "YES" INDICATE NUMBER: [X] YES 123456 [ ] NO

18. LABOR CLASS CODE (Always for emphasis): 07

19. JOB TITLE: BUILDING NO. 14 CONVERT EAST END FOR OFFICE USE.

20. GENERAL JOB DESCRIPTION: 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

a. BREAKDOWN OF WORK

JOB PHASE NO. (1)	WORK CENTER (2)	DESCRIPTION (3)	EST. HOURS (4)
		SEE CONTINUATION SHEET	

b. SUMMARY OF ESTIMATE

WORK CENTER (5)	LABOR HOURS (6)	LABOR (7)	MATERIAL (8)	TOTAL ESTIMATE (9)
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
c. CONTINGENCY				
d. OVERHEAD AND/OR SURCHARGE				
e. GRAND TOTAL				

22. DISTRIBUTION

MCO	2	SCHED	2				
ADP	1						
MAINT	6						

23. AUTHORIZED WORK TO BE PERFORMED (Signature): H. BETZ

TITLE: FMED

DATE: 4-12-84

1 of 3

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)
CONTINUATION SHEET

NAVFAC 1100/4(Rev 10-70) S/N 0105-LF-000-7110
Supersedes NAVFDOCES 3334 and 3337

1. JOB ORDER NO.: 8073456

2. ESTIMATE NO.: 50-001-84

2. JOB PHASE NO.	4. WORK CENTER	5. DESCRIPTION	6. EST. HOURS
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

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)
CONTINUATION SHEET

1 JOB ORDER NO: 8073456
3 ESTIMATE NO: 50-001-84

3 JOB PHASE NO	4 WORK CENTER	5 DESCRIPTION	6 EST. HOURS
7	CAR	INSTALL 1/4" PLYWOOD FOR FLOOR TILE BASE. INSTALL VINYL ASBESTOS	72*
		FLOOR TILE (1800 SF). INSTALL NEW SHOE MOLDING AROUND ENTIRE WALL	
		IN OFFICE.	
8	PPE	INSTALL WATER COOLER AND (2) 10 SECTION RADIATORS.	6*
9	MTL	INSTALL ALUMINUM AWNINGS OVER WINDOWS ON EAST SIDE AND SOUTH SIDE	11*
		OF OFFICE (4 AWNINGS)	
10	PNT	SPACKLE AND TAPE PARTITION ON BOTH SIDES--TWO COAT SPACKLE. PAINT	62*
		INTERIOR WALLS, CEILING, SPRINKLER PIPES, AND RADIATORS AS SHOWN	
		ON DRAWINGS (ALL (2) COAT WORK).	

3 of 3

FIGURE 5-2 (Cont.)
Work Authorization/Estimate

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)

3 JOB ORDER NO: 2804-22

1 ACTIVITY: U.S. NAVAL STATION
2 ACTIVITY CODE: 00188
4 ESTIMATE NO: 50-002-84
5 REQUESTED STARTING DATE: 12-84
6 PRIORITY: 3
7 INSPECTION GENERATED: YES [ ] NO [X]
8 FACILITY NO: 14
9 EQUIPMENT NO: 425
10 RPI CAT CODE: 44110
11 COST ACCOUNT CODE: 7140
12
13
14

15 NAVY ACCOUNTING DATA

a APPROPRIATION SYMBOL AND SUBHEAD	b OBJECT CLASS	c BUREAU CONTROL NUMBER	d AUTH ACCOUNTING ACTIVITY	e TRANS CODE	f PROPERTY ACCTG ACTIVITY	g COST CODE
17x4912.1954	25	77777	00188	2F	00188	

16 FOR FURTHER INFORMATION CALL (Name and telephone): JIM JONES 69148
17 SKETCH/PLAN ATTACHED IF YES INDICATE NUMBER: [X] YES 123456 [ ] NO
18 LABOR CLASS CODE (Except for overhead): 07
19 JOB TITLE: CHANGE OF OCCUPANCY REHAB.
20 GENERAL JOB DESCRIPTION: CHANGE OF OCCUPANCY REHAB.-QUARTERS A MUST BE COMPLETED BY 28 JAN 1966.

21 ESTIMATE

a BREAKDOWN OF WORK

JOB PHASE NO (1)	WORK CENTER (2)	GROUP CODE (3)	DESCRIPTION (2)	EST HOURS (4)
	02	22	PAINT INTERIOR	150
	02	22	PAINT EXTERIOR	30
	01R	21	REPAIR ROOF	5
	91	34	REPLACE GARAGE DOOR	10
	34	33	REPAIR SIDEWALK	5
	32	32	TRIM SHRUBBERY	40
	01F	61	REPAIR FURNITURE	5
	51	64	REPAIR BOILER	5

b SUMMARY OF ESTIMATE

WORK CENTER (5)	LABOR HOURS (6)	LABOR (7)	MATERIAL (8)	TOTAL ESTIMATE (9)
82	188*	540	170	710
01R	15*	45	55	100
34	5*	15	15	30
32	40	80	0	80
01F	5*	15	55	70
51	5	16	5	21
TOTAL	250*	711	300	1011
c CONTINGENCY				
d OVERHEAD AND/OR SURCHARGE				
e GRAND TOTAL				1011

22 DISTRIBUTION

MCO	2	SCHED	2				
ADP	1						
MAINT	6						

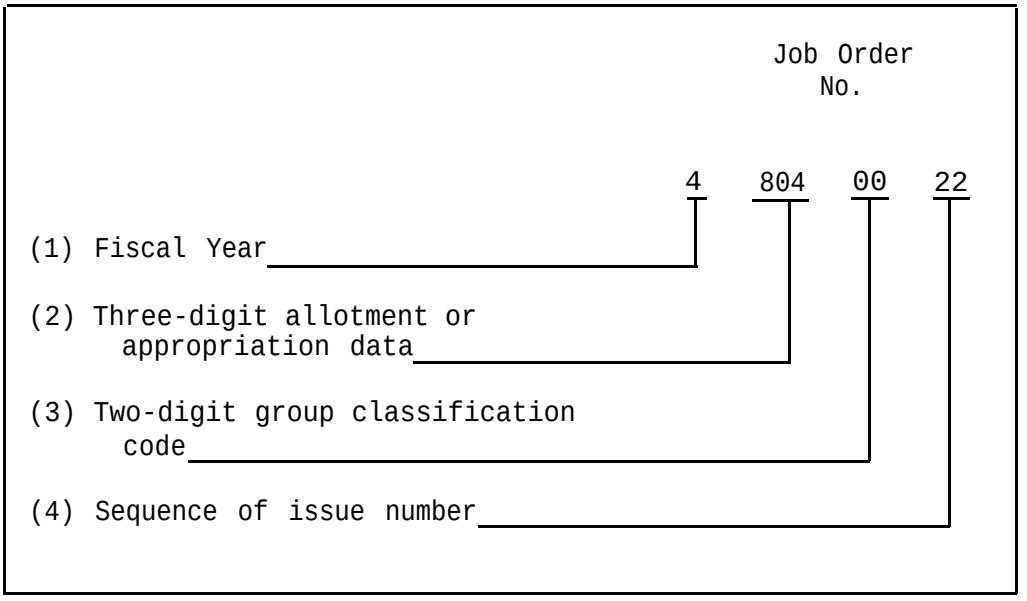
23 AUTHORIZED WORK TO BE PERFORMED (Signature): H. BETZ
TITLE: FME
DATE: 10-12-84

FIGURE 5-3
Job Order for Multiple Expenditure Accounts (Housing)

TABLE 5-2
Identification of Job Orders

No.	Work	Functional Account	Group Classification	Group Code
1	Paint	44551	2b	22
2	Repair roof	44551	2a	21
3	Replace garage door	44573	3d	34
4	Repair sidewalk	44761	3c	33
5	Trim shrubs	44790	3b	32
6	Repair furniture	44120	6a(1)	61
7	Repair boiler	44688	6b(1)	64

TABLE 5-3
Job Order Structure (Housing)



8. DIVISION AND BRANCH CODES. Because of variation in the types of work performed, work center codes standardization is not practical. However, it is practical and desirable to have Branch Codes standardization to facilitate cost accounting procedures. Table 5-4 groupings establish branch codes uniformity.

9. WORK CENTER CODES. Work Center Codes are two-digit numbers representing organizational Public Works Department segments and subdivisions and are assigned on a functional or craft basis. They provide a means of identifying sources of changes on work authorization documents.

TABLE 5-4
Branch Code Standardization

Codes 00 - 49 Maintenance Division
Codes 50 - 59 Utilities Division
Codes 90 - 99 Office Divisions
- Administrative
- Facilities Management Engineering
- Engineering
- Housing

Maintenance Division

Building Trade Branch	00
Metal Trade Branch	10
Electrical Trade Branch	20
General Service Branch	30
Administrative Branch-Maintenance Division	45

Utilities Division

Administrative Branch	50
Generation Branch	51
Distribution Branch	52

Office Divisions

Administrative	90
Facilities Management Engineering	91
Engineering	92
Housing	95

10. ESTABLISHING WORK CENTERS. Work Centers are normally composed of personnel engaged in the same type of work. These personnel are considered an organizational unit for personnel availability determinations, and for scheduling and work performance evaluations. Because Work Centers are considered reference points for work performance evaluation, it is desirable that a work center be established for personnel engaged in the same type of work. It must be recognized, however, that administrative support costs increase directly in relation to the number of Work Centers used. For this reason, it is not desirable to divide commonly combined trades into individual Work Centers, unless this will result in the assignment of five or more personnel in each Work Center. For example, the carpentry supervisor frequently controls carpenters, joiners, and roofers. Division of this group into three Work Centers is not justified unless there will be at least five craftsmen in each Work Center. In general, formal work centers should not be established below the foreman level and each shop employee should be assigned to a work center.

11. SUBDIVIDING WORK CENTERS. Although the number of personnel assigned to various crafts may not justify the official designation of separate Work Centers, alphabetical subdivisions may be used to assist in work programming and scheduling. Work Center Codes may be subdivided as shown in Table 5-S.

TABLE 5-5
Work Center Subdivision

Building Trade Branch	00
Carpentry	01
Carpenters	01C
Millmen	01M
Roofers	01R
Painting	02
Wharf Builders	03
Masonry	04
Rigging	05
Metal Trade Branch	10
Plumbing & Pipefitting	11
Plumbing	11P
Pipe & Stream Fitting	11S
Welding	12
Sheetmetal	13
Electrical Trade Branch	20
Electrical-Inside	21
Electrical-Linemen	22
Refrigeration & Air-Conditioning	23
General Service Branch	30
Janitorial	31
Grounds-Labor	32
Refuse & Trash Collection	33
Ground Structures-Labor Etc	34
Emergency/Service Branch	40
(Becomes Work Center at small activities)	
*Administrative Branch-Maintenance Division	45

* Should include all clerical personnel of the Maintenance Division, and all supervisors and shop planners associated with more than one work center.

CHAPTER 6

WORK GENERATION

1. METHODS FOR CORRECTING MAINTENANCE AND REPAIR DEFECIENCIES. Planned shore facilities inspection is the principal work generation method for upkeep of facilities. Inspections are planned, scheduled, and systematically Performed by qualified Public Works Department inspectors and operators. In-house capability is augmented by specialists, (such as boiler or elevator inspectors), specialized inspections conducted through EFDs and contract inspection. Other work generation methods include observations by personnel who are not part of the prescribed group of public works department inspectors and operators, such as tenants and military inspections.

2. SHORE FACILITIES INSPECTION SYSTEM. The Shore Facilities Inspection System deals with existing facilities and equipment. It identifies deficiencies and initiates corrective action to bring these facilities and/or equipment up to a desired condition. Properly administered and supported, these inspections should detect deficiencies in early stages of development, reduce the number of breakdowns and cost of repairs, provide for a more constant flow of important repair deficiencies for correction by shops or contract, and permit better planning for utilization of labor and material through predetermination of forthcoming work. This inspection system is not concerned with requirements for new construction, addition, expansion, extension, or improvements that may be considered desirable or necessary as a result of changes in the mission of the activity or changes in operational procedures except where the above influences the level of maintenance to be performed. Shore facilities inspection should be performed by personnel familiar with the facilities and equipment to be maintained, who know the accepted condition standards and guides, and who operate on a planned schedule. The full benefits of the facilities management system are realized when the maximum amount of repair work results from inspection. Administration of planned inspections is the responsibility of the Work Generation Branch Manager under the Director, Facilities Management Engineering Division. See NAVFAC MO-322, Inspection of Shore Facilities, for Complete information regarding the Shore Facilities Inspection System.

3. CATEGORIES OF SHORE FACILITIES INSPECTION. There are four inspection categories: Operator Inspection, Preventive Maintenance Inspection, Control Inspection, and Specialized Inspection.

a. OPERATOR INSPECTION. Operator inspection consists of examination, lubrication, and minor adjustments of equipment and systems for which the Public Works Officer is responsible and to which a specific operator is assigned. Frequency and details of the inspections should be contained in standard operating procedures developed for the operator. Deficiencies beyond the capacity and authority of the operator should be reported to the cognizant supervisor or to Work Reception and Control.

b. PREVENTIVE MAINTENANCE INSPECTION (PMI). PMI is the examination, lubrication, minor adjustment, and minor repair of equipment and systems for which a specific operator is not assigned. PMI is concerned primarily with items that, if disabled, would (1) interfere with an essential operation of the field activity, (2) endanger life and/or property, -or, (3) involve high

cost or long lead-time for replacement. Generally, PMI should be performed by shop personnel under shop supervision. It is the basic responsibility of the inspection function to determine what is to be inspected and how often. Such determinations would normally be made with advice and assistance of the shop personnel, Navy publications, and manufacturer's brochures involved. Breakdowns should be reported immediately to the cognizant supervisor or to work reception and control. Deficiencies found are reported in deficiency reports to the appropriate personnel through the inspector's supervisor. Functions of the inspection personnel include reviewing reported deficiencies, initiating further action if required, and evaluating, at the time of Control Inspection, the effectiveness of the PMI program.

c. CONTROL INSPECTION. Control Inspection is a scheduled examination and/or test of shore facilities to determine the physical condition with respect to the required level of maintenance. Control Inspection objectives are: (1) to provide for examination of all shore facilities items not covered by Operator Inspection or PMI, (2) to assure adequacy of Operator Inspection and PMI, (3) to obtain a reduction in the number of equipment breakdowns and cost of repairs, (4) to provide an evenly balanced flow of work to the Operating Division or contractors, (5) to allow improved planning for utilization of labor and determination of material requirements, and (6) to detect and reduce over-maintenance. Control inspection is performed by inspection personnel assigned to either the Inspection Branch or Planning & Estimating function, or made by others under the supervision of the FME Division when these personnel are not available. Control Inspectors do not make adjustments on equipment, but shall report deficiencies to the Branch Manager. Breakdowns-shall be reported immediately to the cognizant supervisor, or to the Work Reception and Control Branch. To classify and document deficiencies at the time of inspection, use Inspector's Report identified in MO-322 Volume 1. Emergency/Service and Minor Work information should also be recorded on the Inspection Report. When Inspection Reports are complete, the Branch Manager retains the summary sheet for control purposes and processes the Inspector's Report. The Facilities Management Engineering Director should review the Inspection Summaries; accept, correct, or reject; and forward for posting on Work Input Control Charts and for work authorization.

d. SPECIALIZED INSPECTION. Specialized Inspection is a scheduled examination of systems or components that require specialized expertise or equipment to determine condition. The Specialized Inspection program is administered by EFDs. Examples of Specialized Inspections are:

(1) Moisture detection in built-up roofing
(2) Under-water inspection of waterfront facilities

Results of Specialized Inspection should be integrated with findings of the Control Inspection program to determine overall facility condition.

4. NON-INSPECTION WORK GENERATION. Work generated by this method includes work requests (see Figure 6-1) made by personnel other than designated operators or inspectors. For emergency or breakdown situations, it includes the report made to the work receptionist. Written requests involving emergencies and breakdowns need no controls other than those prescribed in

WORK REQUEST (MAINTENANCE MANAGEMENT)
NAVFAC 9-11014/20 (REV. 2-68) S/N-0105-002-7510
Supersedes NAVDOCKS 2351

(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.
[X] APPROVED. PROGRAMMING TO START IN Based on priority by 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 *(Check one if other than PW funds are involved)*
[ ] NAVCOMPT 140 [ ] OTHER

20. WORK REQUESTED
[ ] HAS BEEN CANCELLED [ ] HAS BEEN DEFERRED [ ] WILL BE PERFORMED BY OTHERS

21. SIGNATURE	22. DATE

Figure 6-1
Work Request (NAVFAC 9-11014/20)

Procedure Chart 5. Oral and telephone reporting procedures, and the publicizing thereof, can approximate those established for reporting fires. The following controls are applicable to generating work other than emergencies or breakdowns.

a. Established Channels. Maintenance work may be generated through established channels as a result of various programs such as safety, utilities management, fire prevention, security, and transportation Shop Repair Orders. Shop Repair Orders (SRO) prepared by the Transportation Division for Maintenance Division performance should be submitted to the FME Division and processed as customer work requests.

b. Military Inspections. Military inspections, which are standard practice at most activities, fulfill an important function as a command audit of the physical plant. Maintenance work that is generated should be compared with existing inspection reports and then processed through standard work input control channels. It is essential that Commanding Officers recognize that planned shore facilities inspection is an integral part of good facilities management. This recognition of shore facilities inspection as the first line of attack against substandard shore facilities conditions will provide substantial support to the facilities management system.

5. FORMS AND PROCEDURES. The use of forms and adherence to procedures provides a measure of control. Requestors must furnish required information for Public Works Department review and action (see Procedure Chart No. 1 and Figure 6-1). Processing a work request requires considerable preliminary action, thus ruling out the likelihood of haphazard or spur-of-the-moment requests.

6. MAINTENANCE LIAISON REPRESENTATIVES. The designation and use of maintenance liaison representatives is most important.- These are personnel of departments, divisions, or other components within the activity, or other activities, through whom requests for maintenance work are channeled for review and verification prior to submission to the Public Works Department. Availability of funds, duplicate requests, necessity for the work (unless apparent), requested completion dates, compliance with procedures, and so forth, are matters that should be looked into, and properly checked within the requesting unit, before an official request is made. To minimize confusion, it is advisable for customers to publicize internally who their liaison representatives are and that contact with the PWD must be through those representatives.

7. CUSTOMER RELATIONS. The Public Works Department, as a service organization, should maintain good relations with all customers. A key to good customer relations is through judicious Work Request processing (Figure 6-1). There are three important steps that can be taken to establish and maintain proper customer relations:

a. The customer should be notified of the date a cost estimate will be received when more than one week will be required to prepare the estimate.

b. It is only natural for a customer to be interested in the time that the work will be performed. Since the exact starting and completion dates of some jobs cannot be firmly established until all material is on hand and the

job has been scheduled, it may be difficult to predict realistic completion dates. However, status information from the Work Input Control Charts can be used to fairly accurately predict the estimated starting date of requested work. Customer knowledge of the PWD priority system will aid in accepting less than immediate action on requests.

c. Many questions can be eliminated by providing status information to customers on a recurring basis. The use of word processing or ADP has simplified this process.

8. REPETITIVE REQUIREMENTS. Maintenance and operation service performed to meet certain highly repetitive needs, such as garbage disposal, custodial services, and watch standing are authorized for prescribed time periods such as quarterly or annually.

CHAPTER 7

WORK INPUT CONTROL

1. SCOPE. Work Input Control provides basic planning and work status information from work inception to its termination or completion. It includes the actions of screening individual jobs for necessity, determining the relative urgency and programming them through the planning phases, authorizing the work, maintaining a balanced and adequate workload in each work center, keeping informed on job status, and assuring proper job completion. The procedures outlined in this chapter furnish guideline information for establishing a Work Input Control System. Work Input Control procedures aid in Public Works Department management. Work programming must be an orderly process balancing items required for day-to-day operations of the activity with priority items required by safety, operations, or urgency of repair. Although priority systems are utilized, they generally, serve only to assure high priority items are handled expeditiously. The majority of the work accomplished by the Public Works Department is of about equal priority in the broad sense. If the maintenance and repair work has been gene rated by inspect ion, priorities are substantially easier to determine. Paragraph 14 describes a method to develop priorities.

Individual categories of work can be handled as a unit. For example, alteration work can be controlled by establishing target dollar amounts for a year. A station planning board can then prioritize the requests with all work within the target amount accomplished. Maintenance and repair resources should be directed to accomplishing the highest priority repairs on the highest priority facilities. This generally does not mean that some facilities receive no maintenance. What generally occurs is that various facilities are maintained at different levels of maintenance. These determinations cannot be made at a navy-wide level. It is based on the mission and overall condition of a particular activity.

2. RESPONSIBILITY. Work Input Control, the control of work processed to engineering, inspection, planning and estimating and/or shops, is the Facilities Management Engineering Director's responsibility but subject to review and approval by the Public Works Officer, or the PWO's designee. Many of the decisions required must take into consideration total resource availability and frequently involve several Public Works Department divisions. At large field activities active participation in and review of the work input control system would normally be the responsibility of the Assistant Public Works Officer, while at small activities the Public Works Officer would serve as the coordinator.

3. WORK RECEPTION AND CONTROL. Work Reception and Control screens, classifies, and records all incoming maintenance work requests, including: controlling the step-by-step processing of work requests, inspection reports, job orders, and posting and maintaining work progress/job status charts; and maintaining inspection and work order files. Because of the continuing need for ready access to records and data by the Facilities Management Engineering Division, logical placement of the Work Reception and Control functions is in the FME Division. Additionally, this branch controls job order flow within FME Division and to the shops Divisions as well as assistance required from the Engineering Division. Details of processing work requests are provided in Appendix B (Charts 1-4).

4. CHECKING AND CORRECTING REQUESTS. Incoming work requests take various forms. When submitted in writing, prescribed NAVFAC forms should be used. The Work Reception and Control Branch should arrange for correction of obvious work request errors or omissions. Maintenance and repair work requests should be checked against the most recent inspection report for need verification and to assure the work has not already been planned for accomplishment.

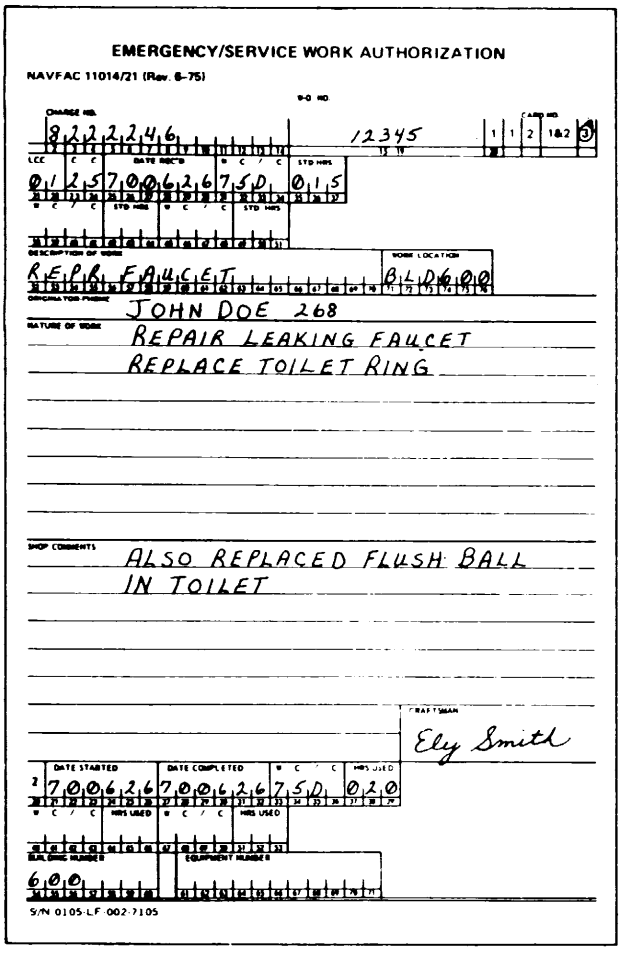
5. CLASSIFYING, IDENTIFYING, AND RECORDING. The Work Reception and Control Branch must classify each incoming work request. The various work classifications are described in Chapter 5. Job order identification will be made, where applicable, and must be accurate because cost controls and management reports are keyed to this number. A work reception log should be maintained for those jobs pending approval, or programming, on work input control charts. This log should provide positive job order status and permit quick reference to transactions processed by the Work Reception and Control Branch. The log entry should be deleted when the work has been either accepted for programming and posted on the work input control chart, or denied. The file may consist of work request copies retained in a folder or of postings to charts.

6. E/S WORK RECEPTION. The Facilities Management Engineering Division is responsible for Emergency/Service Work reception. The Work Reception and Control Desk will prepare the Emergency/Service Work Authorization Form, NAVFAC 11014/21 (Figure 7-1) and distribute for accomplishment. Performance of the assigned function require that it be an around-the-clock operation. Alternate points, such as the public Works Duty Office, or other 24-hour service locations, may be used after working hours to receive and process emergency calls. When public works personnel are unable to gain entry to a job site, especially if it is in a dwelling, a Call Notice, NAVFAC 11014/28 (Figure 7-2) should be placed in a conspicuous location. This requirement is especially important if the personnel are responding to an E/S call, because this type of work should be accomplished promptly.

7. SCOPING ESTIMATES. The Work Management Branch, at activities where the Public Works Department supports customer commands, should have a scoping planner and estimator assigned to provide cost estimates in an expeditious manner using unit cost information. Normally PWLAs would have scoping planner and estimators assigned. Chapter 8 provides additional scoping estimates information.

8. SCHEDULING. It is as important to schedule overhead components of the Public Works Department as it is to schedule the shops. These components may require coordination with other departments, and occasionally other actions such as Station Planning Board reviews will be required before any action can be taken. Scheduling of overhead components should be based on the job requirements and status chart. Individual overhead branch managers should provide detailed schedules of their branch's workload.

9. RELATIVE URGENCY FOR ACCOMPLISHMENT. Upon decision that the work should be accomplished within twelve (12) months, the relative importance of that particular job to all other known work must be determined. Each facility at an activity should be assigned a Level of Maintenance Classification Code (see Table 7-1 and also NAVFAC MO-322, Volume 1) that considers the relationships of the facility to the activity mission. This determines authorization and work programming priority.



EMERGENCY/SERVICE WORK AUTHORIZATION

NAVFAC 11014/21 (Rev. 8-75)

CHARGE NO. 8,2,2,2,4,6 — W-O NO. 12345 — CARD NO. 1 1 2 1&2 3

LCC — DATE REC'D 0,1,2,5 — STD HRS 7,0,0,6,2,6 — W C / C 7,5,D, — STD HRS 0,1,5

DESCRIPTION OF WORK: REPR FAUCET — WORK LOCATION: B,L,D,6,0,0

ORIGINATOR PHONE: JOHN DOE 268

NATURE OF WORK: REPAIR LEAKING FAUCET
REPLACE TOILET RING

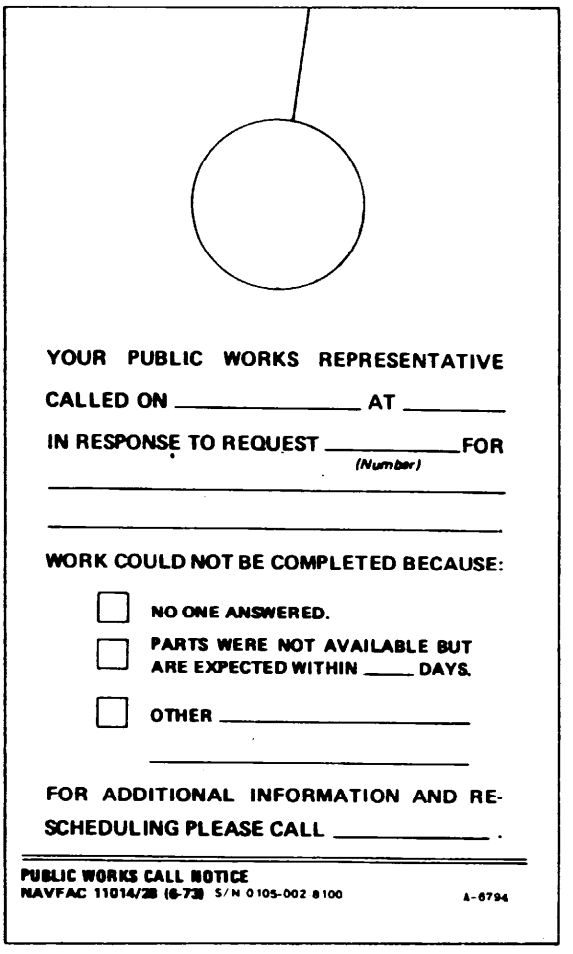
SHOP COMMENTS: ALSO REPLACED FLUSH BALL IN TOILET

CRAFTSMAN: Ely Smith

DATE STARTED 7,0,0,6,2,6 — DATE COMPLETED 7,0,0,6,2,6 — W C / C 7,5,D, — HRS USED 0,2,0

BUILDING NUMBER 6,0,0 — EQUIPMENT NUMBER

S/N 0105-LF-002-7105



YOUR PUBLIC WORKS REPRESENTATIVE

CALLED ON _____ AT _____

IN RESPONSE TO REQUEST _____ FOR
(Number)

_____

_____

WORK COULD NOT BE COMPLETED BECAUSE:

☐ NO ONE ANSWERED.

☐ PARTS WERE NOT AVAILABLE BUT ARE EXPECTED WITHIN ____ DAYS.

☐ OTHER _____

_____

FOR ADDITIONAL INFORMATION AND RESCHEDULING PLEASE CALL _____ .

PUBLIC WORKS CALL NOTICE
NAVFAC 11014/28 (6-73) S/N 0105-002 8100 A-6794

FIGURE 7-1
Emergency/Service Work Authorization

FIGURE 7-2
Public Works Call Notice

10. FUNDS AVAILABILITY. If funds are not available, the deficiency should be classified as an Unfunded Facilities Deficiency (UFD) in accordance with NAVFAC MO-322, Volume 1 instructions. Maintenance and repair deficiencies. are summarized annually on the Annual Inspection Summary. This document is extremely important in that it describes deficiencies in activity condition and is the basis for determining funding level. Some work may have a high priority and be considered necessary, but certain factors must be noted in relation to activity mission support importance.- Minor construction or alterations, not essential to the activity mission, should be deferred in favor of more important maintenance and repair work. Then, the degree of urgency in its particular activity mission support must be considered. Sometimes funds are available, but the work still cannot be done because:

a. The in-house workforce cannot do the work,
b. It is too late in the fiscal year to award a contract, and
c. The funds expire at the end of the fiscal year.

If this is the case, the funding source should be promptly advised so that other essential needs can be looked at and other avenues of expending the funds can be investigated. If this occurs frequently it is a symptom of inadequate advance planning.

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

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

11. PROGRAMMING WORK. Work programming is the control of engineering, planning and estimating work; work authorization, and work performance either by the shops or by contract. Work programming procedures are provided on the Work Input Control Charts as described in paragraphs 19, 20, and 21.

12. DETERMINING TYPE OF PERFORMANCE. The Facilities Management Engineering Division Director should determine or recommend whether the entire job, or parts of the job, should be done by shop forces, by others, or by contract. This determination is based on the workload of the Work Centers affected, the urgency of the work, the capabilities of the shops to do the proposed work, and whether the function has been contracted under the procedures of the CA Program. The decision to have the work accomplished by shop forces, contract, or both, influences the nature of the cost estimate or even whether one is required, and the authorizing documents.

13. TIMING. Job order issuance may be deferred because of budget considerations, more favorable seasons or weather, and/or Work Center capability. Maintenance of equipment and facilities during idle or off-peak seasons is another aspect of job planning. In view of known backlog situations, it may be decided to hold the job orders and not issue them immediately. This precaution assists in providing uniform work center workload. Prior to final job order approval and subsequent release to the shops for accomplishment, the entire backlog of unreleased job orders should be reviewed to determine if any take precedence over those currently being programmed for accomplishment.

14. PRIORITIES. Priority assignments are essential in determining the importance of each job in relation to other identified requirements. Personnel and funding limitations may not permit the accomplishment of all necessary and desired work immediately upon its identification. The use of a priority classification system will assist in optimum resource utilization. The assignment of a priority designator using a system such as that described below will provide a sufficient definition of the relative importance of each job for Public Works Department planning purposes.

The FME Division Director will assign a priority to each preliminary estimate approved. The priority assigned will be a major factor in determining when the job is selected for final estimating. After the final estimate has been made, the priority will affect the placement of the job in the schedule. The importance of various functions and types of work may be expressed by the assignment of priorities in a priority matrix. After initial use of the priority matrix, the results should be reviewed periodically and revised as necessary. Although the priority assigned to an individual job may be changed at any time, the FME Division Director must recognize the affect of these changes on shop scheduling and keep priority changes to a minimum. A Priority matrix that allows classification of all work into one of four types based on the major work content and justification is listed below:

a. Safety. Work identified primarily for safety reasons.
b. Function. Work primarily identified with the activity's mission.
c. Preventive. Work primarily required to prevent significant deterioration of plant or equipment owing to continued use or from natural forces.

d. Appearance. Work primarily for preserving or upgrading the appearance of a facility.

Each of these work classifications will have three levels of importance; high, routine, or low. The importance level of an individual job is based on its impact in relation to other jobs in the same classification and is a subjective determination.

Effect of Priority on Scheduling. In general, jobs with highest priority (lowest number) will precede others of lower priority on the -schedule. The same priority system will be used on Minor Work Authorization in a manner similar to that indicated for Specific Job Orders. Figure 7-3 is a sample priority matrix. Each public works organization should make adjustments to suit its situation.

Priority 1. Priority 1 is reserved for use with specific approval of the Public Works Officer or Assistant Public Works Officer. This priority is an overriding requirement that will insert final estimated work into the schedule in any week by date specified.

15. RESOURCES AVAILABILITY. The resources available to accomplish work vary with each activity. In addition to the Public Works Shops, support usually is available from contractors, from other departments, other activities, and in some instances, military construction forces not directly assigned to the Public Works Department. Some jobs may require special skills or equipment not available to the Public Works Department; may be accomplished by contract because of prior commitments of station forces, or because it is more economical. Some jobs may occur too infrequently to make Public Works Department staffing practical. This subject is covered in Chapter 3.

16. PLANNED RELEASE DATE. Management must exercise judgment in releasing jobs for accomplishment. If a desired starting or completion date for a contract has been established, management must consider the time necessary to advertise for bids, award, and the lead-time for the contractor to mobilize. In the case of work to be accomplished by station forces, the release date of the job order to the shops is equally important. The decision must consider the lead-time necessary to obtain materials, the workload in all work centers involved, the seasonal characteristics of the work, and forces previously committed by scheduling or programming, etc. Only jobs programmed on the short-range shopload plan should normally be released to the shops for accomplishment. Emergency, urgent, and jobs requiring long lead-time for the material purchase are exceptions when the material is ordered in the shops. Overloading the shops results in wasted effort in preparing and revising schedules as jobs already scheduled, or even underway, may require rescheduling to permit accomplishment of a more important job. Overloading the shop negates the management decisions made during the short- and long-range shoploading process.

17. WORK INPUT CONTROL CODES. For the purpose of Work Input Control, three codes have been established for use in conjunction with the charts. These are Level of Maintenance Classification, Functional Activity, and Method of Accomplishment Codes. These codes help management determine actions required in work accomplishment.

EMERGENCY OR EXCEPTIONAL TOP PRIORITY

1

IMPORTANCE LEVEL	WORK CLASSIFICATIONS: SAFETY	FUNCTIONAL	PREVENTIVE	APPEARANCE
HIGH	2	3	4	6
ROUTINE	3	5	7	8
LOW	6	7	9	10

FIGURE 7-3
Sample Priority Matrix

a. LEVEL OF MAINTENANCE CLASSIFICATION (LMC). All personnel involved in the work input control process must be thoroughly familiar with and aware at all times of applicable LMC for their activity's facilities and equipment. This is of vital importance in avoiding expending scarce resources on facilities and equipment not totally mission oriented on a continuous use basis. Table 7-1 reflects classification characteristics that are to be applied to facilities and equipment to determine level of maintenance classifications.

b. FUNCTIONAL ACTIVITY CODE (FAC). This code indicates the fund source for work to be accomplished. This knowledge is necessary for planning purposes to aid in balancing shopload with funds availability, and in maintaining good customer relations. It is also valuable in answering queries received concerning job status. A number or letter will be assigned to customer commands and to special funds such as housing. Each Public Works Department will develop functional activity codes to fit its needs.

c. METHOD OF ACCOMPLISHMENT CODE (MAC). This code indicates the means by which the job will be accomplished; such as contract, shop forces, or military forces. A one-letter code will be assigned for each method available for accomplishing work; such as Contract - C, Shop Forces - S, Military - M, and Production Department - P.

18. ANNUAL MAINTENANCE PLAN. OSD establishes the requirement for an annual maintenance plan. This plan should identify the pattern of maintenance, repair and alterations to be accomplished during the fiscal year. The shopload plans are the detailed execution plans developed from the annual plan to effectively utilize shop resources. It is equally as important to have a plan to execute contract requirements. The following procedures are recommended in determining a maintenance plan.

a. Determine total assets available for facility maintenance and operation under control of the Public Works Department.

b. Determine total fixed costs such as annual contracts, janitorial, trash collection; other standing job orders, and overhead charges.

c. Estimate E/S workload.

d. From the above calculations determine resources available for maintenance, repair, construction and alterations.

e. Evaluate backlog of work as generated from inspection customers for major categories of facilities, and predicted requirements (based on experience).

f. Utilizing a priority system as discussed earlier, prepare a listing of work to be accomplished.

g. Determine a general time schedule of accomplishment so that dates can be entered on the Job Requirement and Status Chart. These dates should be utilized to schedule work to planners and estimators, engineers or other personnel involved in labor or contracting planning and preparation.

This plan should be periodically monitored and adjusted throughout the fiscal year. The advantages of having such as plan are (1) identification of total maintenance requirements, (2) early identification of contract requirements due to shop limitations; (3) knowledge of how changes to this plan will affect the personnel and funding capabilities of the Public Works Department; and (4) evaluating requirements to be placed under annual contracts. The same information required to develop an annual maintenance plan is needed when determining backlog as reported on the annual Inspection Summary.

In addition to annual maintenance plan, it is necessary to consider future requirements that could influence resource availability such as mission change and long-range major repairs. The inspection system and facility history records should provide information leading to a decision to develop projects for major repair or replacement. For example, if the utility system is old, past records identify large annual expenditures for repairs and current inspection reports describe a deteriorating condition, the economics of a major repair should be evaluated. Likewise, facilities past their economic life should be considered for replacement. These requirements should be clearly identified during the Command's participation in the budget cycle. If the efforts are successful, these decisions should be reflected in the annual maintenance plans by performing only limited repairs until the major repair or replacement is accomplished.

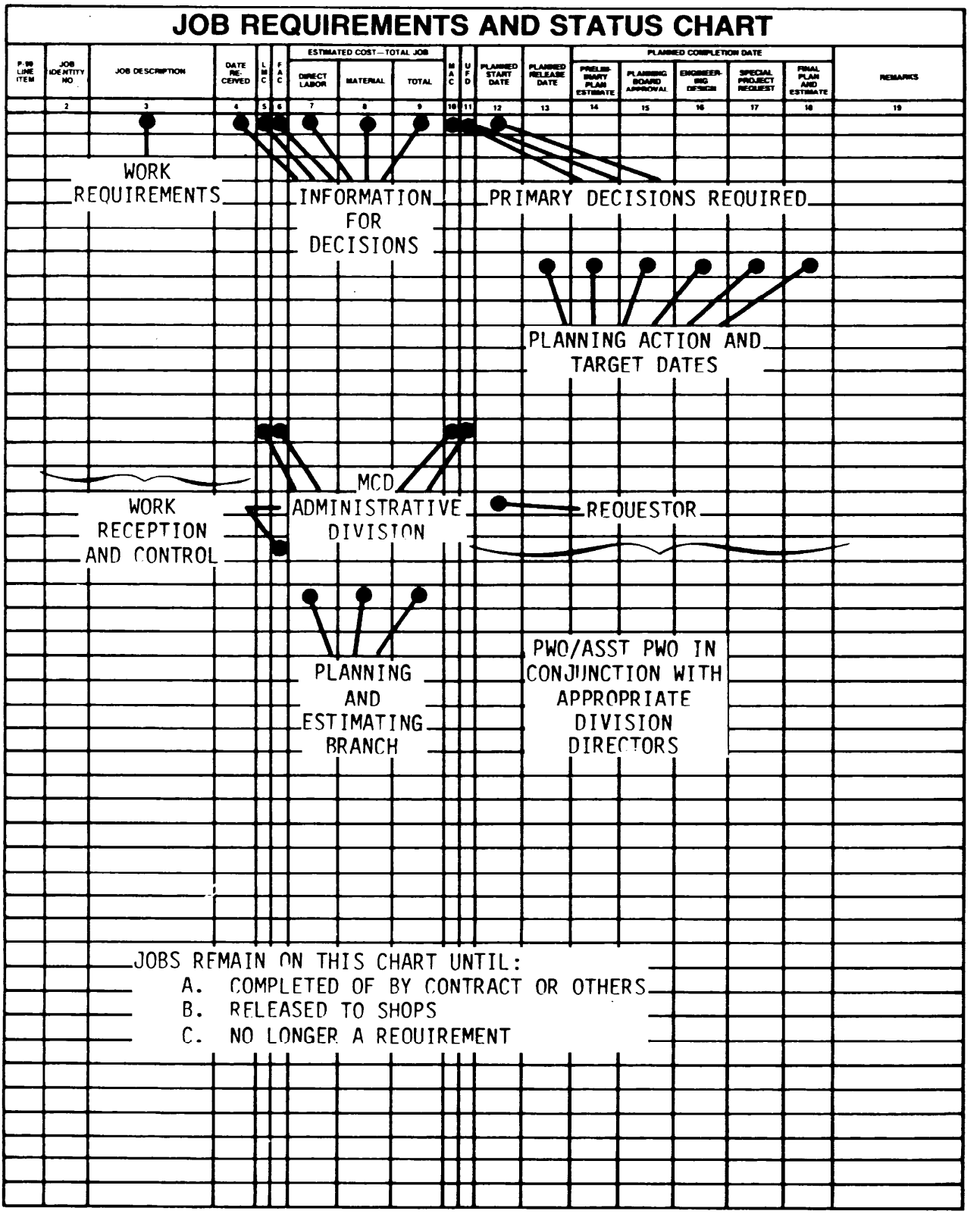
19. WORK INPUT CONTROL CHARTS. The manual work input control system requires three general charts, each serving a specific purpose. The charts have been designed to show primarily Specific Job Order work entering the system. However, if desired, Standing Job Orders, Minor Work Authorizations and large Shop Repair Orders may also be included. The scope can be expanded to cover the Engineering Division as well as other Divisions. These charts are examples of format only. The size, exact content, and format are subject to modification so long as the minimum information published herein is retained. It is suggested that these charts be prepared on paper suitable for reproduction. Automated systems are a major assistance in developing these charts. Word processing systems are also very helpful.

20. JOB REQUIREMENTS AND STATUS CHART - SPECIFIC JOBS. The Job Requirements and Status Chart, Figure 7-4, provides a ready reference for programming all known requirements. It is a holding device for those jobs being processed for programming.

a. PREPARATION FREQUENCY. The Job Requirements and Status Chart is maintained on a continuing basis. Work should not be entered on the chart until approved by the appropriate person.

b. INFORMATION SHOWN. This chart contains all known requirements which, after initial screening for necessity, are required to achieve the proper level of maintenance or are required to support the activity mission. All customer-financed individual jobs and minor construction, alteration, and improvement type work are also included. This chart provides information on status of work not programmed for shop accomplishment. In general, all new work is first entered on this chart and remains there until completed. This chart shows work requests of Specific Job Order size including inspection generated maintenance and repair work, the date the work was received, how it will be accomplished, the facilities categorization code, the customer or source of funds, the estimated cost, and a progressive record of actions planned on these jobs. Minor work authorizations and standing job orders may be shown if kept separate and apart from specific job order size requirements. The chart should cover all Public Works Department functional areas.

c. PROCEDURE. When a work request is received, a Job Identity Number is assigned by Work Reception and Control. This number may be the work request number, inspection report number, or job order number. The job description, reduced to a few words or abbreviations, should follow the identity number. If the FME Division Director, PWO, or his designee, decides that the work should be accomplished, the Work Reception and Control Branch will maintain the chart by use of oral or written instructions furnished by or through the Director, FME Division, PWO or Assistant PWO. The job identity number, job description, facilities categorization code, functional activity code, scoping cost (estimate) for direct labor and material, and total cost will be entered as this information is made available. Also to be entered are method of accomplishment code (MAC), unfunded facility deficiency (UFD) designation, planned start date, and planned release date to the shops for material scheduling. Planning action and target dates, such as preliminary plans and estimate , planning board approval, engineering and design, special project request, and final plans and estimate are to be posted as this information becomes available and as programming proceeds. If a decision is made to



MAINTENANCE WORK INPUT CONTROL

FIGURE 7-4
Job Requirements and Status Chart

contract work, a release date for contract bid is estimated and posted. When the contract is awarded the contract number and date completion is entered under "REMARKS." Entries will be made on the chart as decisions are made and charts will be kept current at all times.

21. WORKFORCE AVAILABILITY SUMMARY AND WORK PLAN SUMMARY. Workforce availability information is essential for work input control. As a first step in work input control, information is required on personnel resources available to perform the work. By use of this chart (Figure 7-5), the current month head count and the three-month picture, by month, of average available hours per work center can be projected. These summaries reflect available labor hours by branch, work center, and subwork center for the period being planned. It divides the available labor hours into the various overhead and productive elements. The Workforce Availability Summary and Work Plan Summary should be completed by the FME Division with the assistance of the *Directors of the Maintenance, Transportation, and Utilities Divisions.

a. BRANCHES AND WORK CENTERS. Branch names are inserted in the blank space on the first line to cover work centers for that branch. The work center codes are inserted on the line under the appropriate branch and the work center name is placed on the line under the code for the appropriate work center.

b. NUMBER OF PERSONNEL. The first item under Number of Personnel is the current month on-board count for each work center listed. Planned adjustments reflect changes expected to occur during the period, such as reassignments between work centers, hiring new personnel, resignations, retirements, etc. The average number of personnel reflects the total number available to perform the work during the period designated. The available hours are computed by multiplying eight times the total average number of personnel in the branch, or work center, by the number of work days in the month.

c. PLANNED LABOR. Planned productive labor, indirect and overhead labor hours, and related Labor Class Codes are explained in Chapter 5, paragraph 4. The planned distribution is influenced by historical data (provided by the Maintenance/Utilities Labor Control Report and Tab A) (see Chapter 10, paragraph 10), known future requirements, and present need. A procedure for planning the distribution of available hours is explained below:

(1) The overhead and indirect functions should be planned first. The simplest method is to multiply the total labor hours available by a percentage to obtain each overhead and indirect function. The starting percentage is the percent in the distribution column of the Labor Control Report for the function. This percentage is then adjusted for trends-and known variations. For example, the Maintenance/Utilities Labor Control Report has listed 4.5 percent allowed time for a trade branch. However, because of management action, the trend has been downward a 3.5 percent allowed time for the month may be a more reasonable estimate. Based on experience at the activity, planned leave may be based on a historical percentage factor or on scheduled leave. Holidays should also be considered. The planned hours for individual items of overhead and indirect functions are added to obtain total planned overhead and indirect hours. This is subtracted from the total hours available to obtain the total available productive hours.

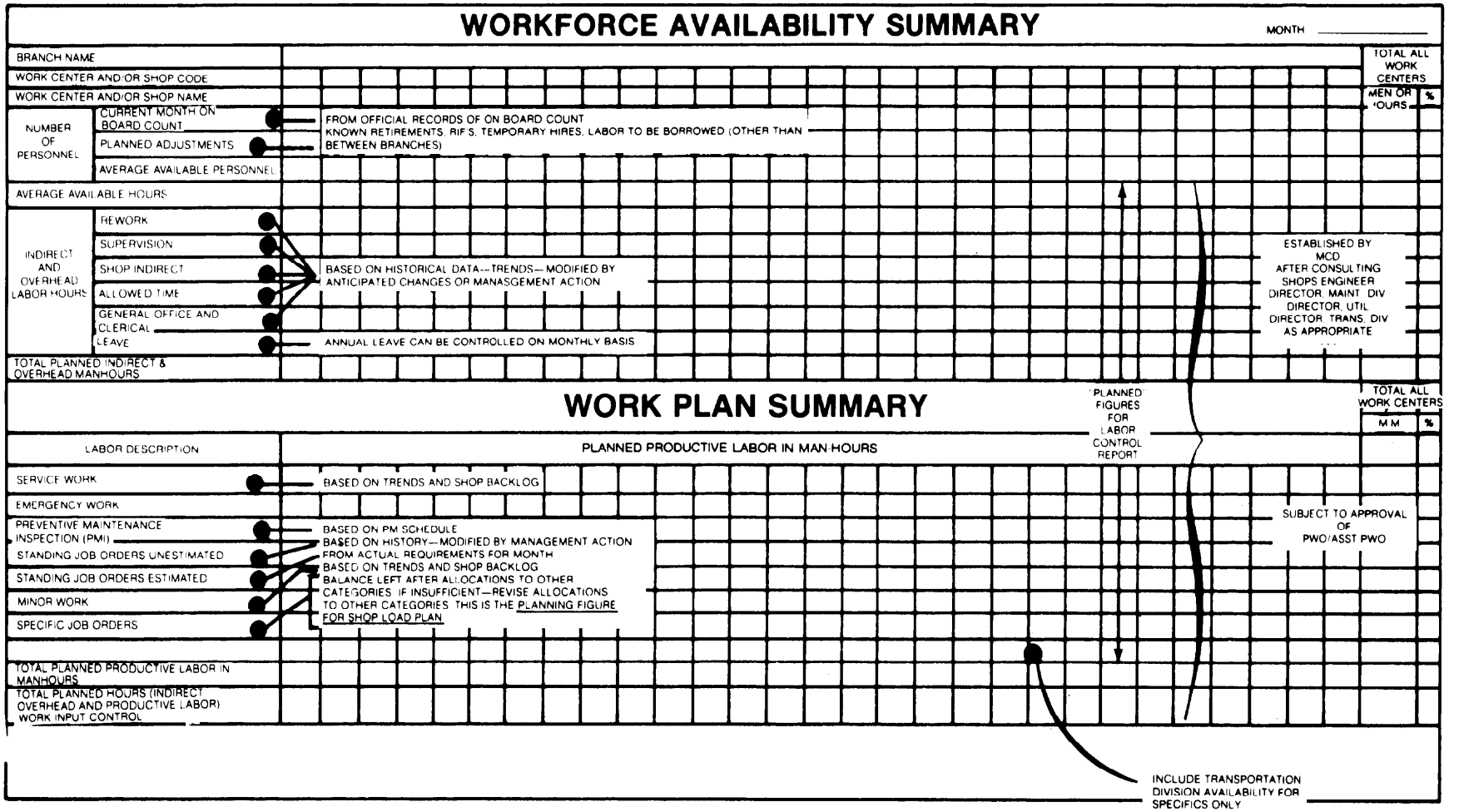


FIGURE 7-5
Workforce Availability Summary

(2) The planned emergency/service work should be based on historical data and known requirements for the month. For example, October may require additional service work caused by the start of the heating season. Planned Minor Work Authorizations and Standing Job Orders should be based on past data and any known workload changes. Prepared schedules should be used to determine PMI requirements. The planned hours to be used for specific work is basically the remainder.

(3) At this point adjustments will normally be required. Leave may be adjusted and word passed to the shops of either tight or loose leave policies. Minor, service, and standing job order work may all be adjusted. The areas to be adjusted should be based on such matters as importance of the work and previous adjustments. For example, if Christmas were to fall on a Thursday, a very tight leave policy for Friday would be hard to justify because of its effect on employee morale. On the other hand, denial of two weeks leave for any employee during peak workload period with a suitable explanation would probably be accepted with little, if any, loss of morale. All adjustments made should be tempered with knowledge that the normal distribution pattern will rule and that the annual leave rate is relatively constant from year to year. Adjustments may be made if long-range planned distribution is desirable to achieve a better distribution, reduce hours on unestimated Standing Job Orders, and increase hours on Minor Work Authorizations and/or Specific Job Orders.

(4) This chart serves as a control on personnel assignment by classes of work. It also is a management tool used to balance work input into the shops, establish limitations regarding the amount of work input into the shops, and to control the amount of work of a given type which can be accomplished during a given period. It is used to furnish information for the columns "Planned" labor on the Maintenance/Utilities Labor Control Report.

22. SHOPLOAD PLAN. The Shopload Plan, Figure 7-6, covers a three month planning period. A separate Shopload Plan is prepared for each month. It should be prepared by the FME Division each month subsequent to the preparation of the Work Force Availability Summary and Work Plan Summary. The Long-Range Plan, similar in format to the one illustrated in Figure 7-6, is for the balance of the year or the 4th through 12th months. This plan may be developed week-by-week or at the same time as the Short-Range Plan, depending on needs. All of these plans should be submitted simultaneously to the Public Works Officer or his designee for approval or modification. The Shopload Plan should be derived from the Annual Maintenance Plan.

a. INFORMATION SHOWN. The plans include: job order number; brief job description; facilities categorization codes and functional activity codes; planned starting date; scheduled starting and completion dates (short-range only); estimated hours by work center or branch; job cost; and remarks. Once a shopload plan has been approved; it should not be altered or changed except by approval of the Public Works Officer or the PWO's designee. The sequence in which jobs are posted on the plans is left to local requirements. However, jobs may be posted on the plan in the order selected, or grouped by month or by customer.

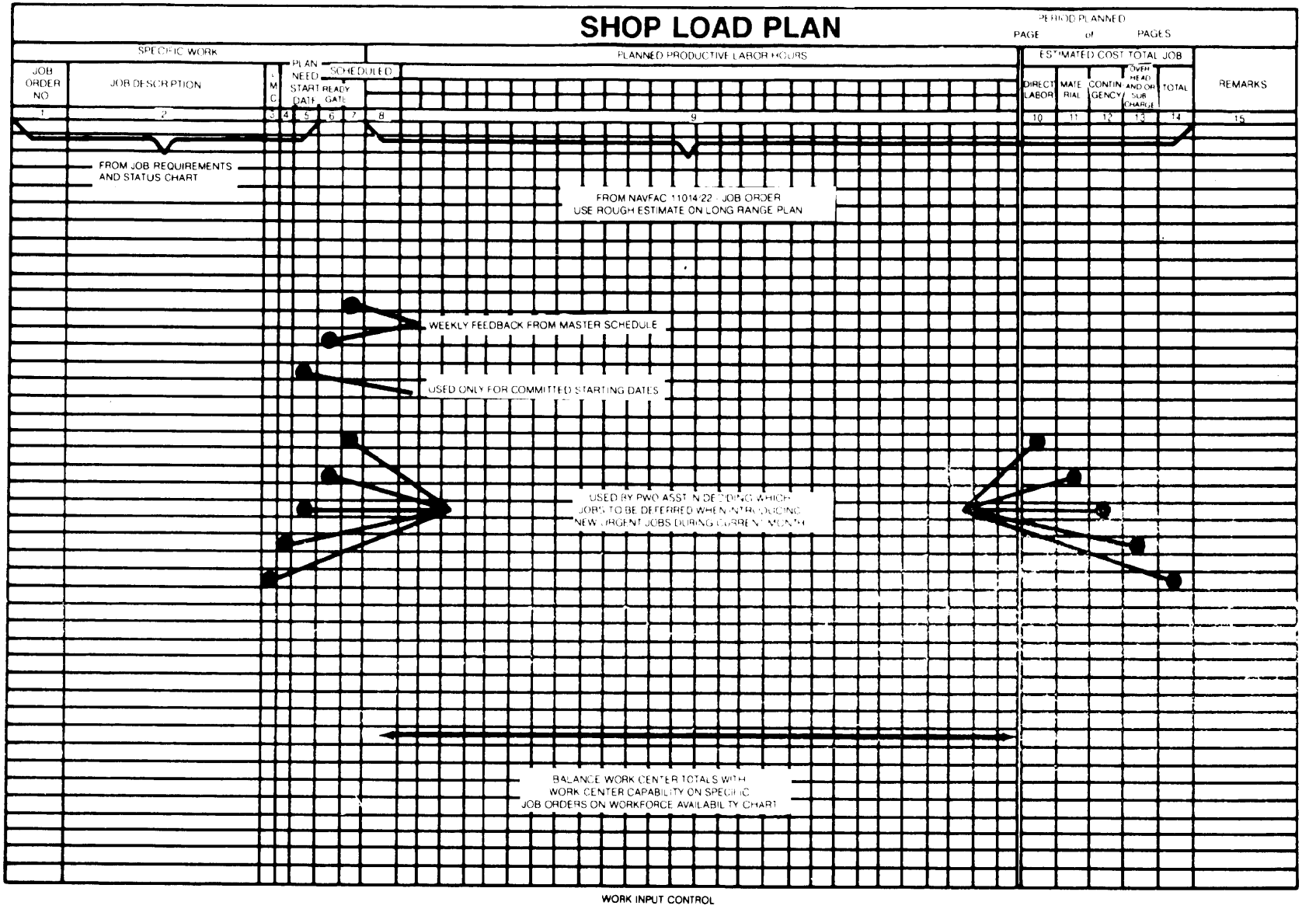


FIGURE 7-6
Shop Load Plan

b. PROCEDURE. The Short-Range Shopload Plan should be completed by month for a three month period. First, program carry-over work; that is, work that was planned for the current month, but could not be completed. Second, adjust the plans for the other two months, if required, by shifting from one month to the other and by adding or deleting work. However, do not load any work center beyond its capability as indicated on the Workforce Availability Summary and Work Plan Summary. The suggested minimum loading is 100 percent capacity for each work center for the first month, 90 percent for the second month and 80 percent for the third month. The maximum loading percent is influenced by the mission of the activity which can result in the short timeframe of specific jobs being generated. If this requirement is consistent from month to month, this factor should be considered in developing the shopload plans.

c. SHOP LOAD PLAN DEVIATIONS. Deviations from the Short-Range Shopload Plan should be controlled on an exception basis. Reasons for deviations should be provided to the Public Works Officer via the Facilities Management Engineering Director as they occur for the current month and at the end of each month for other months. The total specific work accomplished during the month should be compared to the total specific work planned at the beginning of the month. The work may have been dropped, and/or delayed because of priority decisions or material availability, or moved out beyond the next month's work plans. Whatever the reasons, they should be recorded under Remarks on the Shopload Plan so corrective action can be taken as required.

23. VISIBLE STRIPS WORK INPUT CONTROL. Some field activities prefer visible strips filed in metal frames mounted on the wall, or on a star-id, so the frames can be opened and closed like a book. This method of programming shop work is feasible provided a picture is made of the frames at the beginning and end of each month, so deviations from the plan may be ascertained. Visible strips come in sheets of resilient veneer, surfaced with paper on both sides and scored into individual strips for separation after typing or hand preparation. A strip should contain information concerning only one job and should always be filed in a frame that will reflect the work programmed for a given period of time.

a. Work requests, inspection reports, etc. should be indexed on visible strips as they are received and then arranged in chronological, priority, or other desired sequence. As jobs are reprogrammed or released to the shops, the visible strips should be removed from the file or frame. This method of programming eliminates crossed out lines and there is no necessity to recopy old sheets.

b. Visible strips should be filed on the frame dedicated to the month the job is programmed to start or to the proper category if other than the Short-Range Shopload Plan. Any change in programming is made by simply moving the strip to the proper frame (month). Adjustments in a current month's programming may be made right up until the time the frame is reproduced by office copier or photo. Individual strips are filed by priority, type of job, or other desired sequence. If jobs are reprogrammed, the strip can be easily moved to the appropriate month; then removed on completion.

24. AUTOMATED SUPPORT OR WORD PROCESSING. The information contained in the chart can be stored by ADP or word processing and can be rapidly displayed as needed. This will be an integral part of the automated system (BEST) (see

Appendix C) developed for public works. Word processing is an acceptable alternative in the interval.

25. WORK AUTHORIZATION DOCUMENT FILES. These files are maintained by Work Reception and Control. Completed Specific Job Orders and Minor Work Authorizations are filed in one of two ways: (a) In sequence of issue by number by year of issue, and (b) in sequence of issue by building or property number.

26. COMPLETED EMERGENCY/SERVICE WORK AUTHORIZATION FILE. This file consists of the originals of completed Emergency/Service Work Authorizations filed by building or property number in sequence of issue. Emergency/Service Work Authorizations should be analyzed periodically by the Work Management Branch to determine: (a) repetitive type failures or deficiencies; (b) frequency of Emergency/Service Work reported by sources other than inspectors for comparison to the inspection frequency; and (c) the quantity and type of labor required to perform the work, and such other analyses as desired. A brief weekly analysis of the E/S Outstanding and Completed reports should identify problem areas. Monthly analyses of the E/S Analysis and Facilities reports will furnish the information described above.

27. WORK CONTROL PROCEDURES FOR TENANT OR SUPPORTED ACTIVITIES. There are substantially more Navy activities receiving operations and maintenance dollars than activities with Public Works Departments. Activities without a Public Works Department generally receive support from the PWD of their host activity, from a nearby Public Works Lead Activity or from a Public Works Center. Responsibility for the effective use of maintenance resources rests with the fund holder. Liaison with the Lead Public Works Activity can be accomplished by ACE's, Staff Civils or other designated personnel depending on the amount of the resources involved.

a. Execution: The Public Works Lead Activity or support PWD is generally funded for the overhead function associated with the support such as inspection, engineering, or planning and estimating. The customer is responsible for evaluating the condition reports provided and the operational requirements of the activity to develop a priority list of requirements that best utilizes the resources assigned. Technical guidance should be provided by the Lead Public Works Activity or the staff civil engineer located on the staff of the supported tenant. Customer activities should, as a minimum, maintain a Job Requirements and Status Chart and prepare an Annual Maintenance Plan.

b. Elements of Control: The customer activity should maintain a modified Job Requirements and Status Chart to track its backlog of work. Work should be processed to the support/Public Works Department/Lead Activity based on fund availability, priority, normal work processing lead-time, and the desired completion dates of the work.

Two basic levels of control are possible:

(1) Customer owns plant account
(2) Customer occupies property on plant account of activity providing public works support.

c. Degree of Control: The degree of control and involvement of the customer is substantially greater if owning the plant account: Generally, a customer using a facility not owned by the customer is not responsible for the basic structure, but only for costs associated with the occupancy, therefore the customer is not responsible for reporting condition assessment or backlog.

d. Level of Control: Each tenant or supported activity must evaluate the level of control required to execute its mission responsibility to operate and maintain assets assigned. There is no standard guideline, since each case is different. Requirements are highly dependent on the nature and size of the activity as well as the degree of overhead services provided through the host-tenant agreement.

28. TERMINATING THE JOB. The completion of a job signifies that the specifications have been met, quantity and quality of the job have been inspected and certified correct by the cognizant Branch Managers of the Maintenance or Utilities Division, unused materials have been returned to stock, and the customer is satisfied. (See Procedure Chart No. 8). Closing out completed job orders promptly is an important aspect of maintenance management.

CHAPTER 8

JOB ORDER PREPARATION AND AUTHORIZATION

1. INITIAL BASIS FOR PLANNING. The planners and estimators (P&Es) hold a key position in the facilities management system. Their function is to technically plan jobs and estimate the cost and hours required for the job's accomplishment. Their estimates are the basis upon which management plans, schedules, and subsequently evaluates labor hour performance and costs. To a great extent, the judgment and technical experience of the P&E can be measured by the job plan. Jobs usually comprise several phases, and each phase may have several tasks. By listing the phases and tasks in their proper sequence, the following benefits may be derived:

a. Phases and important tasks of the job are less likely to be omitted.

b. Interrelated interests of work center supervisors and Branch Managers for each job are demonstrated.

c. The Shop Planning and Scheduling function is assisted in attaining better timing and coordination.

d. Shop planners and others concerned with material coordination are able to decide more readily the point at which material availability will permit scheduling a job.

2. PLANNING THE JOB. The job should specify the work to be done, material and equipment needed, how work should be phased, what crafts will do the work, or identification of contractor requirements. This means that complete specifications will be provided, the several phases that make up the job will be described, and the applicable work centers will be indicated. Clarity, correctness, and completeness of the job plan are important to assure there is accurate estimating, effective material coordination, and realistic shop scheduling.

3. SPECIFICATIONS ADEQUACY. Adequate specifications are an important part of every job order. The adequacy test is the degree of reliance that can be placed on the specifications to justify ordering materials, obtaining the necessary tools and special equipment or personnel, scheduling the work, and sending personnel to perform the work without prior visiting the jobsite by the various work center supervisors concerned.

4. TECHNICAL ASSISTANCE. P&Es should not hesitate to seek technical assistance in preparing necessary specifications. This may include on-site inspections, consultation with Maintenance Division personnel, or, in the case of difficult technical problems, the advice and engineering assistance of the geographic EFD. Wherever necessary, sketches or drawings should be furnished describing sizes, dimensions, or other pertinent technical characteristics.

5. COMBINED MATERIAL REQUIREMENTS. Grouping material requirements can be of assistance to the P&E in estimating jobs. This technique is based on assembling detailed material estimates into related in-place items. As an example, rather than listing and pricing separately the quantities of felt, nails, asphalt, and gravel needed to install a three-ply built-up roof, the P&E will use in-place descriptions. This will provide a material cost per

square of all materials in place. This description and the cost figures, corrected for price changes, can be used for estimating similar jobs at a later date.

6. MATERIALS. Selection of appropriate materials may be based on information contained in maintenance and operations technical publications (MO Series 100 thru 312), activity policy, facilities categorization codes, fund limitations, or other similar data. Under certain circumstances the reason for selecting a certain material should be noted in the specifications to assure inappropriate substitutes are not made.

7. COMPLETENESS. The P&Es must not overlook their responsibility to clearly and accurately state the nature of the work to be accomplished. The failure to convey all aspects of the required work may come from overfamiliarity or lack of familiarity with the type of work. If they are thoroughly conversant with the work to be done, they may assume wrongly that a general reference will be sufficient.

8. ASSIGNMENT OF PLANNER AND ESTIMATOR WORK LOAD. The P&E representing the craft with the largest amount of work on a job is usually responsible for coordinating the work of other supporting P&Es, and the assembling of the craft phases into a complete job estimate. (See Chapter 3, Estimating Procedures, Engineered Performance Standards, General Handbook, NAVFAC P-701.0) Jobs should be assigned to P&Es far enough in advance so they can estimate the job in time to release it to the shops for securing material and scheduling of work as programmed on the work input control charts.

9. ESTIMATING. Estimating is one of the most important Facilities Management Engineering Division functions. It has greater significance than the usual limited concept of a dollars-and-cents cost estimate. An estimate is the informed analysis of all the known elements of the proposed job and the resulting forecast of the manpower, materials, and related requirements that will be needed to accomplish the job. The principal purposes of estimating are to:

a. Provide a basis for approval, disapproval, or deferment of proposed work.
b. Provide data for shopload planning and scheduling.
c. Provide a benchmark for evaluating performance of the Maintenance and Utilities Divisions and their work centers.
d. Provide government estimates to be used in the contracting process.

10. ESTIMATING PROCEDURE. The Work Generation Branch Manager selects jobs that have been programmed on the job requirements and status chart and designates the P&E who will be responsible for final job plans and estimates.

a. Scope of Proposed Work. The P&E specifies the work to be accomplished and which crafts will be involved in the job. A clear and brief description of the entire job is then entered under the General Job Description of the Work Authorization/Estimate (Maintenance Management), NAVFAC Form 11014/22 (Figure S-2).

b. Job Phase Delineation. The job is divided into phases by craft, or within a craft, when a finer breakdown is required for planning and scheduling. Then each responsible P&E prepares a Job Phase Calculation Sheet

for each phase under-the P&E's responsibility, including sketches, plans, specifications, or other data. The description of each job phase should be written just as it is to appear on the job order. The P&E responsible for the work content of the entire job collects all phases, organizes them in the order they will appear on the Job Order, and prepares the overall estimate. The description of the entire job and of each job phase must be clear enough as to scope and nature of work to be performed so as not to create any misunderstanding regarding work accomplishment. The estimate, which includes the Job Phase Calculation Sheets, is then presented to the Work Generation Branch Manager and FME Division Director for review and approval.

c. Preparation of the Job Order. When approved, the estimate is forwarded to the Work Reception and Control functions for logging in and distribution to pertinent supervisors. The information on the Job Order and the Job Order Continuation Sheets, NAVFAC 11014/22 and 22A (see Figure 5-1) will be the same as that on the estimate. The Job Phase Descriptions will be the same as that on the Job Phase Calculation sheets, NAVFAC 11014/23 (See Figure 8-1). The job phases will be arranged on the Work Authorization (Job Order), Figure 5-2, in the sequence in which they are to be accomplished.

d. Additional Instructions for Preparing NAVFAC 11014/22. Just the block titles not considered self-explanatory are clarified here.

BLOCK 6. PRIORITY. This is the priority designator assigned by PWO/MCD.

BLOCK 9. EQUIPMENT NUMBER. Enter the plant account number, minor property number, or local station assigned number.

BLOCK 10. RPI CAT CODE (Real Property Inventory Category Code). Enter category code as shown on plant account records. Compare Category Code with the facility listing in NAVFAC P-164, Detailed Inventory of Naval Shore Facilities. Category Codes are found in NAVFAC P-72, Naval Facility Category Codes.

BLOCK 11. COST ACCOUNT CODE. Enter applicable data from NAVCOMPT Manual, Vol 2.

BLOCK 16. FOR FURTHER INFORMATION, CALL. Enter the person who should be contacted concerning any problems that arise. Generally, this will be the responsible P&E.

BLOCK 21. ESTIMATE.

(1) BREAKDOWN OF WORK. See discussion of NAVFAC 11014/22 and 22A (Reference: paragraph 10.C). This section is a "small continuation sheet" to be used for jobs that have only one or two shops where the description of work to be accomplished can be completed in the allotted space.

(2) ESTIMATE SUMMARY. Enter each work center listed on the work authorizations with summary figures for labor hours, labor dollars, material dollars, and total cost estimate. Show totals on bottom line. (Reference: paragraph 16, Designation of EPS Estimates.)

Additional Instructions for Preparing NAVFAC 11014.22A. Just the block titles, not considered self-explanatory, are clarified here.

BLOCK 3. JOB PHASE NUMBER. All jobs will be phased, that is, each shop will have listed only the amount of work which it can accomplish before another shop phases in.

BLOCK 4. WORK CENTER. The examples in this book do not use numbers since it would not be obvious which crafts are involved.

BLOCK 5. DESCRIPTION. Enter the job phase description as written in BLOCK 6 of Job Phase Calculation Sheet, NAVFAC 11014/23 (4-72). Statements such as "accomplish work as per engr. dwg. 123456" are acceptable as long as shop personnel know which work is theirs to accomplish (to avoid possible trade conflicts). Statements such as "accomplish work as required." or "for scope of work, see Jim Jones" are unacceptable. The P&E has to know the scope of work to write the work authorization, so be specific with instructions to the shop. Don't keep shops work centers in the dark.

11. ESTIMATING TECHNIQUES. Reliable guides are needed to judge the maintenance effort. An accurate and reliable estimate by the P&E provides the needed guide. To obtain accurate estimates, P&Es will usually use one of two estimating techniques -- experience or predetermined time standards. Experience only provides information on how much time the workers actually used in the past on similar work. Predetermined time standards provide information on how much time should be used. Therefore, whenever possible, P&Es should plan and estimate using Engineered Performance Standards (EPS), which are predetermined time standards. EPS times are available for about 75 percent of facility type work. Since management analyzes deviations between estimated and actual requirements, the more accurate EPS are fairer to all concerned, including the workers.

12. ESTIMATE TYPES. There are two types of estimates commonly used. Each meets a particular need.

a. Scoping Estimate. It is probable that in some instances work for which estimates have been requested will not be authorized or will be made only for planning purposes; therefore, to eliminate unnecessary work for the Planning and Estimating Branch, only scoping estimates will be made in early project stages. Included are inspection generated items that cannot be accomplished in the near future and projected maintenance, or items identified for contract performance. Scoping estimates usually will be relatively simple computations made on an overall basis using up-to-date unit cost information as a guide. As an example, a scoping estimate for exterior painting of a frame structure may be based on the prevailing overall costs per square foot cost for labor and material. Unit Price Standards, NAVFAC P-716.0, should be used for preparing scoping estimates.

b. Final Estimate. This is the type of estimate that is obtained when all work operations listed on the job plan are analyzed and considered in detail. It should be the most accurate forecast that can be made, within a reasonable time, of the costs, hours, and material requirements for a given job. It should be noted that the approved method and form of entry is by work center in the probable sequence in which the work will be performed, with a summary by work centers involved. Listing by sequence of work reduces the possibility of omitting essential steps in the work to be performed. Reference to the probable flow of work shows the interdependence of the various work centers during the course of the job, thereby facilitating shop planning and scheduling.

13. ESTIMATING CRITERIA. In preparing final estimates the following factors should be considered:

a. Travel Time. This is the time required for necessary round trips between the shop and the jobsite per worker per day.

b. Preparation Time. This is the time required for preparation in the shop and at the jobsite and clean up at the jobsite and in the shop.

c. Work Performance Time. This is the time required for actual craft work performance to complete the job order.

d. Delay Time. This is the time allowed for unavoidable, personal, balancing, planning, and communication delays.

e. Direct and Indirect Material Requirements. Material types and costs should be specified. The shop planner should have access to the quantity data used in arriving at the estimated material costs.

f. Equipment Rental. Equipment rental costs from commercial sources must be included when it is expected that necessary specialized equipment cannot be obtained without charge."

g. Delay in Job Authorization. If the job order is not authorized and issued within a reasonable time after submittal of the final estimate, the estimate should be reviewed before it is resubmitted for authorization. If necessary, it should be revised to conform to current material and labor costs. Any decrease/increase in scope caused by the delay should also be incorporated.

h. Surcharges and Overhead. These cost factors will be applied, as necessary, in accordance with Volume III of the Navy Comptroller Manual.

14. JOB PHASE CALCULATION SHEET. The Job Phase Calculation Sheet should be used by the P&E to establish the craft phase total time. This includes non-EPS estimated time as well as EPS estimated time.

15. CRAFT TIME. The craft time for each task listed on the Job Phase Calculation Sheet should be recorded to the nearest tenth of an hour where practical. The total craft time, total estimated time, allowed time, and job phase allowed time should be rounded up to the next whole hour.

16. DESIGNATION OF EPS ESTIMATES. Not all maintenance work can be estimated using Engineered Performance Standards. Job Phase Calculation Sheets must indicate hours that have been derived using EPS estimates. To do this, an asterisk (*) should be placed next to the total hours when 75 percent or more of the job phase allowed time is based on EPS data. When hours are combined on the Estimate or Job Order, 75 percent of the total hours must have been EPS derived before an asterisk is placed beside the hours. (See Figure 5-2.) If the management system permits identification of actual EPS hours then the 75 percent rule is unnecessary.

17. REVIEWING THE ESTIMATE AND THE JOB PLAN. Job order impact on the shop is of such importance that the P&E Branch Manager should carefully examine completed final estimates. This review should include the following factors:

a. Completeness. The final estimate review should assure that no item has been omitted.

b. Accuracy. Technical descriptions and numerical computations should be thoroughly checked.

c. Clarity. The content should be clear to all interested personnel.

d. Conformance with Policy. The content should conform with established policies.

e. Customer Approval. The final estimate must be sent to the requestor for approval. Customer approval must also be obtained for work requests involving funds other than those under the control of the Public Works Department.

18. PLANNING AND ESTIMATING A JOB BASED ON A WORK REQUEST: These procedures should be followed when a Work Request requires an estimate prior to work authorization.

a. The Work Generation Branch Manager, after receipt from the Work Reception and Control function, assigns the Work Request (Figure 6-1) to a P&E for a scoping estimate. Part II will be completed and the Work Request returned to the customer. (See Procedure Chart 2). If the estimate is acceptable, the customer completes Part III of the Work Request. This authorizes the final estimate, programming, and scheduling of the work.

b. The Work Request is again received by the Work Generation Branch Manager with funds authorization. Now the Request is assigned to a lead P&E responsible for the entire job estimate. The lead P&E is the one who estimates for the craft having the largest number of hours among the several crafts involved. The lead Planner and Estimator is also responsible for coordinating other involved Planner and Estimator estimates and assembling all job phases in the proper sequence.

(1) Each P&E will use a sequence Job Phase Calculation Sheet for each craft phase of his particular assignment, or craft responsibility, within the total work required by the Work Request. The lead Planner and Estimator will be furnished the assignment sequence for each craft phase, for inclusion on the Estimate and Job Order.

(2) An overall job description should be developed. Job phase descriptions are developed from this overall job descriptions A job phase is a task, or group of tasks, that can be accomplished by a particular craft without being interrupted by another craft. The job phases should be prepared as illustrated in Figure 8-1, giving the craft phase number, job identity number, the date the P&E made the estimate, work center number and title, job phase description (this is the exact wording to be placed on the job order), and task description.

(3) The next step is to apply the estimated time (EPS or non-EPS) to each task listed and list EPS references (see Figure 8-1). Sum the EPS and conventionally estimated times, apply the nomograph, and fill in the allowed time.

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-76)
S/N 0105-LF-002-7160

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
1	1	8073456	1-3-84

5. WORK CENTER NO AND TITLE
Carpentry

6. JOB PHASE DESCRIPTION
Construct a partition 30' 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 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
43	install partition	16.0	1	16.0	
CT-222					
PWA-5	Additional material handling				
	24 studs 2"x4"x12' = 12 armloads	.04	17	.7	
	60 BF 2"x4"x10' plates = 3 armloads	.11	6	.7	
				17.4	
		TOTALS (Craft & Estimated Time)		18	
		TOTAL (EPS from Nomograph)		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. 1-76)
S/N 0105-LF-002-7160

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
1	2	8073456	1-3-84

5. WORK CENTER NO AND TITLE
Pipe

6. JOB PHASE DESCRIPTION
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 value at
cooler end. Use copper tubing.

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
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				
PWA-5	Addtional material handling	.04	5	.2	
	43 LF copper pipe-7sections = 4armloads				
	copper fittings = 1 armload				
				1.7	
		TOTALS (Craft & Estimated Time)		2	
		TOTAL (EPS from Nomograph)		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)

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0108-LF-002-7100

*See NOTE below

1. CRAFT PHASE NO.	2. JOB PHASE NO.	3. JOB IDENTITY NO.	4. DATE
1	3	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Electrical

6. JOB PHASE DESCRIPTION
Remove (8) existing incandescent light fixtures and 140' 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	9. EPS ESTIMATED TIME UNIT HOURS a.	RECUR-RENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
12-D	Remove fixtures	1.1	1	1.1	
GT-261					
58-C	Remove conduit, wire and boxes	.6	4	2.4	
GT-136	(2 boxes per 30' wire/conduit)(240")				
41-F	Install conduit (using ladder)	2.9	3	8.7	
GT-82	(Includes boxes)(425'-24'boxes)(40LF=2 boxes)				
41-F	Install conduit (no ladder)(includes boxes)	2.9	1	2.9	
GT-81					
36-E	Install panel and connect 8 circuits	1.8	1	1.8	
GT-450					
75-C	Pull wires using ladder	.6	3	1.8	
GT-149	(3 wires - 30')				
75-B	Pull wires using ladder	.3	19	5.7	
GT-149	(2 wires-400') (Box-to-box)				
		TOTALS (Craft & Estimated Time)			
		TOTAL (EPS from Nomograph)			
		TOTAL JOB PHASE TIME			

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

SHEET 3 OF 12

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0108-LF-002-7100

*See NOTE below

1. CRAFT PHASE NO.	2. JOB PHASE NO.	3. JOB IDENTITY NO.	4. DATE
1	3	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Electrical-Sheet 2

6. JOB PHASE DESCRIPTION
Continued from sheet 1

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	RECUR-RENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
PWA-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 (Craft & Estimated Time)		25.8	
		TOTAL (EPS from Nomograph)			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 (REV. 1-75)
S/N 0100-LP-002-7100

*See NOTE below

1. CRAFT PHASE NO.	2. JOB PHASE NO.	3. JOB IDENTITY NO.	4. DATE
2	4	8073456	4-3-84

5. MAIN CRAFTS NO. AND TITLE
Pipe

6. JOB PHASE DESCRIPTION
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 (fiberglass insulation).

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
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					
PWA-5	Additional material handling	.04	4	.2	
	3 sections pipe = 2 armloads				
	insulation = 2 armloads				
				5.8	
		TOTALS (Craft & Estimated Time)		6	
		TOTAL (EPS from Nomograph)			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 (REV. 1-75)
S/N 0100-LP-002-7100

*See NOTE below

1. CRAFT PHASE NO.	2. JOB PHASE NO.	3. JOB IDENTITY NO.	4. DATE
2	5	8073456	4-4-84

5. MAIN CRAFTS NO. AND TITLE
Carpentry

6. JOB PHASE DESCRIPTION
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 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
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					
PWA-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 (Craft & Estimated Time)		11	
		TOTAL (EPS from Nomograph)			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. 1-76)
S/N 0108-LF-002-7100

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
2	6	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Electrical

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

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
11	Install (18) fluorescent fixtures	.70	18	12.6	
GT-242					
84-C	Install (6) receptacles and (1) switch	.3	2	.6	
GT-157					
PWA-3	Additional material handling				
	18 fluorescent fixtures = 18 armloads	.04	18	.8	
				14.0	
		TOTALS (Craft & Estimated Time)		14	
		TOTAL (EPS from Nomograph)			20*
		TOTAL JOB PHASE TIME			20

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

SHEET 7 OF 12

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-76)
S/N 0108-LF-002-7100

*See NOTE below

1. CRAFT PHASE NO.	2. JOB PHASE NO.	3. JOB IDENTITY NO	4. DATE
3	7	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Carpentry

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

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
55-E	Remove shoe mold (150 LF)	.6	1	.6	
GT-314					
30	Install 1/4" plywood sub floor (1800 SF)	1.574	18	28.4	
GT-109					
55-F	Install shoe mold (180 LF)	1.8	1	1.8	
GT-308					
26-L	Install floor tile (1800 SF)	16.0	1	16.0	
GT-88					
PWA-3	Additional material handling				
	[illegible] sheets 1/4" plywood = 18	.[illegible]	15	1.7	
	1800 SF floor tile	.04	42	1.7	
				50.2	
		TOTALS (Craft & Estimated Time)		51	
		TOTAL (EPS from Nomograph)			72*
		TOTAL JOB PHASE TIME			72

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

SHEET 8 OF 12

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

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0105-LF-002-7160

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO.	3. JOB IDENTITY NO	4. DATE
3	8	8073456	4-3-84

5. WORK CENTER NO AND TITLE: Pipe

6. JOB PHASE DESCRIPTION: Install water cooler and (2) 10-section radiators.

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME: UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
24-C	Install water cooler	.6	1	.6	
QT-129					
10-C	Install (2) radiators	.6	2	1.2	
QT-80					
PWA-5	Additional material handling	.11	3	.4	
	2 radiators				
	1 fountain				
				2.2	
		TOTALS (Craft & Estimated Time)		3	
		TOTAL (EPS from Nomograph)			6*
		TOTAL JOB PHASE TIME			6

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

SHEET 9 OF 12

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0105-LF-002-7160

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
1	9	8073456	4-3-84

5. WORK CENTER NO AND TITLE: Metal

6. JOB PHASE DESCRIPTION: Install aluminum awnings over windows on east side and south sides of office (4 awnings)

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME: UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
42-H	Install (4) awnings	6.0	1	6.0	
LAT-144					
PWA-5	Additional material handling	0.4	4	.2	
	4 awnings = 4 armloads				
				6.2	
		TOTALS (Craft & Estimated Time)		7	
		TOTAL (EPS from Nomograph)			11*
		TOTAL JOB PHASE TIME			11

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

SHEET 10 OF 12

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

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0105-LF-002-7160

*See NOTE below

WORK SITE

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
1	10	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Paint

6. JOB PHASE DESCRIPTION
Spackle and tape partition on both sides - two coat spackle. Paint interior walls, ceilings, sprinkler pipes, and radiators as shown on on drawings (all (2) coat work).

Crew 2 Zone 4

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME: UNIT HOURS a.	RECURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
32	Spackle and tape new partition	15.3	1	15.3	
PT-119	(720 SF) (.0206 x 720 = 14.83 + .43)				
22	Roller paint walls and ceilings	.004	4320	17.3	
PT-73	(walls = 2520 SF) (ceilings = 1800 SF)				
40-C	Brush paint (3) doors - 1 side/2 coats	.6	2	1.2	
PT-159	(2'6" W x 7'H)				
40-C	Brush paint (3) door frames - 1 side/	.6	2	1.2	
PT-190	2 coats				
48-E	Paint (6) windows - 2 coats	1.8	2	3.6	
PT-180	(2'6" W x 6'H - 6/6)				
45-E	Paint chair rail - 2 coats	1.35	2	2.7	
PT-176	(180LF x 4" W)				
18	Prime and paint sprinkler lines	0164	220	3.6	
PT-69	(220 LF) (.0082 hrs. LF x 2 coats =				
	.0164 hrs. LF)				

TOTALS (Craft & Estimated Time)	46	
TOTAL (EPS from Nomograph)		
TOTAL JOB PHASE TIME		

*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. 1-75)
S/N 0105-LF-002-7160

*See NOTE below

WORK SITE

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
	10	8073456	4-3-84

5. WORK CENTER NO. AND TITLE
Pain. - Sheet (2)

6. JOB PHASE DESCRIPTION
Continued from Sheet 1

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME: UNIT HOURS a.	RECURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
Est.	Paint (6) Radiators - 2 coats				4
PM-27	Job prep per job phase	.9	1	.9	
				45.8	

TOTALS (Craft & Estimated Time)	46	4
TOTAL (EPS from Nomograph)		5H*
TOTAL JOB PHASE TIME		62

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

SHEET 2 OF 12

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

(4) The lead P&E collects all job phase estimates and assembles them in the sequence they will appear on the job order by entering the Job Phases Numbers on each sheet. Then he completes the estimate (Figure 5-2 (1 of 3)). The estimate is placed on top of the job phase calculation sheets with any pertinent drawings (Figure 8-2). This package is then given to the supervisory P&E for review.

c. After review the Supervisory P&E will pass the estimate to Work Reception and Control for processing.

d. The completed Job Order (Figure 5-2) is submitted to the appropriate authority for approval, released in accordance with the shopload plan.

19. RESPONSIBILITY FOR AUTHORIZATION. Certain types of work require prior Commanding Officer or higher authority approval, but job issue to the shops is the Public Works Officer's responsibility. The following personnel are those who normally have direct or delegated authority to sign work authorization documents and/or to approve work performance within prescribed monetary limitations.

a. Public Works Officer. The Public Works Officer may approve and sign any and all work authorization documents within limitations established by cognizant authority.

(1) Priority Designation. The Public Works Officer is normally the only person authorized to establish the priority designation of "1" on a job order.

(2) Rework. All work authorization documents issued to correct Public works Department faulty workmanship must be approved by the Public Works Officer or his specified designee.

b. Assistant Public Works Officer. The Assistant Public Works Officer may approve any work authorization documents when such authority has been specifically delegated by the Public Works Officer.

c. Director, Facilities Management Engineering. The Director may approve any work authorization documents not exceeding the monetary authorization limitations specifically delegated by the Public Works Officer.

d. Shops Engineer. The shops engineer may approve emergency Minor Work Authorizations and Emergency/Service Work Authorizations. However, to assure proper and uniform cost reporting, the work authorization should be processed in the normal manner. If the work is needed to meet an emergency, the shops engineer may assign qualified personnel prior to formal authorization receipt. In such cases, the shops engineer should indicate the emergency nature of the work to the person processing the work authorization to expedite the processing. This procedure is normally limited to after normal duty hours or when the normal approving officials are not available.

e. Duty Officer. The Duty Officer should be granted limited authority to approve emergency Minor Work and Emergency/Service Work Authorizations in conformance with procedures outlined for the Shops Engineer.

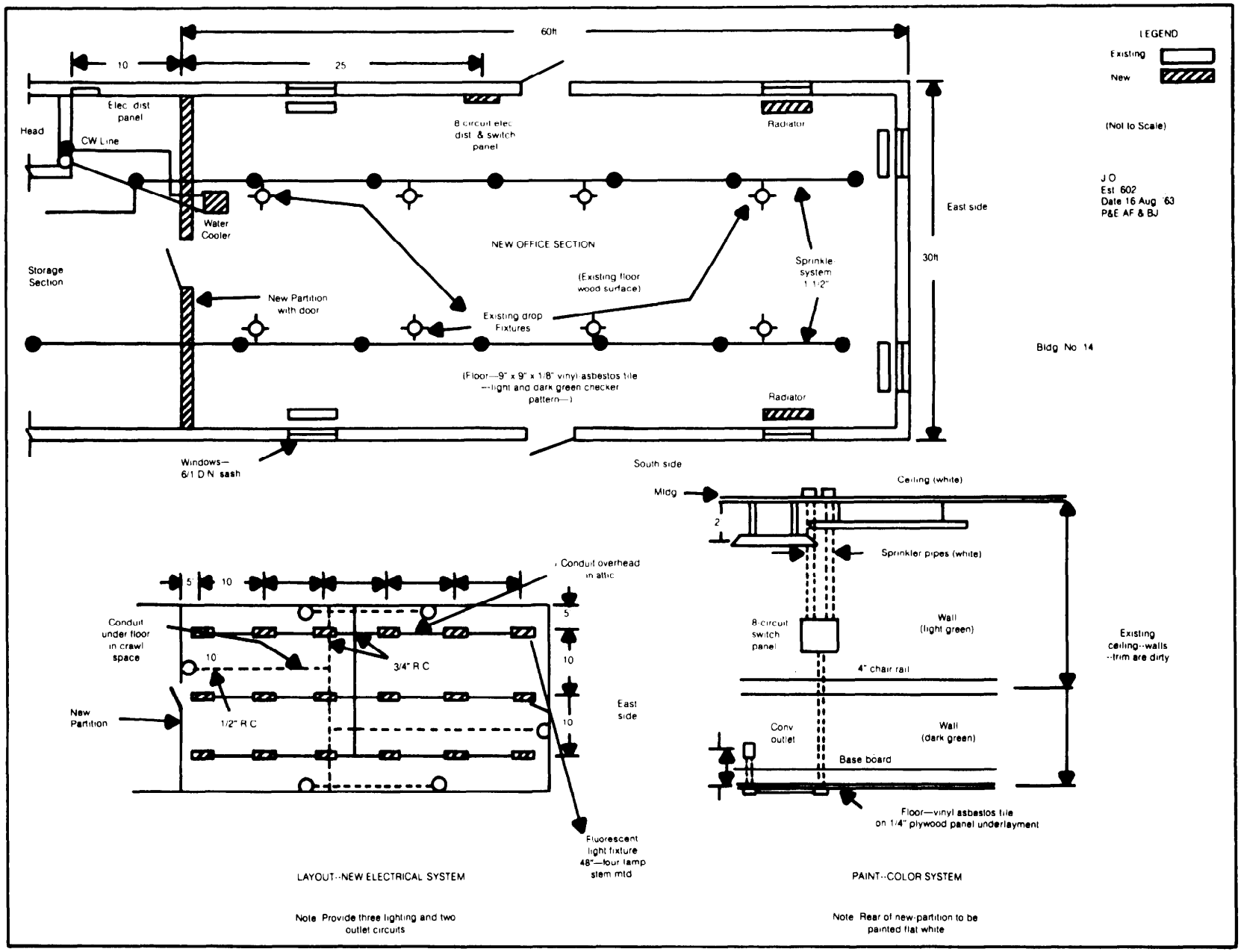


FIGURE 8-2
Sketch of Job

f. Director, Maintenance or Utilities Division. The Director, Maintenance or Utilities Division, may approve Minor Work and Emergency/Service Work Authorizations, in conformance with procedures outlined for the shops engineer.

g. Work Reception and Control. Work Reception and Control may approve and sign Emergency/Service Work Authorizations within the limits established by the Public Works Officer.

20. JOB MATERIAL COORDINATION. To achieve material coordination the following actions are required: determine the material required by each work center for a given job, estimate the material, cost by work center, order material, expedite delivery, record material costs, compare actual material costs with estimated cost, evaluate the causes of significant discrepancies between actual and estimated material costs for each work center, take corrective action when required, and perform effective liaison between the Public Works Department, Supply Department, Fiscal Office, and others concerned with material. The two major categories of material are shop-stores material and direct-procurement material.

21. RESPONSIBILITY FOR MATERIAL AVAILABILITY. Organizations responsible for the kind, quantity, and quality of available material are as follows:

a. Facilities Management Engineering Division. This Division:

(1) Specifies the types, quantities and qualities of material required.

(2) Estimates material costs.

(3) Prepares the Material Requirements/Issue Document (nonmechanized) NAVFAC 11014/8 (Figure 8-3).

(4) Additional instructions for preparing NAVFAC 11014/8 are shown. Just the block titles not considered self-explanatory are clarified here.

BLOCK 3. PRIORITY. Enter the local priority designator.

BLOCK 5. REQUESTOR. Enter requestor's name in this block. In the case of Specific Job Orders, the name entered will be that of the Planner and Estimator who prepares the MRI document.

BLOCK 7. DATE MATERIAL REQUIRED (DMR). Enter the applicable four-character numeric Julian date to indicate the date material is required. To allow adequate internal processing for material issues and for accomplishing procurement action, the DMR should be extended to the latest date possible, consistent with actual job requirements or realistic shoploading.

BLOCK 8. SHOP REPAIR ORDER (SRO). When applicable, record the chargeable SRO number from NAVFAC Form 11200/3A.

BLOCK 9. EMERGENCY/SERVICE OR MINOR WORK AUTHORIZATION SERIAL NUMBER. Work Reception and Control will normally assign the serial number. The Emergency/Service number will normally be the five-digit Emergency/Service

MATERIAL REQUIREMENTS/ISSUE DOCUMENT (NON-MECHANIZED)
NAVFAC 9-11014/8 (4-67)

NOTE: This is "No Carbon Required" paper. Tear off required number of copies BEFORE filling in.

SHEET 1 OF 1

1. JOB SEQUENCE W.C. NO.	2. JOB ORDER NO.	3. PRIORITY	4. SHOP STORE NO.	5. REQUESTOR	6. DATE PREPARED	7. DATE MAT'L. REQUIRED
	8073456				7-3-84	

8. SHOP REPAIR ORDER NO.	9. E.S.M. SER. NO.	10. TYPE ISSUE	11. DELIVER TO (Other than Staging)
		☐ COUNTER ISSUE ☐ DMI ISSUE ☐ TURN-IN	PW Staging Area

12 ITEM	13 CLASS/STOCK OR PART NUMBER	14 DESCRIPTION OF MATERIAL	15 STATUS	16 SUPPLY POINT	17 UNIT	18 QUANTITY	19 UNIT COST	20 (✓) NIS	20 (✓) NC	21 ORDER DOCUMENT NO. (NIS or NC only)	22 TOTAL COST
		PLATES--									
1	G5510-220-6194	6 pcs. 2"x4"x16' Studs			BFM	64	.15				9.60
2	G5510-220-6194	24 pcs. 2"x4"x12' Gyp Board			BFM	192	.15				28.80
		(sheetrock)									
3	5640-235-0297	1/2"x4'x8'			SH	23	2.10				48.30
	Morgan cat. Nos	BRYANS RD. BLDG. SUPPLY									
4	WP-641	Baseboard			LF	60	.20				12.00
5	M-1252	Chair Rail			LF	180	.25				4.50
6	M-1274	Shoe Mould			LF	60	.12				7.20
7	M-1000	Door and Jamb Unit									35.00

23. TO STAGING (Date and Item No.)	24. AUTHORIZED BY (Signature)	25. RECEIVED BY (Signature)	26. ISSUED (Signature and Date)

FIGURE 8-3
Material Requirements/Issue Document (NAVFAC 9-11014/8)

Work Authorization Number and will be prefixed by an "E" or an "S" as appropriate. The Minor Work Authorization serial number will be preceded by an "M". The vehicle USN number will be used for Automotive Shop Stores instead of the serial number.

BLOCK 10. TYPE OF ISSUE: Counter Issue - Direct Material Inventory - Turn-In. Check "DMI" for all Specific Job Orders for which material is to be staged. "Issues" will account for all other material requirements.

BLOCK 13. CLASS/STOCK OR PART NUMBER. Enter the class/stock or manufacturer's part number for each item from the Navy Management Data List of SN items, the Federal Supply Catalog, or the manufacturer's parts lists. The Federal Stock Number must be used in all cases where applicable. For outside purchases, include the local vendor's catalog numbers and identify the vendor.

BLOCK 14. DESCRIPTION. Describe each material item so it can be understood by personnel unfamiliar with class/stock or manufacturer's parts requirements. The noun name of the item must be the first word of description followed by the specifications peculiar to the particular material (Example: "Studs, 2" x 4" x 8', 6 PCS).

BLOCK 17. UNIT. Enter the Shop Store unit of issue in Capital Letters. (Example: BF - board feet of lumber.)

BLOCK 20. (NIS or NC) Supply Department will complete. NIS - Not in Stock. NC- Not Carried (in shop stores or pre-expended bins).

BLOCK 23. TO STAGING. If material staged, date each item received at staging area.

BLOCK 24. AUTHORIZED BY. The person authorized to obligate funds against the job order must sign this block.

(5) Reviews causes of marked discrepancies between actual and estimated material costs.

Recommends or takes corrective action as appropriate, to assure accurate material descriptions and estimated costs

b. Maintenance and Utilities Divisions. These Divisions accomplish the following functions except where local procedures have other Divisions responsible:

(1) Requisition shop-stores material for Emergency or Minor Work. Additional material required while a job is in progress will be requisitioned by the Work Center Supervisor or designated representative.

(2) Obtain delivery status from the Supply Department for all direct-procurement material and keep Work Reception and Control advised of delays.

(3) Stages material on site for job accomplishment.

(4) Maintains inventory of surplus materials.

(5) Initiates action to return surplus materials.

(6) Provide liaison between Public Works Department, Supply Office, and Fiscal Office for such matters as the stocking of shop stores items, prompt reporting, and recording of material costs, and so forth.

22. SHOP-STORES MATERIAL. Shop-stores material acquisition entails the following procedures:

a. Requisitioning. The Shop Planner or the Work Center supervisor involved requisitions required shop-stores material. To provide data required for management reports, all material requisitions must include the job order number. Procedures governing shop-stores operation are contained in NAVSUPSYSCOM publications.

b. Return. Any unused material drawn from shopstores for a particular job, shall be returned to shop-stores for credit, provided it is in quantities of (retail) unit or issue. If not, it should be used for replenishing pre-expended bins. Acceptance of this material in the shop-stores, with consequent credit to the job on which it was not used, is covered in Volume II, Supply System Command-and Accounts Manual.

c. Replenishment. Shop stores stock replenishment is the shop-stores supervisor's responsibility. It will, in general, be accomplished in accordance with Volume II, Supply System Command and Accounts Manual. It is the Public Works Department's responsibility to maintain liaison with the shop-store's supervisor and to effect mutually satisfactory stocking procedures.. Replenishment action for items in the Navy Stock Account will be taken on the basis of regular, recurring demand, and the minimum inventory limit established for each item. For items that must still be replenished by the Appropriation Purchases Account, the shop-store supervisor's stub requisitions must be forwarded to the Public Works Department for approval because its allotment is involved. This approval includes review and acceptance of ordered items, the quantities ordered, and the funds cited. To avoid tying up operating funds, items and quantities ordered should be the minimum necessary to keep work flowing smoothly. Seldom should the quantity ordered exceed 60-day supply. The use of standard stock items should be encouraged wherever possible; When this possibility has been explored fully, ways should be sought with Supply Department assistance to finance items under Navy Stock Fund allotments rather that from the operations and maintenance funds.

23. DIRECT-PROCUREMENT MATERIAL. The following guidelines are established for direct-procurement materials.

a. Material List. The material list should be used when material required is not available in shop stores or is required in quantities not available in shop stores.

b. Requisitioning. Stub requisition preparation and submission to the Supply Department will be made in accordance with Volume II, Supply System Command and Accounts Manual procedures, and regulations of the local Supply Department.

c. Return for Credit. Material planning is very important in relation to maximum utilization of assigned dollar. Too much material awaiting scheduling or surplus to needs reduces the dollars available to perform needed repairs. Jobs should be planned to permit scheduling as soon as possible after all material is received. It is essential that any direct-procurement material left over from a job be returned to shop stores or the Supply Department. With the increasing use of the Navy Stock Fund to finance shop-stores stocks, it may be possible to obtain an allotment credit as well as a statistical cost accounting credit for returned material in ready-for-issue condition. In any event, the cost accounting charge for material shown on the tabulated reports should be an accurate record of the material actually used on the Specific Job Order rather than that originally ordered for it. Shop supervisors should assure that material credit is made to the proper job.

24. MATERIAL SUPPORT. Having the right material in the right quantity, at the right time, and at the right place is one of the most important requirements for efficient work accomplishment and good customer relations. Proper material support, however, requires the joint efforts of both the Supply and Public Works Departments. Unfortunately, the joint responsibility of these two departments is, all too frequently, not clearly stated or understood. The result is poor material support. Activities that define these responsibilities and establish procedures for carrying them out will have responsive material support resulting in increased Public Works Department efficiency.

25. SUPPLY DEPARTMENT. The Supply Department should perform the following functions:

a. Accept, for material reservation, properly prepared and authenticated material lists from approved job orders.

b. Procure, assemble, and segregate Specific Job Order materials by utilizing blanket purchase orders, imprest funds, retail issue procedures, and other means available to meet planned delivery dates.

c. Keep the Public Works Department informed of material procurement status and give prompt notification of "ready" lists.

d. Provide informal notification regarding reservation status of auxiliary stores issues daily to Public Works Department representatives.

e. Accept all returnable materials, provided the quantities are at least equal to the minimum retail unit of issue, and give credit where allowable.

f. Accept all returnable materials, provided the quantities are at least equal to the minimum retail unit of issue, and gives credit where allowable.

26. PUBLIC WORKS DEPARTMENT. The Public Works Department should perform the following functions:

a. Submit material lists in duplicate, for approved job orders, prepared in sufficient detail to insure full and proper identification of materials. The lists should specify the date materials are required, normally using a lead time of four weeks or the lead time specified by local directive, and

should be signed by an authorized Public Works Department representative. The Supply Department is authorized to obligate a 10 percent increase on material reservations to cover price increases on the entire material list, except that on local purchase items the 10 percent limitations apply on a line item basis.

b. Furnish supplementary information on material lists as required, advise on substitutions, and assist in identification and inspection of materials.

c. Draw, receive, and return materials promptly, as appropriate or required.

27. COST RECORDING AND REPORTING. Material cost recording is the Supply Department's responsibility. Reporting of, and accounting for, material costs are Fiscal Office responsibilities. The continued cooperation of both is needed for accurate and timely material cost reporting. As noted in the NAVCOMPT Manual, it is most important that job orders be closed out and reported on Tabulated Report B promptly upon completion of the work. Therefore, in many instances it will be necessary to use material commitments or obligations data rather than to delay reporting final job costs pending receipt of final expenditure data. For example, this procedure may be used frequently for direct-procurement material that comes from outside purchase sources when the Fiscal Office must await the arrival of an abstracted public voucher from the Navy Regional Finance Office. Separate cost reporting is generally in effect for shop-stores material and direct-procurement material.

CHAPTER 9

SHOP SCHEDULING

1. THE PLAN OF ACTION. Shop scheduling commits shop personnel to work sufficiently in advance of execution to assure optimum coordination of personnel, materials, jobsite, and equipment. Shop scheduling is a carefully prepared advance plan of action that takes into consideration the availability of personnel, materials, jobsite, and equipment; proper work operations sequence; proper craft sequence necessary to perform these operations; and the most economically sized work force to be assigned to the operations making up the complete job. The basis of the schedule is the Shopload Plan.

2. SCHEDULING BENEFITS. Effective shop scheduling provides orderly and economical job accomplishment. Scheduling introduces work into the shops based on availability of crafts skills and recognizes shop coordination. It should minimize lost effort resulting from stand-by time caused by materials not being available or the work place ready for the next job phase.

a. Flexibility. The scheduling system is designed to permit advance planning for individual job accomplishment except Emergency/Service Work Authorizations. Preventive maintenance inspection, and repetitive work authorized by Estimated Standing Job Orders, should also be scheduled. It should be recognized that adherence to rigid scheduling for all work is impossible and that flexibility must be provided. This flexibility is obtained by utilizing a two-stage scheduling system: Master Scheduling and Work Center Scheduling.

b. Committing Work. Master Scheduling firmly commits the shop forces "available" for Specific Job Orders, or if the minor designation is not used, 75 percent of the total personnel available for specifics. This 75 percent is scheduled on both the Master Schedule and Work Center Schedules. The remaining 25 percent of "available" shop forces is scheduled for minor Work Authorizations on Work Center Schedules only. This 25 percent is the cushion that provides flexibility necessary to absorb urgent jobs, or other unforeseen events that occur. The 75-25 percent ratio is not rigid. When several "crash" jobs simultaneously interrupt Master Scheduled Work, it may be necessary to reduce the 75-25 percent ratio to 70-30 percent or 65-35 percent during follow-on weeks. It may also be necessary to temporarily reduce the 75-25 percent ratio if a large Minor Work Authorization backlog develops in Work Centers. Some crafts by the nature of the work performed have a larger number of small jobs necessitating a different ratio. If the Work Center backlog of Minor Authorizations becomes low, it may be necessary to raise the minor labor limit to maintain the proper flexibility provided by the 75-25 percent ratio. When deviation from the 75-25 percent ratio is required for protracted periods, the conditions causing it should be investigated and corrective action taken. The basic principle of this scheduling system is that once a job is scheduled, its schedule should not be interrupted. Urgent jobs affecting the Work Center Schedule can generally be limited since it generally requires several days to mobilize and plan for a job. Work Center Schedules are not even prepared until shortly before the start of the week.

3. MASTER SCHEDULING. Master Scheduling is the orderly establishment of a time frame for completing each job subject to Master Scheduling, and the assignment of these jobs on a weekly basis within shop forces capability, Following are Master Scheduling procedures:

a. Adjustments. Master Scheduling establishes a coordinated plan for accomplishment of major jobs (Specific Job Orders). It firmly commits Work Centers to jobs for specific weekly periods. Once the plan has been accepted and agreed upon, adherence to the schedule should be mandatory to assure that the work progresses in the most economical manner. The Master Schedule should not be adjusted to meet minor changing job conditions or actual performance deviations. The Master Schedule should be modified only when there is a major change in work scope; when major delays occur as a result of the nondelivery of material; or when the entire schedule is disrupted by emergency conditions. The basis for the Master Schedule is the Shopload Plan.

b. Procedures. The Master Scheduler, under the supervision of the Maintenance Division Director is responsible for the Master Schedule. Under unusual conditions the Master Scheduler could be located in the Facilities Management Engineering Division; however, the basic principle is for the FME Division to be concerned with medium and long range planning and the shops with work execution. Close coordination is required between the two divisions to assure that longer range planning and the Master Schedule are compatible. The Master Scheduler develops the scheduling plan on the Job Schedule, NAVFAC 9-11014/26, (Figure 9-1) then awaits notification of material availability. Material availability, however, does not mean full receipt of material. For example, where paint is not needed for building repairs until four weeks after the job has started, material availability would be realized if delivery of paint is assured within that four-week period. Once the estimated date of material availability has been established, the Scheduler completes tentative job schedules by establishing time periods when Work Centers involved will be available to accomplish the work in accordance with the tentative job plan. Prior to the weekly scheduling meeting, each Branch Manager should review the tentative job schedule to become familiar with the jobs to be considered at the weekly selecting meeting. No action is taken during this period except that a Branch Manager may correct or adjust the tentative job schedule. Such corrections or adjustments are coordinated with the Master Scheduler. All tentatively scheduled jobs are carefully reviewed at the weekly scheduling meeting and necessary changes are made so that each job schedule becomes the most economical plan of action for that job (Figure 9-1). The end result is a firm schedule for each job which is posted on the Master Schedule Board and which must be adhered to by all Work Centers. The Master Scheduling process is shown on Procedure Chart No. 7.

(c) Personnel Availability. In preparing the tentative job schedule for review at the weekly scheduling meeting, the Master Scheduler must have information on personnel availability for each Work Center, and know not only the total hours that can be scheduled for each Work Center, but how many of these hours have been previously committed.

(1) Work Center Labor Hour Availability Log. Figure 9-2 is an example of a plastic covered work sheet that is commonly used to determine personnel availability. It displays for each future week the total average hours available for Master Scheduling in each Work Center and the hours that

JOB SCHEDULE (MAINTENANCE MANAGEMENT)

☒ TENTATIVE SCHEDULE ☒ FINAL SCHEDULE

1. COMMITTED STARTING DATE

2. JOB ORDER OR SHOP CONTROL NO: 72482032

3. JOB DESCRIPTION: REPAIRS TO BUILDING NO. 77

4. TOTAL ESTIMATE LABORHOURS: 500

5. JOB ELEMENTS	6. WORK CENTER	7. WEEKLY LABORHOUR SCHEDULE 8/16	8/25	8/30	9/7					
SHORE FLOOR JOISTS, LEVEL	01	64	8							
STRUCTURE, REPLACE BEAMS										
DISCONNECT WATER AND WASTE LINERS	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 LABORHOURS WEEKLY		132	104	176	88					
CUMULATIVE		132	236	412	500					

Note: No carbon paper necessary

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 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

have already been master scheduled for each Work Center. Basic information for forecasting the Work Center availability is obtained from the Workforce Availability Summary and Work Plan Summary - Work Input Control Chart - for the current month which provides data on the average hours planned for Specific Job Orders and Minor Work Authorizations. Normally, 75 percent of this total should be considered available for firm scheduling on the Master Schedule.

(2) Operation of Work Center Labor Hour Availability Log. The average labor hours available in each Work Center should be entered on the "AVAILABLE L.H." line of the Work Center Labor Hour Availability Log, after deduction for known Holidays. The Master Scheduler should keep in close touch with the Branch Managers to ascertain more accurately the personnel availability in the immediate future. As each job is scheduled, the hours committed to each Work Center are entered in appropriate spaces on the Work Center Labor Hour Availability Log. By periodically totaling the actual and tentatively scheduled hours, the Master Scheduler can ascertain the degree to which each Work Center is loaded in the forthcoming weeks, and can then accurately determine when a new job from the shopload plan may be scheduled, or what adjustment must be made to conform with revised starting dates.

4. MASTER SCHEDULE BOARD. The Master Schedule Board is a centrally located visual focal point where job status review can take place. It pictures a job through the various stages of awaiting material, awaiting scheduling, and the scheduled and actual progress for the job duration. It shows at a glance the committed and scheduled starting dates and the scheduled completion date. It also shows dates on which the job orders were issued to the shops. This identifies major jobs that have been pending for an abnormal period. Several types of Master Schedule Boards have been used, including plastic covered boards, blackboards or the equivalent, and strip type boards with removable cards.

5. REQUIREMENTS. A Master Schedule Board minimum requirements are:

a. The board should be located for easy reference by the Maintenance Division Director, key shop supervisors, and other management personnel.

b. The entries on the board should be easily visible.

c. The board should provide a minimum of six weeks scheduling.

d. The board should provide a means of determining whether a job is "ahead" "behind," or "on" schedule.

e. The board should provide identification, in labor hours, of schedule deviations to indicate necessity for remedial action.

f. The board should identify Work Centers that require special assistance.

g. The board should show total major work scheduled for each Work Center each week.

h. The board should provide a means for backlog computation by Work Center.

i. The board should show a comparison to the shopload plan by clearly identifying work not on the shopload plan.

6. EXAMPLES. The following are examples of a Master Schedule Board.

a. Sections. Figures 9-3, 9-4, and 9-5 show a plastic covered board that meets all of the above criteria and is considered the most acceptable. This Master Schedule Board is divided into three sections. The first section (Figure 9-3) lists all jobs that are awaiting materials. The second section (Figure 9-4) list those jobs that are awaiting scheduling. The third section (Figure 9-5) lists all jobs whose schedule approved at the weekly scheduling meeting. It is generally referred to as the "active" board. The complete Master Schedule Board should list all major jobs in the shops. The format of Work Input Control Charts (Figure 7-6) containing the Short Range Shopload Plan for a three-month period may be substituted for the format of Master Schedule Board Sections on Awaiting Material (Figure 9-3) and Awaiting Scheduling (Figure 9-4).

b. Colors and Codes. This board can be enhanced by judicious use of colors and codes. The following have been used to good advantage:

(1) Each Work Center is identified by a different color. Thus, individual Work Center scheduled work may be easily identified in the various weeks shown on the board.

(2) "Scheduled" labor hours are posted in BLACK figures.

(3) "Actions" labor hours are posted in RED figures.

(4) A RED circle indicates the specific Work Center has completed its portion (or all) of the job.

(5) "W" in the Remarks column indicates weather held up the job. Other codes may be developed to meet local requirements.

7. SCHEDULE DEVIATIONS. All schedule deviations should be noted and carefully considered by the Facilities Management Engineering and Maintenance Division Directors. Changes that cause a job to be added or deleted from a Shopload Plan should be approved by the Public Works Officer or his designee. Nonadherence to schedule may adversely affect economical work performance. An early deviation investigation helps determine whether the job can be accomplished as originally scheduled, or whether additional resoures may be required. Procedure Chart No. 9 shows the various scheduling process steps.

8. MINOR WORK CONTROL BOARD OR LOG. The Minor Work Control Board or Log controls small planned and estimated jobs that fall beneath the cut-off point for master scheduling. A visual device similar in format to Figure 9-6 has proven useful at many field activities. All Minor Work Authorizations can be controlled in this manner as well as many of the smaller Specific Job Orders, such as customer financed jobs. In addition to providing effective visual control, it also lends itself to backlog compilation for those small jobs that are not posted on the Master Schedule Board or Work Control Charts.

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) Twin Post Vehicle Lift, Area No 2	8/16					80	18	13		10			60	181
7242144	Install Fans and Louvers N End, Bldg No 56	8/16			14	32	6			4		56		12	124
7242145	Constr Conc 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			1324	387	212		367	85		265		694	3334
7242154	Repair Bumper System Bldgs Nos 104,105,106	8/1			50										50
7242159	Rehabilitate Cold Storage Room, Messhall	8/3			40	40				38		10	120	16	264
7242158	Move and Install 300'-12" Water Main-K St	8/16			24		24	105	24					234	411
7242161	Replace (1) Post & (3) Truss Ties - Bldg No 106	8/21			96						6			12	114
7242165	Remove & Install Roofing, Eaves & Vent Pipe, Bldg No 107	8/31			126					24				24	174
TOTAL LABOR HOURS AWAITING MATERIAL BACKLOG					2886	1910	728		2742	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	276	21	314	2141

FIGURE 9-4
Master Schedule Board - Awaiting Scheduling Section

MASTER SCHEDULE

WORK CENTER COLOR CODES ⇨

CARP.	PAINT	MASONRY	RIGGER
01	02	04	06

JOB ORDER OR SHOP CONTROL NUMBER	DESCRIPTION	DATE ISSUED TO SHOPS	COMMITTED STARTING DATE	SCHEDULED STARTING DATE	SCHEDULED COMPLETION DATE	REMARKS		TOTAL MANHOURS ESTIMATED AND TOTAL MANHOURS ACTUAL TO DATE												WEEK ENDING 8/12 SCHEDULED & ACTUAL MANHOURS THIS WEEK										CUM. JOB TOTAL	WEEK ENDING 8/19 SCHEDULED & ACTUAL				
								01	02	04	06	11	12	15	21	23	32	TOTAL		01	02	04	06	11	13	15	21	23	32		01	02	04	06	11
7242012	Replace Siding Bldg. Nos. 54,55	7/19		8/14			E	928										928	SCHED.												120				
							A	522										522	ACTUAL												120				
7212014	Secure Bldg. No. 102	8/15	8/17	8/17	8/26		E	(40)										(40)	SCHED.																
							A	(40)										(40)	ACTUAL																
7242015	Alterations Bldg. No. 71	7/3		8/7			E	640	64		(32)	56	736	(16)	48		72	1664	SCHED.				24		80	16			24	144	40			8	
							A	280			(32)	60	400	(16)	16		48	852	ACTUAL				24		80	(16)			24	144	40			(8)	
7242032	Repair West Side Bldg. No. 77	7/3		8/7			E	(252)	(48)			(12)					(188)	(500)	SCHED.	64				4					64	132	64				
							A	(252)	(49)			(12)					(188)	(501)	ACTUAL	64				4					64	132	64				
							E												SCHED.																
							A												ACTUAL																
							E												SCHED.																
			Overexpended				A					4						4	ACTUAL																
TOTALS-	SCHEDULED MAJOR JOBS	ESTIMATED MANHOURS						4189	2846	1383	780	2994	1671	911	3641	441	3962	22,818	TOTAL SCH	572	419	183	120	445	272	150	520	95	580	3356	568	425	170	128	450
		ACTUAL MANHOURS TO DATE						1879	1399	587	407	1473	885	495	1703	318	1904	11,050	TOTAL ACT.	572	419	183	120	445	272	150	520	95	580	3356	568	425	170	128	450
BACKLOG-	SCHEDULED MAJOR JOBS FOR WEEK ENDING			9/2	*			2310	1447	796	373	1525	786	416	1938	123	2058	11,772																	

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

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

* NOTE: COMPUTE BACKLOG BY ADDING DIFFERENCE BETWEEN ESTIMATED AND ACTUAL FOR ALL JOBS EXCEPT THOSE COMPLETED OR OVEREXPENDED

BOARD

PE	SHT. MTL.	MACHINE	EF. & A.C.	LABOR
1	13	15	23	32

EEK 32	CUM. JOB TOTAL	WEEK ENDING 8/26 SCHEDULED & ACTUAL MANHOURS THIS WEEK 01	02	04	06	11	13	15	21	23	32	CUM. JOB TOTAL	WEEK ENDING 9/2 SCHEDULED & ACTUAL MANHOURS THIS WEEK 01	02	04	06	11	13	15	21	23	32	CUM. JOB TOTAL	WEEK E SCHEDU 01	02	WEEK ENDING 9/16 SCHEDULED & ACTUAL MANHOURS THIS WEEK 01	02	04	06	11	13	15	21	23	32	CUM. JOB TOTAL	JOB ORDER OR SHOP CONTROL NUMBER
	120	200										320	200											520	160		160										840	7242012
	120	200										320	202											522														
		40										40																										7212014
		(40)										(40)																										
16	288	80				40	80					488	160				16	160		16		8	848	120		120				136		16		8	1472	7242015
16	288	88				40	80					496	152				20	160		16		8	852														
40	236	120	16								40	412	4	32			8					44	500														7242032
40	236	120	16								40	412	(4)	(33)			(8)					(44)	(501)														
		(LEMON YELLOW)	(VIRIDIAN)	(PINK)	(BURNT OCHRE)	(AZURE)	(GREEN)	(GRAY)	(OLIVE GREEN)	(YELLOW OCHRE)	(SKY BLUE)																									
567	3315	573	418	176	124	440	265	148	508	96	572	3320	544	416	178	115	442	268	152	510	90	565	3280	464	33	456	336	140	95	360	224	120	410	70	460	2671	
567	3315	581	418	176	124	440	265	148	508	96	572	3328	538	417	178	115	442	268	152	510	90	565	3275														

FIGURE 9-5
Master Schedule Board

JOB IDENTITY NUMBER	DESCRIPTION	COMPLE-TION DATE	TOTAL HOURS FOR JOB	HOURS BY WORK CENTER			LABOR 32
				CARP. 01	PAINT 02	MASONRY 04	
7240152	Replace as-phalt tile, Rm. 21, Bldg. 22	30 Aug	~~32~~	~~32~~			
7240193	Alterations to Rm. 103, Admin. Bldg.	13 Sept	36	16	8	8	4
7240219	Alterations to Rm. 122, Supply Dept.		38	24	14		
7260227	Repair Stores		18	14			
TOTAL	For Backlog			543	209	95	364

USE OF CONTROL BOARD

1. Job is posted following review by Division Director.
2. Labor hour entries are circled when all material is available; uncircled entry indicates awaiting material.
3. After all material is available, a deadline completion date is assigned by Division Director.
4. When a work center completes its portion of a job, its labor hour entry is crossed out.
5. It is not necessary or desirable to maintain progress status of these small jobs; for backlog purposes, a work center should be given 100% credit until its portion of a job is completed and the labor hour entry is crossed out.
6. Advise the Division if a job is not completed prior to the designated deadline completion date.

FIGURE 9-6
Minor Work Control Board or Log

9. WORK CENTER SCHEDULING. This type of scheduling covers daily personnel work assignments for the following week.

a. Planning. Work Center Scheduling is both a weekly and a daily operation. It starts when the Work Center Supervisor receives the Work Center Schedule, NAVFAC Form 9-1014/27 (Figure 9-7). This form advises the Specific Job Orders on which work will be required the following week and the labor-hours necessary to adhere to the Master Schedule. The Work Center Supervisor converts the weekly totals for each job into a daily plan and then selects and assigns sufficient Minor Work Authorizations to provide an assignment for all productive labor hours available for each day of the next week. Work Center Scheduling requires close coordination with all Work Center Supervisors on a particular job to ascertain site Availability, or when a preceding craft phase is to be completed.

b. Procedure. Work Center Scheduling accounts for and schedules the entire Work Center work force. After deducting for overhead and fixed assignments, the remaining labor hours can be scheduled on Specific Job Orders and Minor Work Authorizations. As noted previously, approximately 75 percent are scheduled on Specific Job Orders. The remaining 25 percent are scheduled on Minor Work Authorizations. The work schedule should never be interrupted except for unavoidable emergencies. If an emergency, or a priority job, is imposed on the Work Center after the weekly Master Schedule has been prepared, then scheduled Minor Work Authorizations or lower priority single craft specific job orders, not the committed multi-craft Specific Job Orders, should be interrupted to make the necessary personnel available for the emergency or priority. The only scheduling restriction imposed on Minor Work Authorizations is that they must be completed within a specified period established by the field activity, usually two to four weeks after receipt. When Minor Work Authorizations start accumulating to the extent that they cannot be accomplished during the specified period, the Master Scheduler should be informed and that Work Center's commitments on the Master Schedule for subsequent weeks temporarily reduced, or the Work Center's personnel resources adjusted. The Work Center Scheduling process is shown on Procedure Chart No 8. Instructions for completing the Work Center Schedule are provided on the reverse of Form NAVFAC 9-11014/27.

10. WORK CENTER SCHEDULE BOARD.

a. Operation: A Work Center Schedule Board, or the Work Center Schedule, NAVFAC 9-11014/27, if used in lieu of a board, should be prominently displayed in such a place and manner that all Work Center personnel can observe it. The Board or the Form should be completed and posted for the following week by the close of business the preceding Friday. In this way shop personnel know which jobs they are to work on the following week. During the subsequent week, the Work Center Supervisor should visit each major jobsite daily, and minor work sites as is considered necessary. As a result of these visits, and, because of other factors such as emergency leave and weather, it may be determined that a force adjustment is required. Before adjusting the force, the impact upon other Work Centers involved should be considered and, when necessary, the proposed changes discussed with them. Upon reaching a mutual agreement, each supervisor should then adjust the Work Center Schedule accordingly. By the close of business each day, Work Center Schedule Boards must reflect accurate work assignments for the following morning. Also, at the end of each day, actual labor hours expended on each job that day must be posted.

WORK CENTER SCHEDULE (MAINTENANCE MANAGEMENT)

WORK CENTER 01 WEEK ENDING 9/2

JOB NUMBER OF SHOP CONTROL NO		JOB DESCRIPTION	WORK HOURS SCHEDULED	REMARKS
		SPECIFIC J.O.		
7242012	07	Siding Bldg. 54,55	200	
7242015	07	Alter Bldg. 71	160	
7242032	07	Repairs Bldg 77	4	
7242042	07	Dredack	16	
7242060	07	Siding Bldg. 52	8	
7242063	07	Siding Bldg. 42	20	
7242064	07	Repairs Bldg. 35	40	
7242072	07	Louvres Bldg. 48	96	

A – Work Center Schedule for Week Ending 9/2
Prepared by Master Scheduler
on Thursday 8/24

WORK CENTER SCHEDULE (MAINTENANCE MANAGEMENT)

WORK CENTER 01 WEEK ENDING 9/2

JOB NUMBER OF SHOP CONTROL NO		JOB DESCRIPTION	WORK HOURS SCHEDULED		M	T	W	TH	F	SA	WORK HOURS	REMARKS
					200	200	200	200	200		1000	
					0	0	0	0	0		0	
					64	64	64	64	64		320	
					16	16	16	16	16		80	
					152	152	152	152	152		760	
		SPECIFIC J.O.										
7242012	07	Siding Bldg. 54,55	200		40	40	40	40	40		200	
7242015	07	Alter Bldg. 71	160	+8	32	32	32	32	32		160	
7242032	07	Repairs Bldg. 77	4			4					4	
7242042	07	Dredack	16			8	8				16	
7242060	07	Siding Bldg. 52	8					8			8	
7242063	07	Siding Bldg. 42	20			4	8	8			20	
7242064	07	Repairs Bldg 35	40			8	8	8	8		40	
7242072	07	Louvres Bldg. 48	96				24	24	24	24	96	
		MINOR WORK										
7240152	06	Asphalt Life Bldg. 22	32			16	8	8			32	
7240164	06	Screens Bldg. 14	24			16	8				24	
7240153	06	Screens Bldg. 19	32				8	8	8	8	32	
7240187	06	Screens Bldg. 7	24				8	8			24	
7240191	06	Roof Repairs Gym	24		24						24	
7240188	06	Wallboard Bldg. 34	36					16	12	8	36	
7240187	06	Stairs Bldg. 7	20					4	16		20	
7240196	06	Fence Bldg. 80	24					8	16		24	

B – Work Center Schedule for Week Ending 9/2
Developed by Work Center Supervisor
on Friday 8/25

WORK CENTER SCHEDULE (MAINTENANCE MANAGEMENT)

WORK CENTER 01 WEEK ENDING 9/2

JOB NUMBER OF SHOP CONTROL NO		JOB DESCRIPTION	WORK HOURS SCHEDULED		M	T	W	TH	F	SA	WORK HOURS	REMARKS
					200	200	200	200	200		1000	
					0	0	0	0	0		0	
					64	64	64	64	64		320	
					16	16	16	16	16		80	
					152	152	152	152	152		760	
		SPECIFIC J.O.										
7242012	07	Siding Bldg. 54,55	200		40	40	40	40	40		200	
7242015	07	Alter Bldg. 71	160	+8	32	32	32	32	32		160	
7242032	07	Repairs Bldg 77	4			4					4	Complete
7242042	07	Dredack	16			8	8				16	Complete
7242060	07	Siding Bldg 52	8					8			8	on Schedule
7242063	07	Siding Bldg 42	20			4	8	8			20	on Schedule
7242064	07	Repairs Bldg 35	40			8	8	8	8		40	
7242072	07	Louvres Bldg. 48	96				24	24	24	24	96	
		MINOR WORK										
7240152	06	Asphalt Life Bldg. 22	32			16	16	8			40	
7240164	06	Screens Bldg. 14	24			16	8				24	Complete
7240153	06	Screens Bldg. 19	32				8	8	8	8	32	
7240187	06	Screens Bldg. 7	24					8	8		16	Carry Ahead next
7240191	06	Roof Repairs Gym	24		24						24	Complete
7240188	06	Wallboard Bldg. 34	36					16	12	8	36	
7240187	06	Stairs Bldg. 7	20					4	16		20	
7240196	06	Fence Bldg. 80	24					8	16		24	

C – Work Center Schedule for Week Ending 9/2
Maintained by Work Center Supervisor
on Thursday 8/31

WORK CENTER 01 WEEK ENDING 9/9

Job Order or Work Control No.		Job Description	Hours Required		M	Tu	W	Th	F	SA	Total Hours	Remarks
1		2	3	4	5						6	
					N	200	200	200	200		800	
					O							
					L	O	O	O	O		O	
					O	44	44	44	44		220	
					R							
					Y	16	16	16	16		64	
						120	120	120	120		480	
		SPECIFIC J.O.										
7242012	07	Siding Bldg. 54 55	160			40	40	40	40		160	
7242015	07	Alter Bldg. 71	120			32	32	32	32		128	
7242060	07	Siding Bldg. 52	40			16	16	8			40	
7242063	07	Siding Bldg. 42	44			20	8	8	8		44	
7242064	07	Repairs Bldg. 35	32			8	8	8	8		32	
7242072	07	Louvres Bldg. 48	32				16	16			32	
7242083	07	Doors Bldg. 93	12			4	8				12	
7242085	07	Fixtures Bldg. 10	24				8	8	8		24	
		MINOR WORK										
7240187	06	Screens Bldg. 7	24	+16		8					8	only 8 hrs this week
7240197	06	Fence Bldg. 57	24			24					24	
7240212	06	Stairs Fire School	40					16	32		40	
7240183	06	Alterations Bldg. 88 Adams Bldg.	32				8	8			16	
7240196	06	Blinds Bldg. 90	24						24		24	
7240194	06	Const. Partitions Bldg. 62	48				8	8	8		24	Carry 24 hrs next week

D – Work Center Schedule for Week Ending 9/9
Developed by Work Center Supervisor
on Friday 9/1

WORK CENTER 01 WEEK ENDING 9/2

Job Order or Work Control No.		Job Description	Hours Required		M	Tu	W	Th	F	SA	Total Hours	Remarks
1		2	3	4	5						6	
					N	200	200	200	200		800	
					O	200	200	200	200		800	
					L	O	O	O	O		O	
					O	O	O	O	O		O	
					R	44	44	44	44		176	
					Y	44	44	44	44		176	
						16	16	16	16		64	
						16	16	16	16		64	
						152	152	152	152		608	
						152	152	152	152		608	
		SPECIFIC J.O.										
7242012	07	Siding Bldg. 54 55	200			40	40	40	40	40	200	
7242015	07	Alter Bldg. 71	160	+8		40	40	40	40	40	200	+8 Above
						32	32	32	32	32	160	On Schedule
7242032	07	Repairs Bldg. 77	4			4					4	Complete
7242042	07	Drydock	16			8	8				16	Complete
7242060	07	Siding Bldg. 52	8					8			8	
								8			8	On Schedule
7242063	07	Siding Bldg. 42	20			4	8	8			20	On Schedule
7242064	07	Repairs Bldg. 35	40			8	8	8	8	8	40	
						8	8	8	8	8	40	On Schedule
7242072	07	Louvres Bldg. 48	96				24	24	24	24	96	
							24	24	24	24	96	On Schedule
		MINOR WORK										
7240152	06	Asphalt Site Bldg. 22	32			16	16	8			40	
						16	16	8			40	Complete
7240164	06	Screens Bldg. 14	24			16	8				24	
												Complete
7240153	06	Screens Bldg. 19	32				8	8	8	8	32	
							8	8	8	8	32	Complete
7240187	06	Screens Bldg. 7	24					8	8		16	
								8	8		16	Carry 8 hrs next week
7240191	06	Roof Repairs Gym	24			24					24	Complete
7240188	06	Wallboard Bldg. 34	36					16	12	8	36	
								16	12	8	36	Complete
7240187	06	Stairs Bldg. 7	20						8	12	20	
									8	12	20	Complete
7240186	06	Fence Bldg. 30	24						16	8	24	
									16	8	24	Complete

E – Work Center Schedule for Week Ending 9/2
Completed by Work Center Supervisor on
Tuesday 9/5 (Normally Monday) and
Forwarded to Master Scheduler

b. Adjustments. The Work Center Schedule Board is primarily a visual communications means - for all levels of management and craftsmen - to inform them as accurately as possible where that Work Center has been, is, and will be working each day of the week. While scheduled daily assignments are adjusted as required during the week, the weekly assignment (column 4 of NAVFAC Form 9-11014/27) on Specific Job Orders should not be adjusted by the Work Center Supervisor. If a Work Center has overexpended or underexpended its assigned man-hours on Master Scheduled jobs, the total hours behind or ahead must be shown in column 5 of Form NAVFAC 9-11014/27. The Work Center Supervisor, or designee, must then determine how to make up this difference. These decisions will be based upon discussions with the appropriate Branch Manager, held at the first indications that the flexibility provided by Minors will not permit the schedule to be achieved and that possibly other Work Center tasks will be affected. It is possible that a major revision in the Work Center schedule or even the Master Schedule will be required.

11. CRITICAL PATH SCHEDULING. Critical path scheduling is finding the shortest time and/or the most efficient time it will take to complete a job. See Appendix A.

a. USE. In some instances, overtime on a certain phase may reduce overall jobcosts. Also, critical path scheduling permits evaluation of overtime costs in relation to the full benefits to be derived. It may be decided to extend the completion date rather than to authorize the overtime. In short, critical path scheduling provides all the information required to make rational decisions as to time and cost. As an optional method, for use at the direction of the Public Works Officer, it can be effectively used for repair or alteration of jobs normally accomplished by Public Works forces. Generally, only multicraft jobs costing $5,000 or more should be considered for this method. With only superficial examination, critical path scheduling may appear to be a complex operation; however, the average Master Scheduler can become proficient in its use with a little study and practice. Although this technique might not be used very often, the principles apply to all types of scheduling. Therefore personnel executing the scheduling function should become familiar with the technique.

b. ADVANTAGES. A critical path schedule takes more time to develop than an ordinary schedule, but this extra effort is offset by the following advantages:

(1) A much more reliable and inclusive schedule is developed than that produced by the ordinary scheduling process. The critical path method allows selection of the best schedule under any given set of conditions.

(2) Costly and embarrassing mistakes, such as failing to consider the effect of material delivery on the-job, are less likely to occur; and the possibility of omitting small, but important, job operations is reduced to a minimum.

(3) The entire job is shown in the form of a visible layout diagram for management decisions. Each part or step of the job is represented by an arrow in a diagram, and each part is thoroughly examined to assure its true relation to all other parts.

(4) Supervision can be alerted to the critical parts of a job that require maximum jobsite at tent ion and assistance to complete a job on schedule.

(5) It is not expected that the normal job will be scheduled under this method. Occassionally large jobs are performed, particularly those of special project size where this technique would be of assistance.

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	115.0	1438.9
	04	59.6	752.6
	05	218.7	1988.0
	06	175.3	1942.5
	07	788.2	7864.4
		1465.1	16122.3
	40	5.5	51.2
	41	152.0	1820.0
	42	89.6	752.1
	43	58.0	531.0
	44		
	45	178.0	1962.0
		483.1	5116.3
		1948.2	21238.0
12	01	79.0	831.2
	02	16.0	194.6
	03	81.0	754.2
	04		215.6
	05	495.0	5318.1
	06	51.6	436.2
	07	115.0	1630.2
		837.6	9380.1
	40		31.2
	41	120.0	1432.0
	42	94.6	756.0
	43	45.0	421.8
	44		
	45	129.0	1536.0
		388.6	4177.0
		1226.2	13557.1
Branch (A) Summary	01	153.9	1469.4
	02	49.4	592.3
	03	196.0	2193.1
	04	59.6	968.2
	05	713.7	7306.1
	06	226.9	2378.7
	07	903.2	10594.6
		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	2431.6	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	1537.0
	45	1452.0	18536.2
		2685.1	30812.6
		15560.9	147462.1
Utilities Division Summary	01	79.0	833.2
	02	38.2	311.7
	03	104.6	1312.2
	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	586.85	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 9-11014/30 (6-67)
Supersedes NAVDOCKS 2121

For Instructions on use of Form see NAVFAC P-321

REPORT ON VARIATIONS ON COMPLETED JOB ORDERS

DATE: 14 AUGUST 1984

JOB ORDER NO.	BRIEF DESCRIPTION OF JOB	ESTIMATE LABOR (MH)	ESTIMATE MAT'L ($)	ACTUAL LABOR (MH)	ACTUAL MAT'L ($)	REASON FOR VARIATION AND ACTION TAKEN (If more space is needed use supplemental sheets)
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

D-00000

FIGURE 10-1
Report on Variations on Completed Job Orders

MAINTENANCE/UTILITIES LABOR CONTROL REPORT

NAVFAC 9-11014/29 (10-84)

Supersedes NAVDOCKS 2728

☒ MAINTENANCE DIVISION ☐ UTILITIES DIVISION

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

2. ☒ SUMMARY REPORT ☐ BRANCH REPORT

3. BRANCH NAME:

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	6-7.6%
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	66923	-1832	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	67990	62718	-5272	12.1	6-9%
11	02	EMERGENCY WORK	2900	2495	-405	30395	29157	-1238	5.6	1.5-2.5%
12	03	DYNAMIC EQUIPMENT	106	157	57	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	46250	41129	-5121	7.7	
15	06	MINOR WORK	5988	4649	-1339	66294	52995	-13299	10.2	
16	07	SPECIFIC JOB ORDERS	18551	14533	-4018	207683	165394	-42289	31.9	
17										
18										
19		TOTAL PRODUCTIVE MAN-HOURS	40624	34798	-5826	460642	387661	72981	74.7	68-72%
20		GRAND TOTAL MAN-HOURS	57728	50453	-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%			95-105%
23		LABOR PERFORMANCE - NON-EPS[2/]		108%			101%			95-105%
24		PRODUCTIVE MAN-HOUR CONTROL $\frac{\text{Line 12 + 14 + 15 + 16}}{\text{Line 19}}$	69.3%	66.8%		70.5%	67.9%			80-85%

[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

CHAPTER 11

FACILITIES MANAGEMENT APPRAISAL AND QUALITY ASSURANCE

1. PURPOSE. The Facilities Management Appraisal Questionnaire (Table 11-1) is designed to assist key public works managers in comparing, performance with plans so deviations may be noted, rectified, and prevented from occurring again.

2. DISCUSSION. Appraisal is a basic element of the Facilities Management System. The Public Works Officer is responsible for successful maintenance operations. He assigns responsibilities to others to carry out various management functions and delegates necessary authority, but he cannot delegate overall responsibility. It follows, therefore, that if the Public Works Department is to be operated successfully, the Public Works Officer must be fully informed at all times of key indicators. Tabulated and management reports described in Chapter 10, "Report Requirements", assist in controlling and measuring Maintenance and Utilities Divisions maintenance effectiveness, but do not in themselves complete the basic management cycle of planning, executing, and appraising.

3. BENCHMARKS. The beginning point for appraisal in the Facilities Management System is established benchmarks found in this manual and other pertinent manuals and directives (see reference page). These benchmarks serve as guides for operating personnel, and as a basis for measuring personnel performance.

4. FACILITIES MANAGEMENT APPRAISAL QUESTIONNAIRE INTENT. The questionnaire, (Table 11-1) provides a means for monitoring Facilities Management system status: (a) Shore Facilities Inspection, (b) Work Input Control and Planning and Estimating, (c) Shop Scheduling and Work Accomplishment,(d) Facilities Maintenance Resources, (e) Management Reports, and (f) Miscellaneous. Questionnaire answers allow managers to concentrate on assessing reasons for abnormal deviation from target answers, and to initiate corrective actions.

5. FACILITIES MANAGEMENT APPRAISAL QUESTIONNAIRE USE. Questionnaire usefulness depends upon close cooperation and understanding by all Public Works Department organizational components affected either directly or indirectly by the questionnaire answers. Management personnel attitudes will determine whether the questionnaire's use is constructive or destructive. The questionnaire is a management tool for improving cost and labor performance if used within a framework of complete objectivity and education. Also, it must be remembered that detailed analysis arising from questionnaires will potentially reach all Public Works Department organizational components. Each affected manager from the shop foreman to the Public Works Officer should investigate functional element variances beyond acceptable ranges and take suitable corrective action. The questionnaire is intended for self appraisal; therefore, there are no prescribed preparation intervals. A questionnaire indicating problems should stimulate managers to prepare a plan of action to improve performance with short interval follow-up questionnaires to monitor progress.

6. 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 l?	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 all 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 hour6 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.	Rave 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 TAR "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

APPENDIX A

The Critical Path Method (CPM)

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:

JOB PHASE CALCULATION SHEET
NAVFAC 11014/23 (REV. 1-75)
S/N 0105-LF-002-7160

*See NOTE below

1. CRAFT PHASE NO	2. JOB PHASE NO	3. JOB IDENTITY NO	4. DATE
1		436	2-24-84

5. WORK CENTER NO. AND TITLE: 03 PAINT

6. JOB PHASE DESCRIPTION: PREPARE PRIME AND PAINT 2 NEW PARTITIONS. CLEAN AND PAINT 3 INTERIOR OFFICE SECTIONS, CEILINGS, SPRINKLER SYSTEM AND NEW PARTITIONS FLAT WHITE. UPPER WALLS, CEILING MOULDING, TO BE LIGHT GREEN. LOWER WALLS CHAIR RAIL, BASEBOARD, DOORS, WINDOWS AND TRIM TO BE DARK GREEN. WALLS, TRIM, ETC., TO BE SEMIGLOSS ENAMEL. PAINT EXTERIOR BUILDING SAME COLOR.

REFERENCE 7	TASK DESCRIPTION 8	9. EPS ESTIMATED TIME: UNIT HOURS a.	OCCURRENCE b.	CRAFT TIME c.	NON-EPS ESTIMATED TIME 10
17M	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	
PWA-27	CRAFT PREPARATION LARGE JOB	1.1	3.9	4.3	
19D	PAINT SPRINKLER SYSTEM 390'	8	3.9	4.3	
13I	PAINT INTERIOR OF HEADS	8	2	16	
12T	PAINT EXTERIOR OF BUILDING	65	1	65	88 HOURS
		STEP (3 MEN) DURATION	STEP (9 MEN) DURATION		Computed by
STEP # 9	40% CEILINGS 128 HRS.	42.7	14.2		MASTER
STEP #10	60% WALLS 192 HRS.	64.0	21.3		Scheduler
STEP # 6	EXTERIOR 88 HRS.	24.3			
	408 HRS.	136.6			
			TOTALS (Craft & Estimated Time)	303.1	
			TOTAL (EPS from Nomograph)		402
			TOTAL JOB PHASE TIME		408

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

SHEET OF

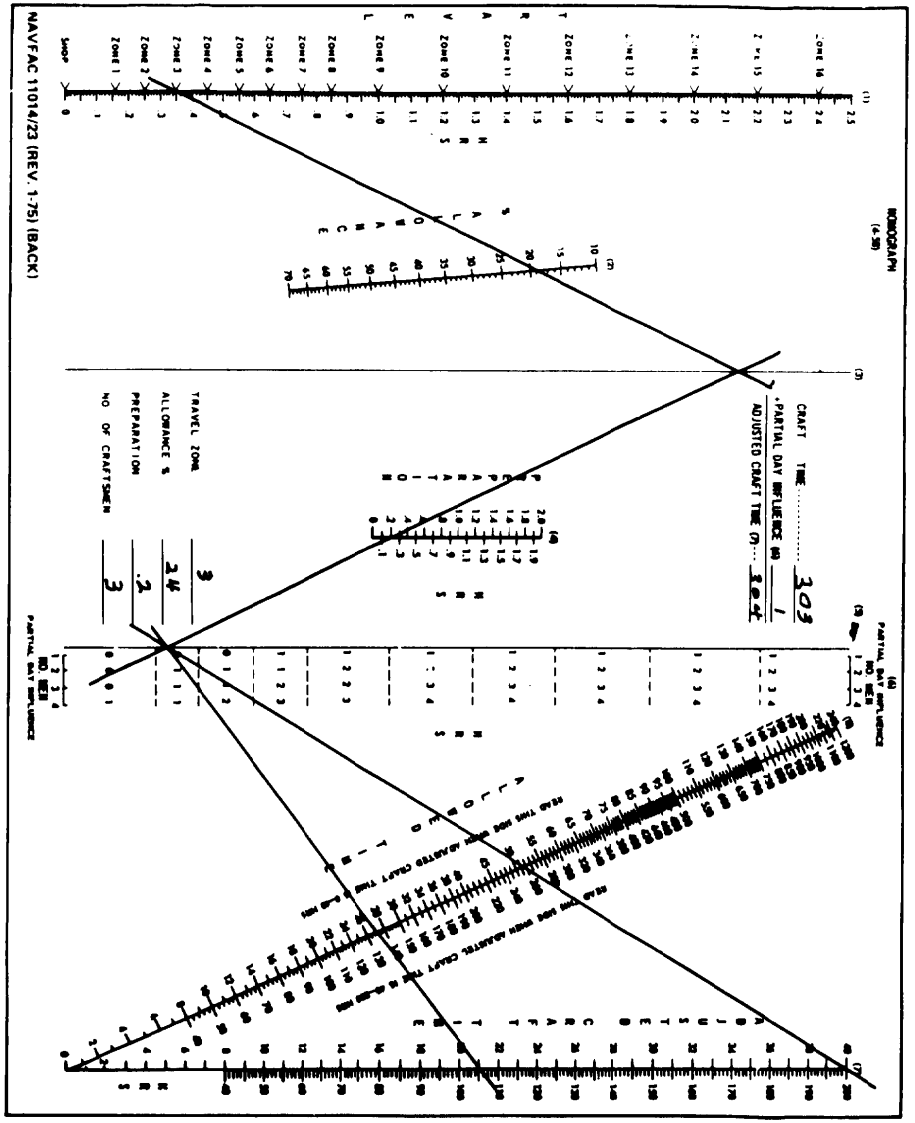


FIGURE A-1
Job Phase Calculation Sheet

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)

NAVFAC 1101/6(R) (10-74) S/N 0108-LF-004-1110
Supersedes NAVDOCKS 2314 and 2314A

(Instructions for completing form are contained in NAVFAC MO-321)

3. JOB ORDER NO: 7312#11

1. ACTIVITY: NAVAL STATION Anywhere
2. ACTIVITY CODE: 62699
4. ESTIMATE NO: 436
5. REQUESTED STARTING DATE: MAY 1974
6. PRIORITY:
7. INSPECTION GENERATED: [ ] YES [ ] NO
8. FACILITY NO:
9. EQUIPMENT NO:
10. MR-CAT 3884: 2515 1721804
11. COST ACCOUNT CODE:
12: 12008
13:
14:

15. NAVY ACCOUNTING DATA

a. APPROPRIATION SYMBOL AND SUBHEAD	b. OBJECT CLASS	c. BUREAU CONTROL NUMBER	d. AUTH. ACCOUNTING ACTIVITY	e. TRANS CODE	f. PROPERTY ACCTG ACTIVITY	g. COST CODE

16. FOR FURTHER INFORMATION CALL (Name and telephone):
17. SKETCH/PLAN ATTACHED (IF YES INDICATE NUMBER): [X] YES _____ [ ] NO
18. LABOR CLASS CODE (Except for overhead): 87

19. JOB TITLE: CONVERT STOREHOUSE, BUILDING 32 INTO THREE OFFICE AREAS

20. GENERAL JOB DESCRIPTION:
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

a. BREAKDOWN OF WORK				b. SUMMARY OF ESTIMATE				
JOB PHASE NO (1)	WORK CENTER (2)	DESCRIPTION (3)	EST HOURS (4)	WORK CENTER (5)	LABOR HOURS (6)	LABOR (7)	MATERIAL (8)	TOTAL ESTIMATE (9)
	01	Construct and erect 60 linear feet		02"	300	647	484	1,131
		of 12' high full partition sheat-		03"	606	848	296	1,136
		hed with gypsum wall board on both		07"	29	68	835	895
		sides, 2"x4" frame. Studs 16" a.c.		12"	153	329	1372	1,201
		5" baseboard with shoe moulding.		14"	8	13	7	28
		Shoe moulding to be set loose. 3"		15"	26	161	125	336
		cave ceiling coulding. Install						
		6'8"x2' 8" door (flush type) in						
		center of new partition. 4" chair						
		rail to be installed on wall.						
				TOTAL	978	2050	3169	5,219
				c. CONTINGENCY				
				d. OVERHEAD AND/OR SURCHARGE				
				e. GRAND TOTAL				5,129

22. DISTRIBUTION

MCD	1							
ADP	1							
MAINT	12							

23. AUTHORIZED WORK TO BE PERFORMED (Signature): TITLE: W.A. HATCH DATE: 6 MAR 84

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT) CONTINUATION SHEET

NAVFAC 1101A/6BA (10-74) S/N 0108-LF-004-1110
Supersedes NAVDOCKS 2314A and 2317

1. JOB ORDER NO: 7312011
2. ESTIMATE NO: 436

3. JOB PHASE NO	4. WORK CENTER	5. DESCRIPTION	6. EST HOURS
	01	Lay 5300 SQ. FT. of 9"x9" asphalt tile with 15Q asphalt felt base	
		on existing wood floor. Existing loose floor structure to be	
		realigned and rough sanded before cementing 15Q 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 base-	
		board flat white. Walls above door, ceiling moulding, light areas.	
		Paint all walls including chair rail, baseboard, shoe moulding	
		doors, windows, casing and trim, etc. to be seal-gloss. Paint	
		Paint exterior existing color.	406"
	21	Install and connect 52 stem mounted, 4 tube 48" louvered fluores-	
		cent 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 cass iron radiators. Pro-	
		vide 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"

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

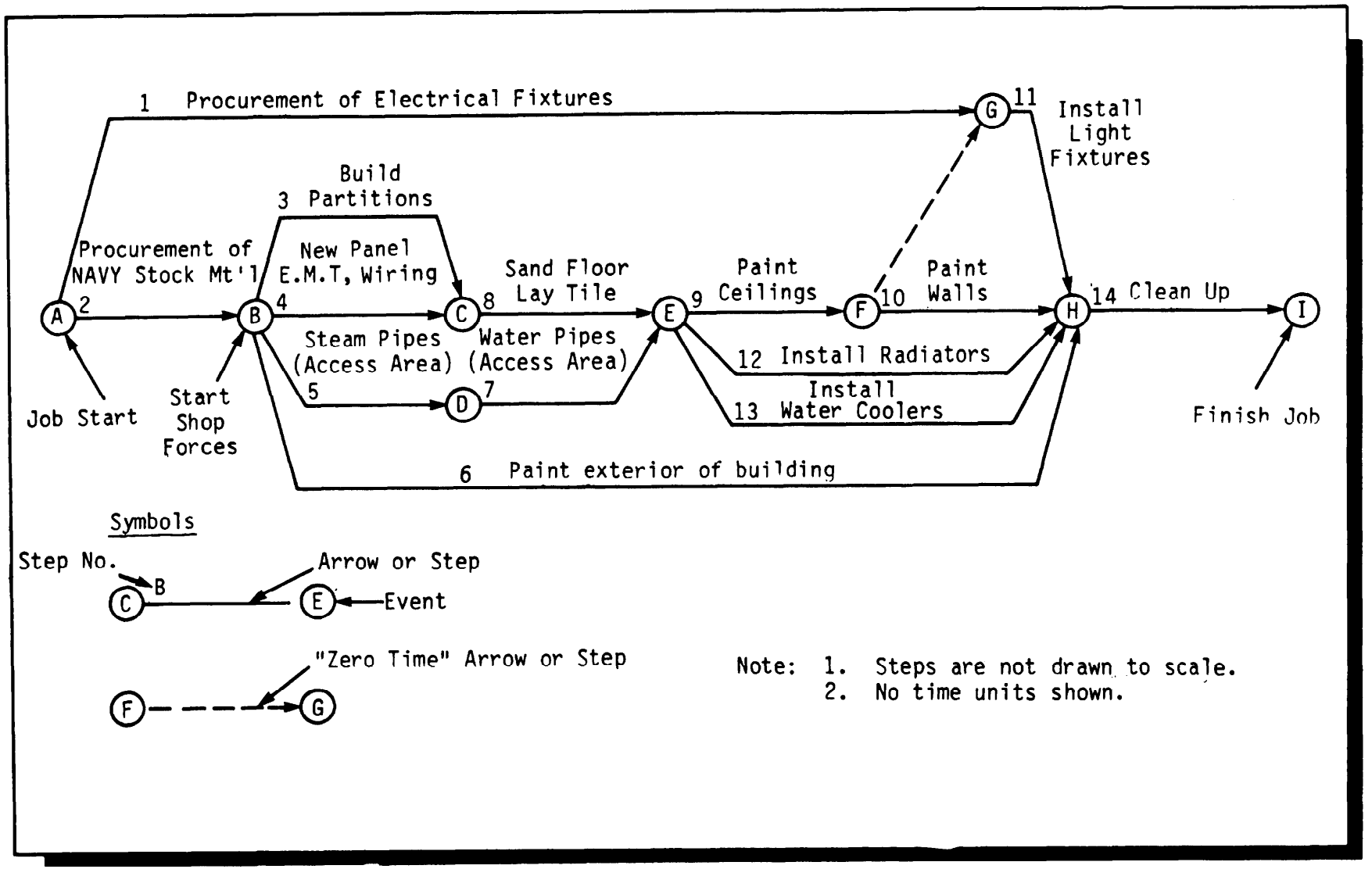


FIGURE A-4
Arrow Diagram

(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.

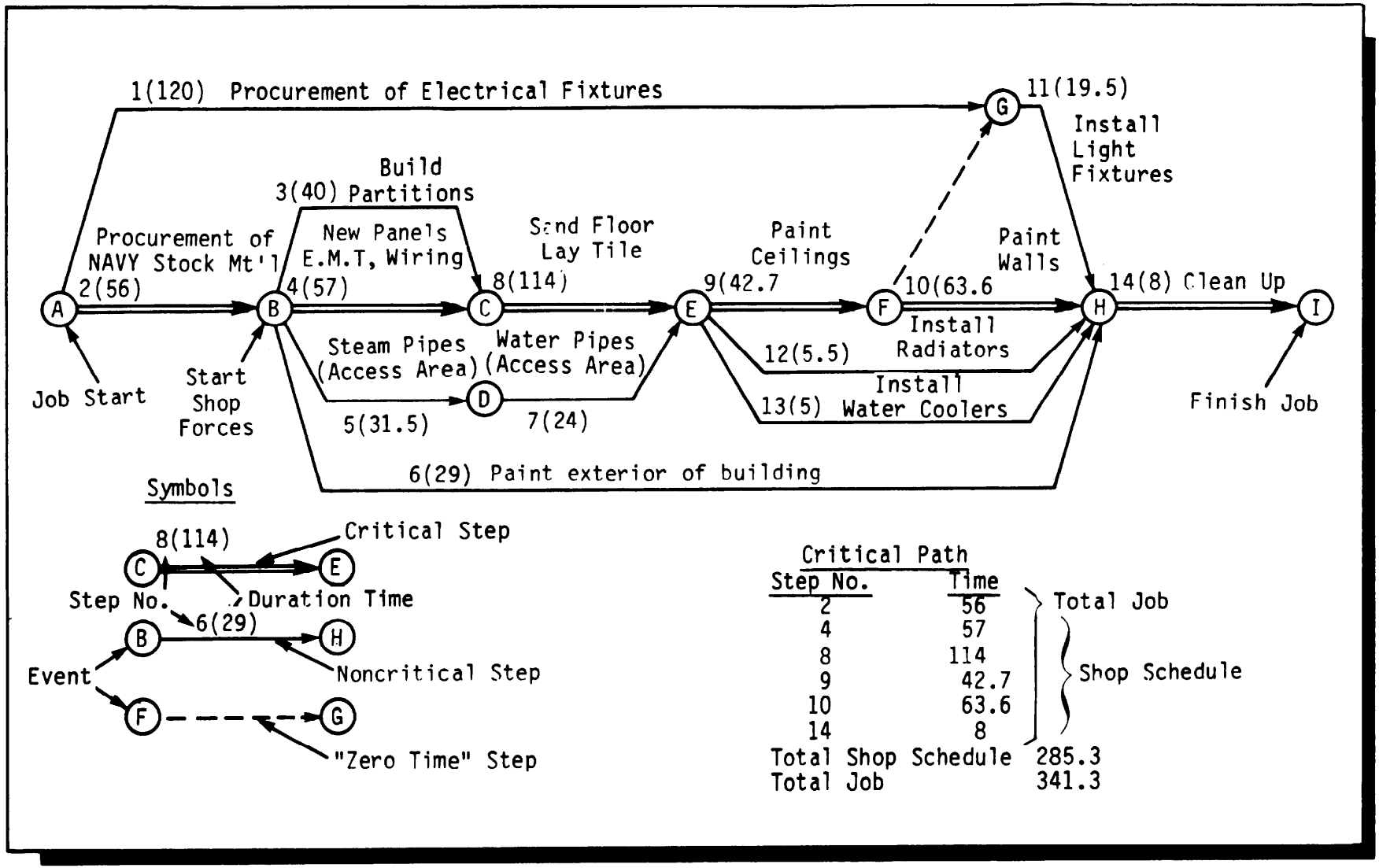
(3) Arrows (steps) are numbered to agree with the step number shown in the step list. A brief description of the work involved may also be placed on the arrow.

(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.



Critical Path

Step No.	Time	
2	56	Total Job
4	57	Shop Schedule
8	114	
9	42.7	
10	63.6	
14	8	
Total Shop Schedule	285.3	
Total Job	341.3	

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

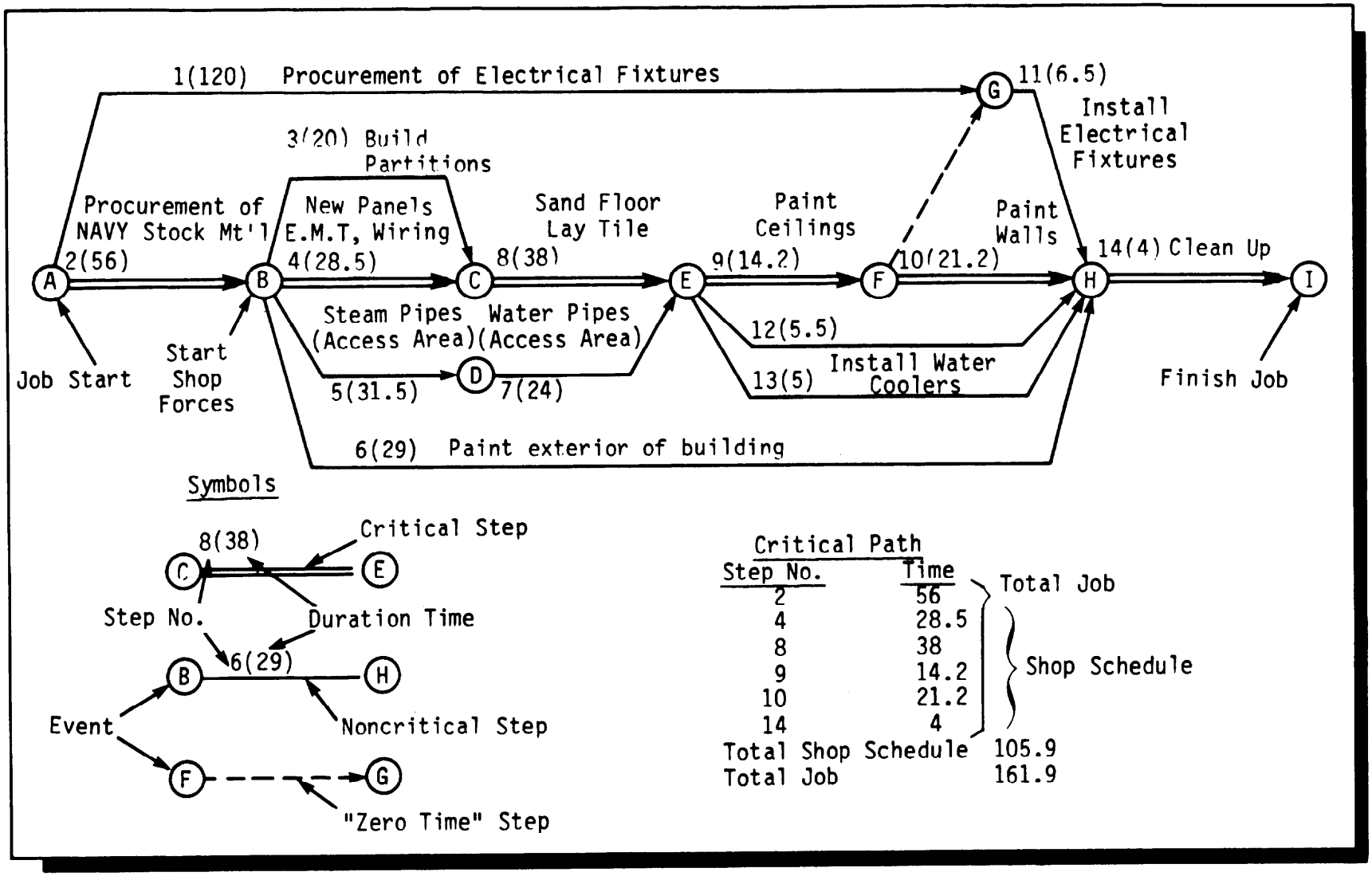


FIGURE A-6
Final Critical Path

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?

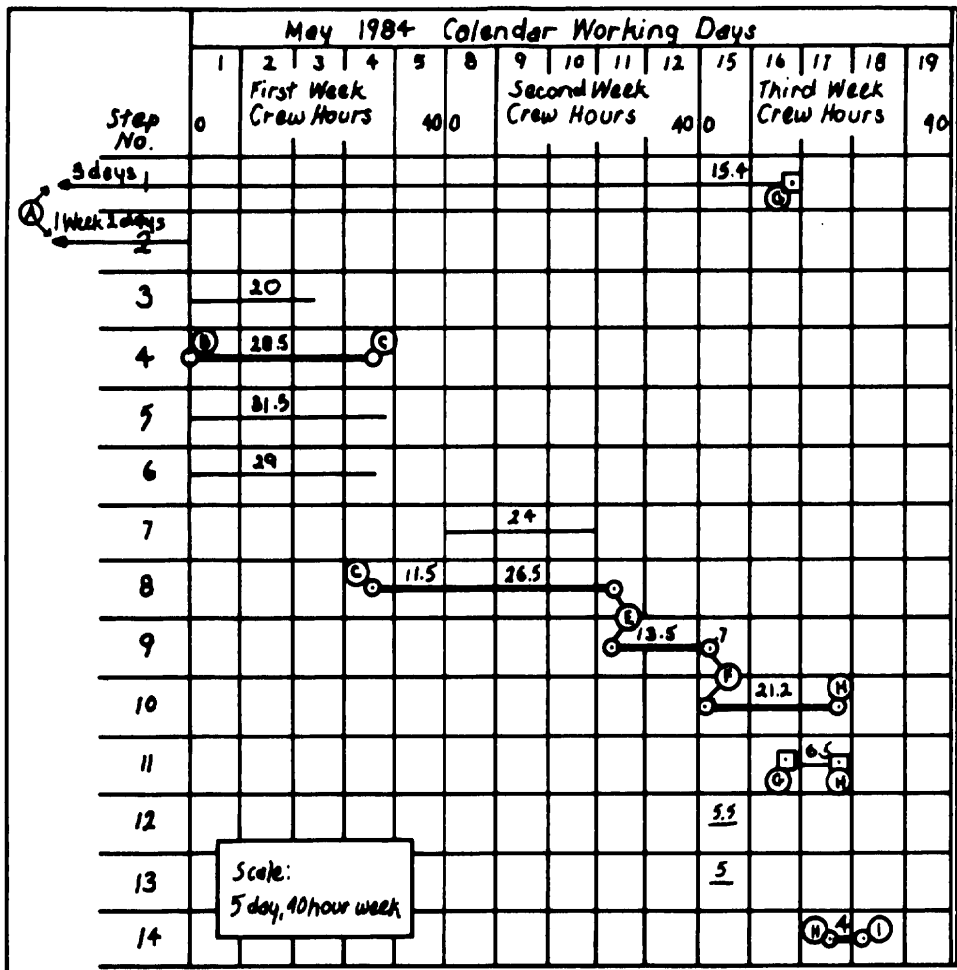
As suggested in paragraph 1b, steps 9 and 10 might be subdivided and regrouped into: 9, prepare ceilings and walls; 9a, prime ceilings and walls; 9b, paint ceiling and sprinkler system; 9c, paint upper walls, and 10, paint dado. This arrangement would minimize spotting wall because different paint colors 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



Step No.	No. in Crew	Work Center	First Week	Second Week	Third Week	Total Labor-hours	
1						120	
2						56	
3	4	01	80 20			80	Scheduled Labor-hours Duration hours
4	4	21	114 28.5			114	Scheduled Labor-hours Duration hours
5	2	15	63 31.5			63	Scheduled Labor-hours Duration hours
6	3	02	87 29			87	Scheduled Labor-hours Duration hours
7	1	11		24 24		24	Scheduled Labor-hours Duration hours
8	6	01	69 11.5	159 26.5		228	Scheduled Labor-hours Duration hours
9	9	02		121.5 13.5	6.8 .7	127.8	Scheduled Labor-hours Duration hours
10	9	02			190.8 21.2	190.8	Scheduled Labor-hours Duration hours
11	6	21			39 6.5	39	Scheduled Labor-hours Duration hours
12	2	15			11 5.5	11	Scheduled Labor-hours Duration hours
13	1	11			5 5	5	Scheduled Labor-hours Duration hours
14	2	32			8 4	8	Scheduled Labor-hours Duration hours

Notes: Step 11 as shown would require 3.6 labor-hours on 16 May or 0.6 hours per worker. Schedule all for 17 May.

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)
NAVFAC 9 11014/28 (10-84)
Supersedes NAVDOCKS 2339

☐ TENTATIVE SCHEDULE ☐ FINAL SCHEDULE

1 COMMITTED STARTING DATE: 5-1-84

2 JOB ORDER OR SHOP CONTROL NO: 7312011

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

4 TOTAL ESTIMATE LABORHOURS: 978

5 JOB ELEMENTS	6 WORK CENTER	7 WEEKLY LABORHOUR 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 LABORHOURS WEEKLY				413	305	260		413	305	260
TOTAL LABORHOURS CUMULATIVE				413	718	978		413	718	978

Note: No carbon paper necessary.

FIGURE A-9
Job Schedule

APPENDIX B

PROCEDURE CHARTS

PROCEDURE Charts

NO. 1 – PROCESSING WORK REQUEST–OTHER THAN PWD FUNDS IF ESTIMATE IS NOT REQUESTED

NO. 2 – PROCESSING WORK REQUEST–OTHER THAN PWD FUNDS IF ESTIMATE IS REQUESTED

NO. 3 – PROCESSING WORK REQUEST–FUNDS UNDER CONTROL OF PWD (PART I)

NO. 4 – PROCESSING WORK REQUEST–FUNDS UNDER CONTROL OF PWD (PART II)

NO. 5 – INITIAL PROCESSING OF SPECIFIC JOB ORDERS AND MINOR WORK AUTHORIZATIONS

NO. 6 – SUBSEQUENT PROCESSING OF MINOR WORK AUTHORIZATIONS

NO. 7 – SUBSEQUENT PROCESSING OF SPECIFIC JOB ORDERS (SCHEDULING)

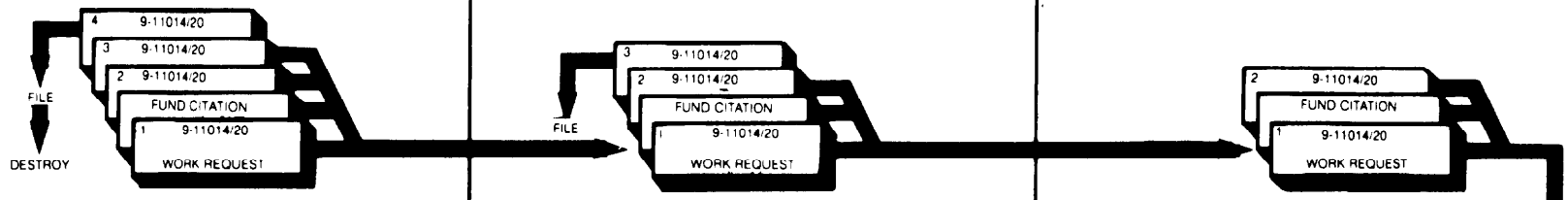
NO. 8 – PROCESSING OF COMPLETED SPECIFIC JOB ORDERS

NO. 9 – LABOR REPORTING PROCEDURE

CHART NO. 1
PROCESSING WORK REQUEST
OTHER THAN PWD FUNDS IF ESTIMATE IS NOT REQUESTED

REQUESTOR	FACILITIES MANAGEMENT ENGINEERING	
	WORK RECEPTION AND CONTROL	DIVISION DIRECTOR

NUMBER OF PERSONNEL AUTHORIZED TO SUBMIT SUCH REQUESTS SHOULD BE LIMITED AND SPELLED OUT IN STATION INSTRUCTION.



1. Prepares Form NAVFAC 9-11014/20 filling in all Part I items, filling in items 19, 21, and 22 of Part III, attaches sketch or plans as required
2. Attaches Fund Citation Document to original and two copies; forwards to Public Works Department
3. Retains Copy No. 4

4. Screens for adequacy of information and validity of signature
5. Forwards original and copy No. 2 with Fund Citation Document to Division Director
6. Retains Copy No. 3

7. Determines, by preliminary review, that requested work conforms to activity policy and that processing may proceed

If Work Request is disapproved reason is inserted in Part IV over signature of Public Works Officer. Both copies returned to requestor, via Work Reception and Control

CHART NO. 1 (Continued)

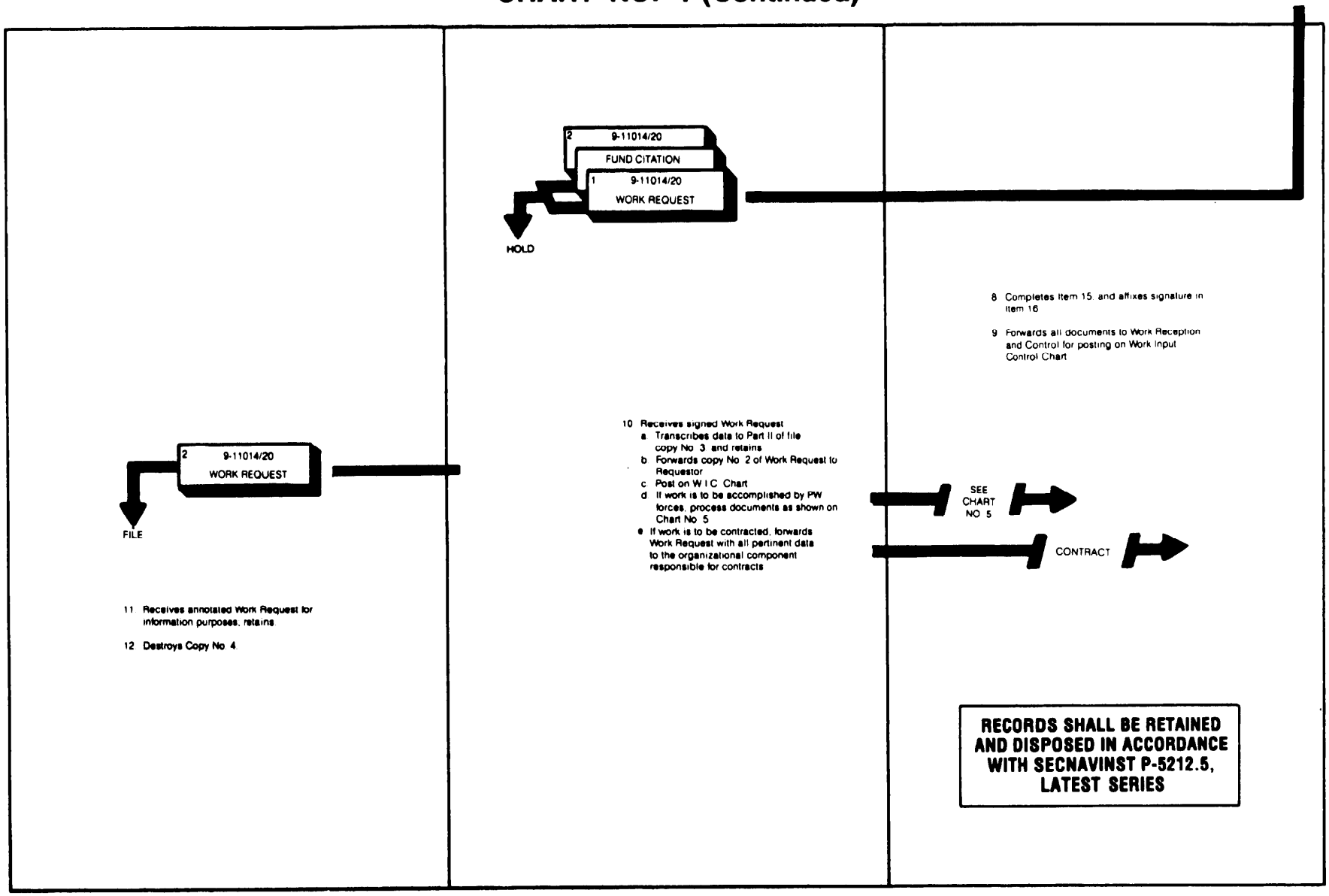


CHART NO. 2
PROCESSING WORK REQUEST
OTHER THAN PWD FUNDS IF ESTIMATE IS REQUESTED

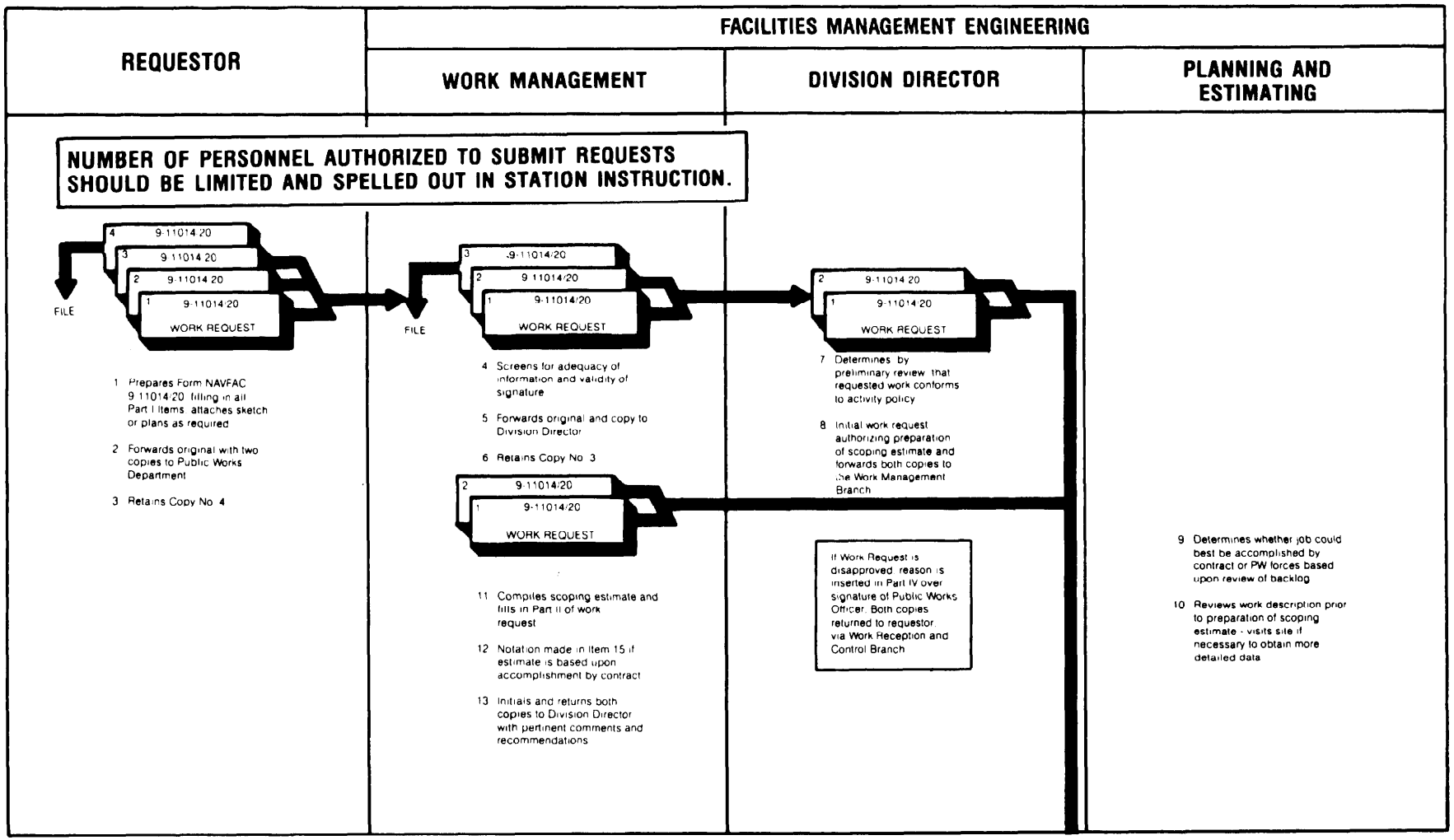


CHART NO. 2 (Continued)

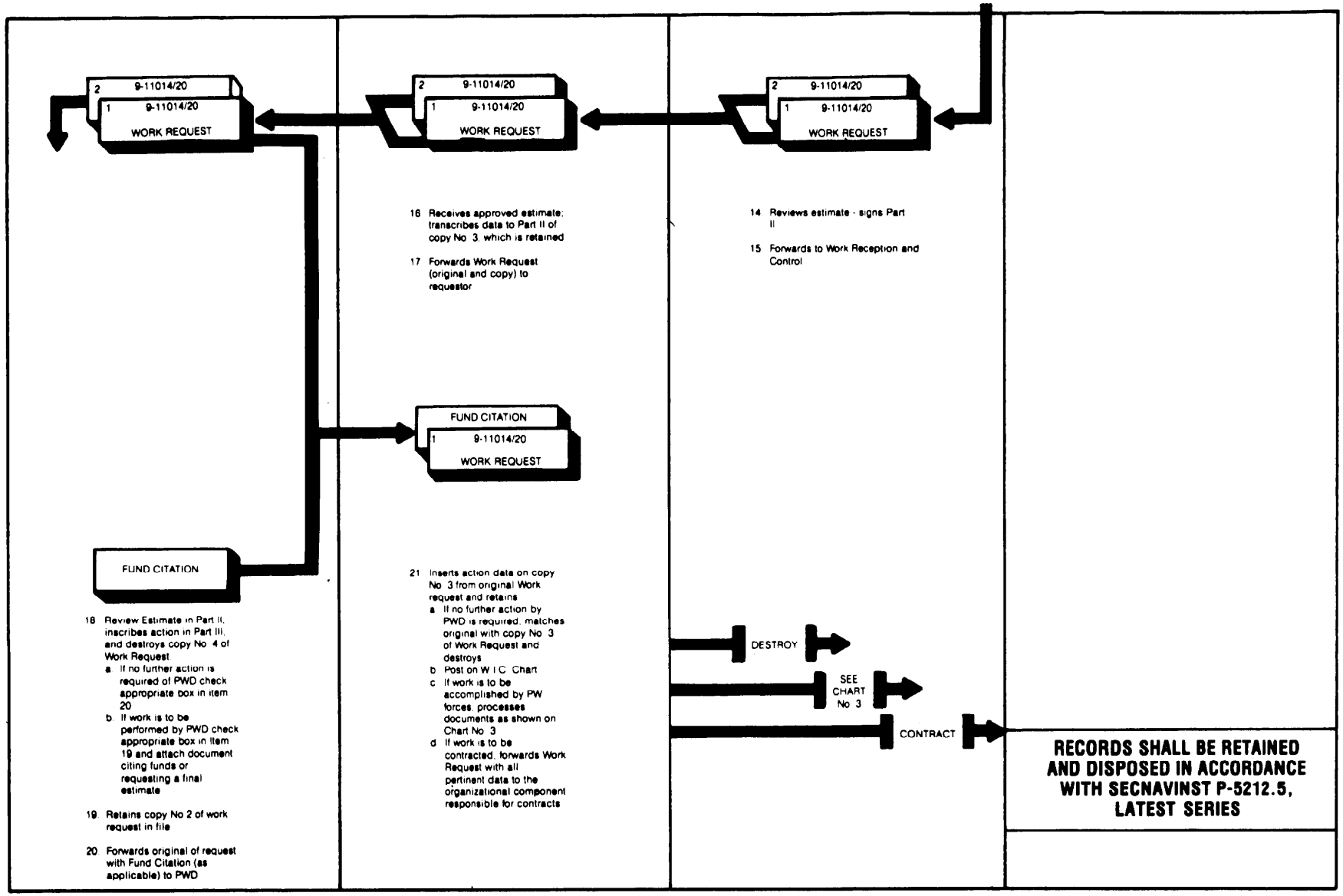


CHART NO. 3
PROCESSING WORK REQUEST
FUNDS UNDER CONTROL OF PWD (PART I)

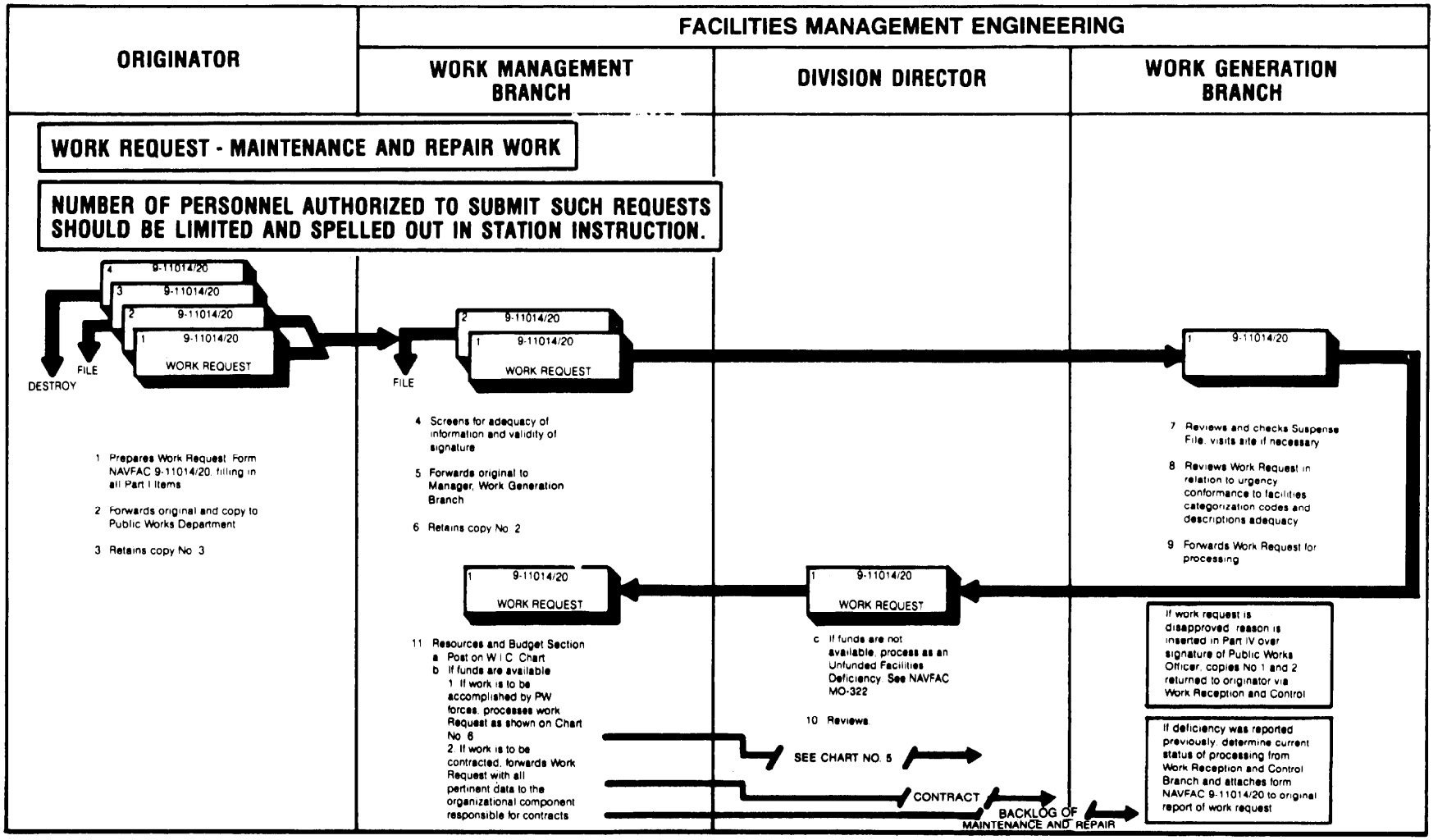


CHART NO. 3 PART I (Continued)

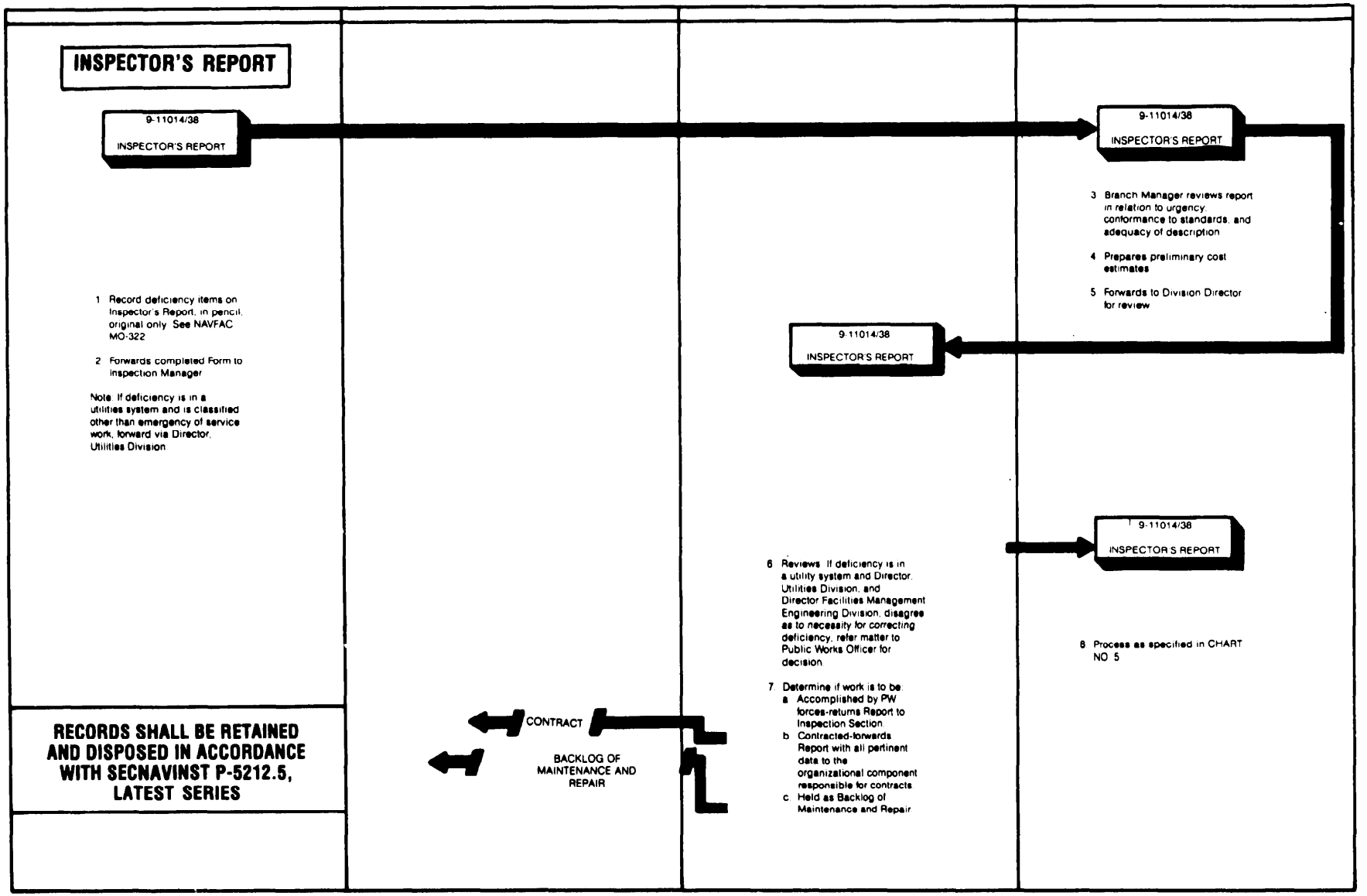


CHART NO. 4
PROCESSING WORK REQUEST
FUNDS UNDER CONTROL OF PWD (PART II)

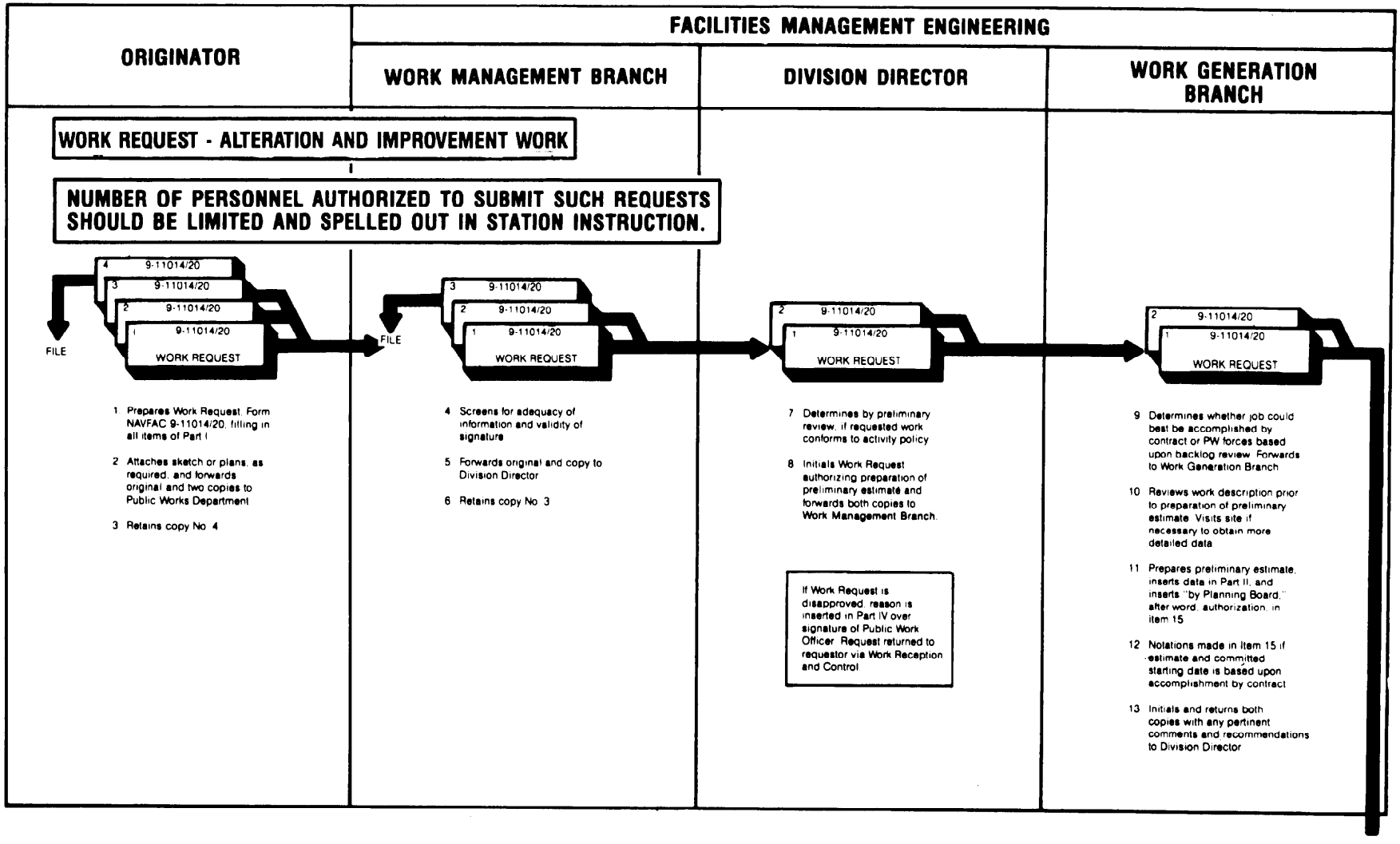


CHART NO. 4 PART II (Continued)

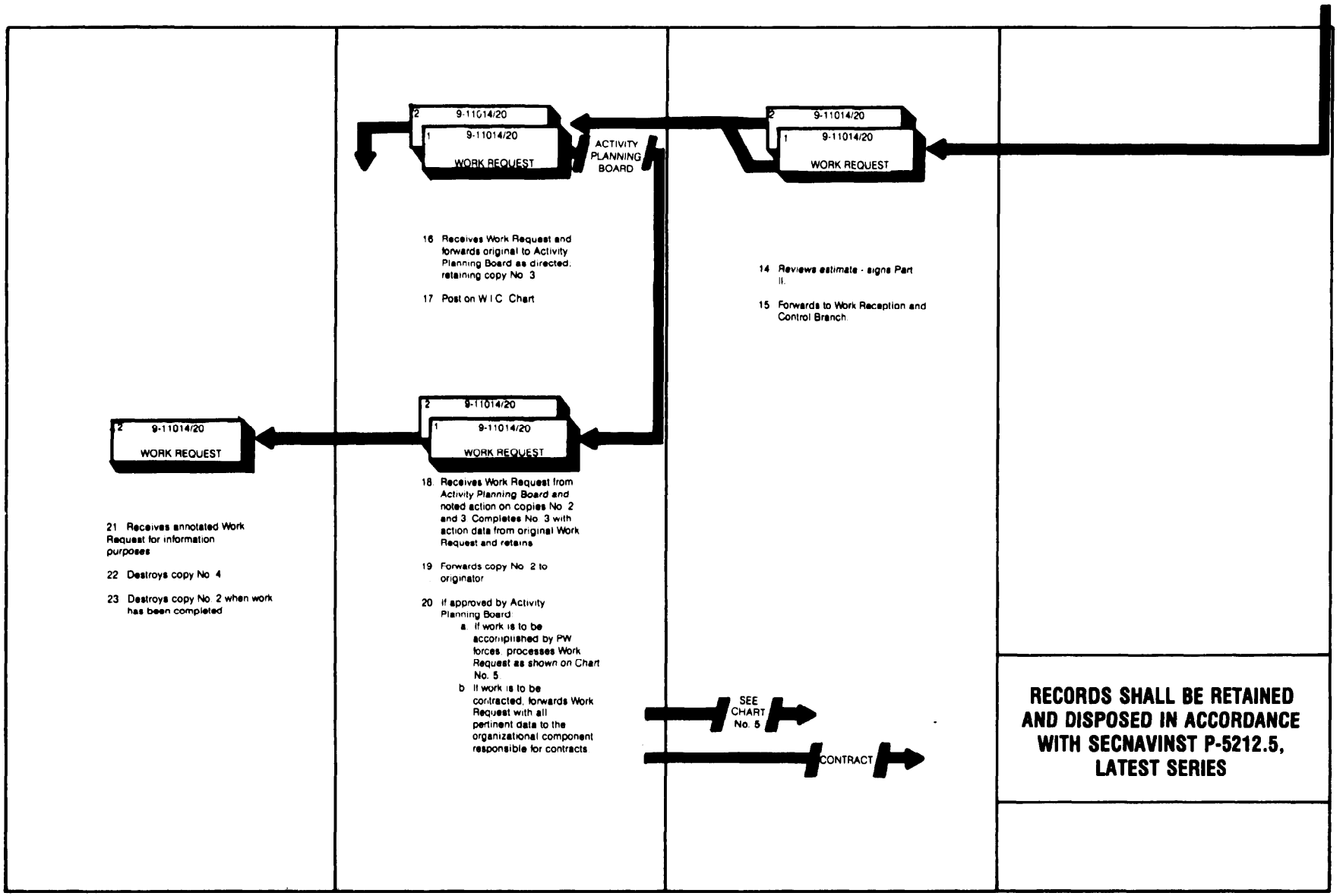


CHART NO. 5
INITIAL PROCESSING OF SPECIFIC JOB ORDERS AND MINOR WORK AUTHORIZATIONS
(IN FACILITIES MANAGEMENT ENGINEERING DIVISION)

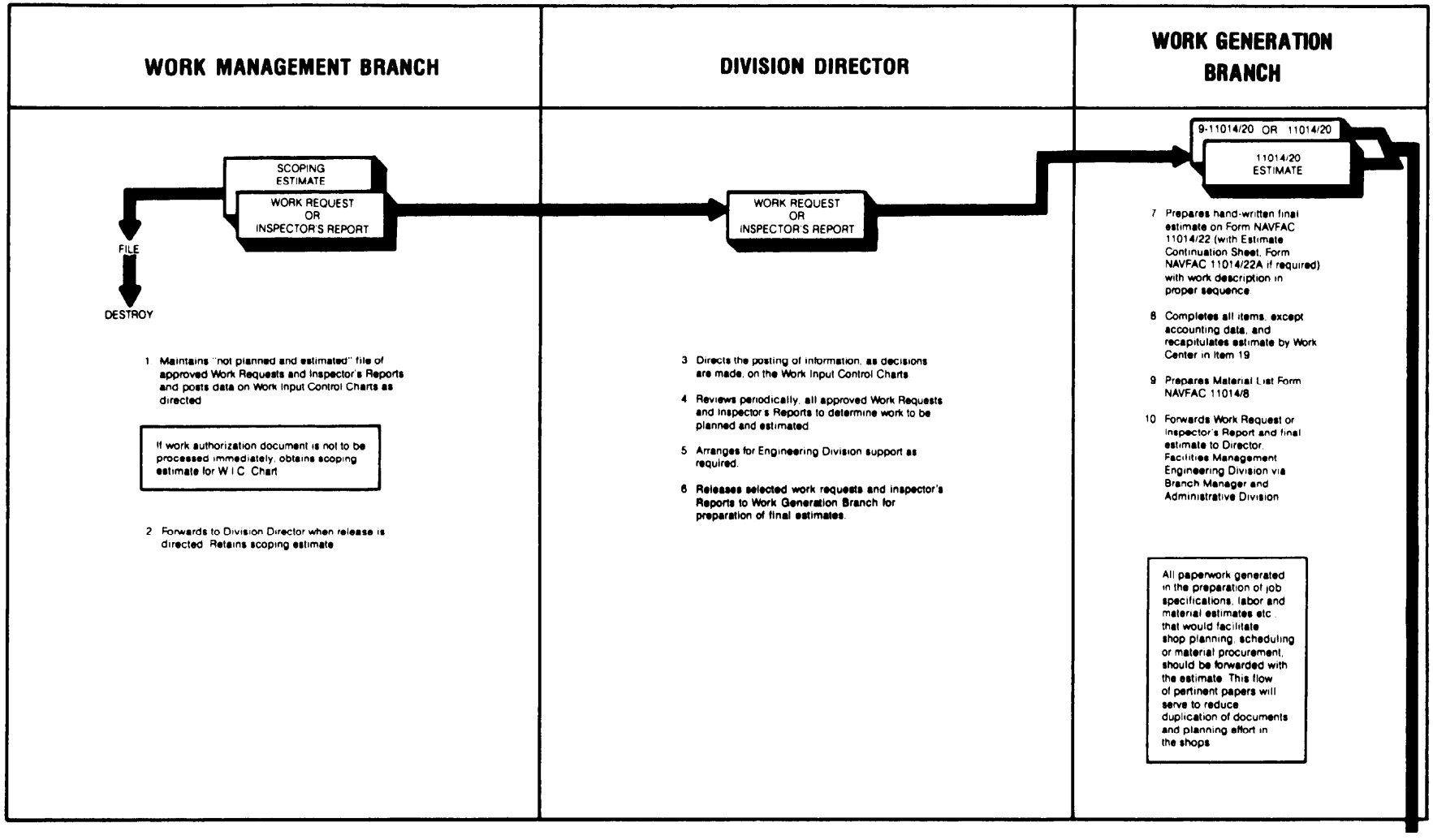
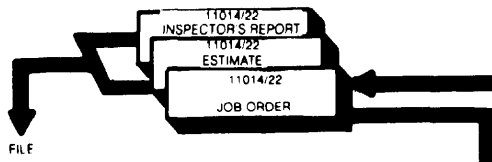


CHART NO. 5 (Continued)



12 Received final estimates, types Job Order Form NAVFAC 11014/22 (with Job Order Continuation Sheet 11014/22A, if required), filling in all items except authorizing signature and date

13 Attaches related sketches, plans, material lists, and other papers of value in shop planning and places in "ready for issue" file Destroys scoping or preliminary estimates, files Work Request and final estimate. If Job Order is to be released immediately, forward Job Order and attached papers to Division Director for action by Step 15

17 Reproduces signed and dated Job Order with related sketches, plans, material lists etc., and distributes as follows:

a Customer

b Maintenance or Utilities Division Director with copies for Master Scheduler, each affected Branch Manager and Work Center Supervisor

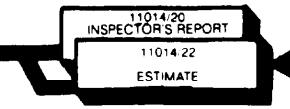
c Fiscal office (Specific Job Orders only, with fund citation as required.)

d Inspection Section with Inspector's Report, if latter was used

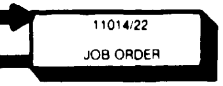
e File

FOR FURTHER PROCESSING SEE:

Chart No. 6 Subsequent Processing of Minor Work Authorizations
Chart No. 7 Subsequent Processing of Specific Job Orders
Chart No. 8 Subsequent Processing of Completed Job Orders



11 Reviews Work Request or Inspector's Report, and final estimate. Initials and forwards to Work Reception and Control



14 Periodically reviews Work Input Control Charts and determines jobs to be released

15 Signs and dates Job Orders, for jobs to be released if within authorized limitations. otherwise, obtains signature of Public Works Officer. (Job Orders shall not be dated until signed for releases.)

16 Returns released Job Orders to Work Reception and Control

Priorities will be established only if directed by the Public Works Officer. When rapid processing is required for certain routine work, e.g. work in housing, the operations in Steps 11, 15, and 16 may be delegated to the Manager, Planning and Estimating

Estimates for Specific Job Orders shall be routed VIA the Financial Branch of the Administrative Division (with fund citation - if customer financed) for insertion of accounting data on Estimate for NAVFAC 11014/22 and recording of reservation, if required

Estimates for Minor Work Authorizations shall not be routed to the Financial Branch. Funding data for the appropriate standing job order shall be used

RECORDS SHALL BE RETAINED AND DISPOSED IN ACCORDANCE WITH SECNAVINST P-5212.5, LATEST SERIES

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

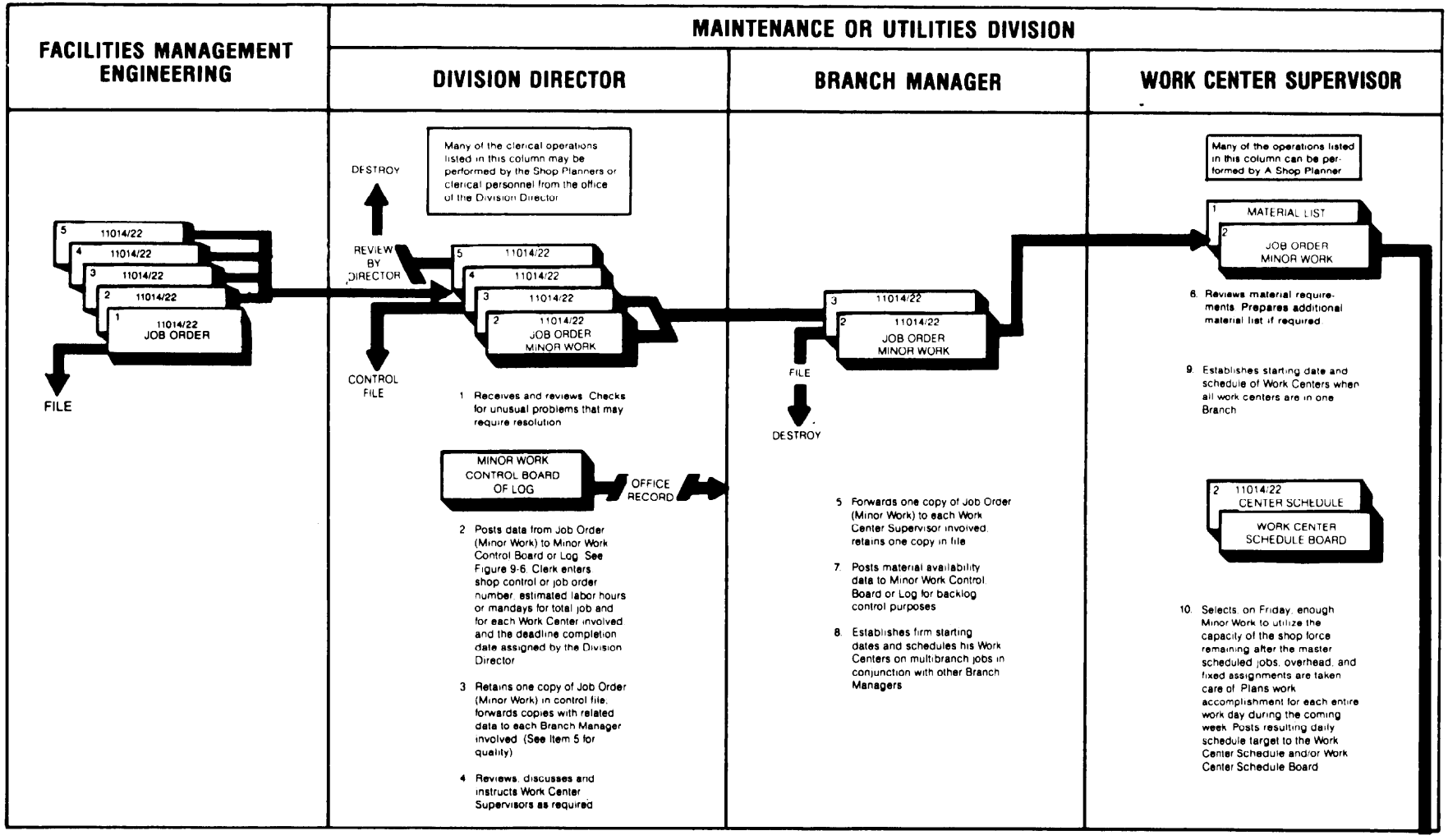


CHART NO. 6 (Continued)

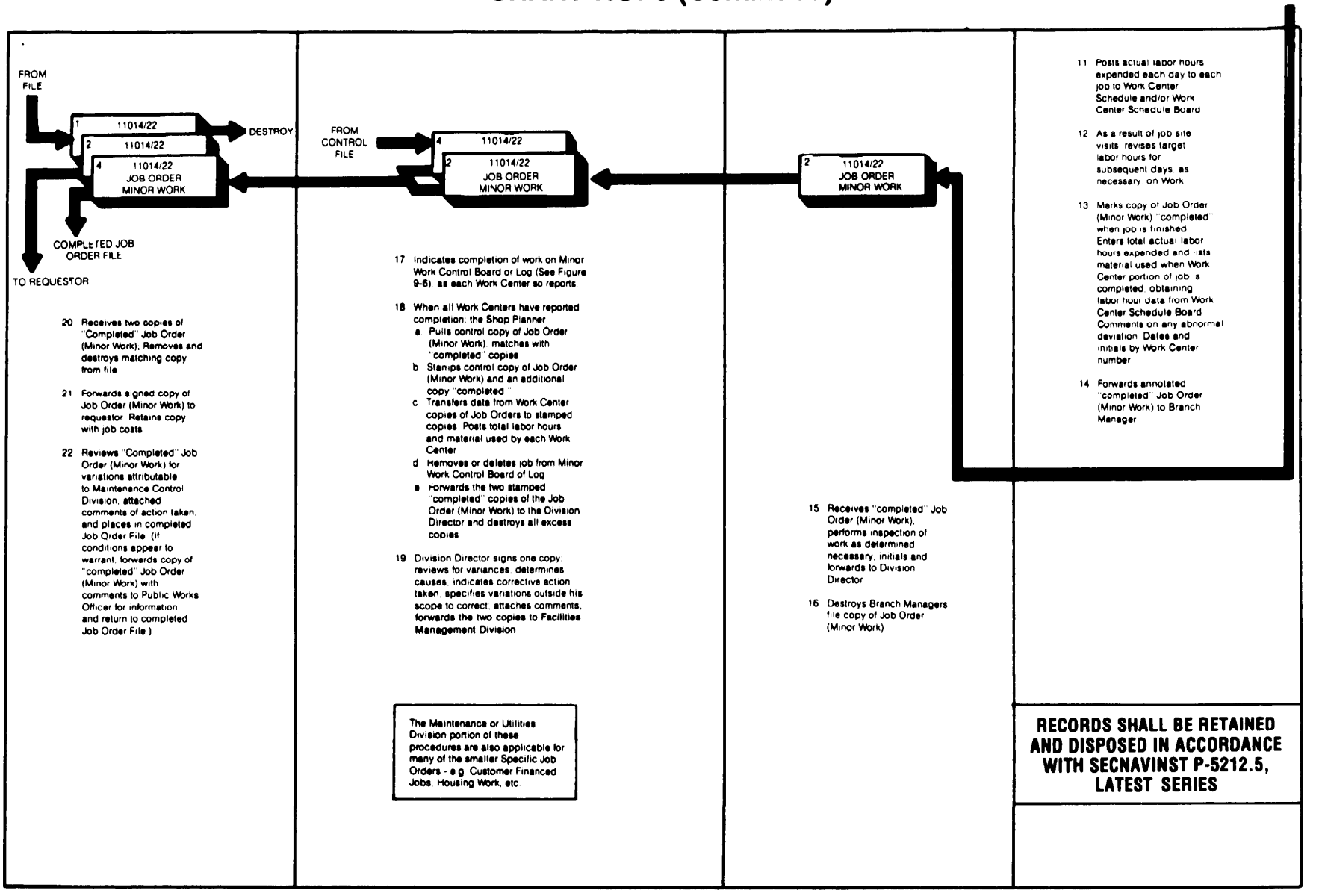


CHART NO. 7
SUBSEQUENT PROCESSING OF SPECIFIC JOB ORDERS (SCHEDULING)
(SEE CHART NO. 5 FOR INITIAL PROCESSING)

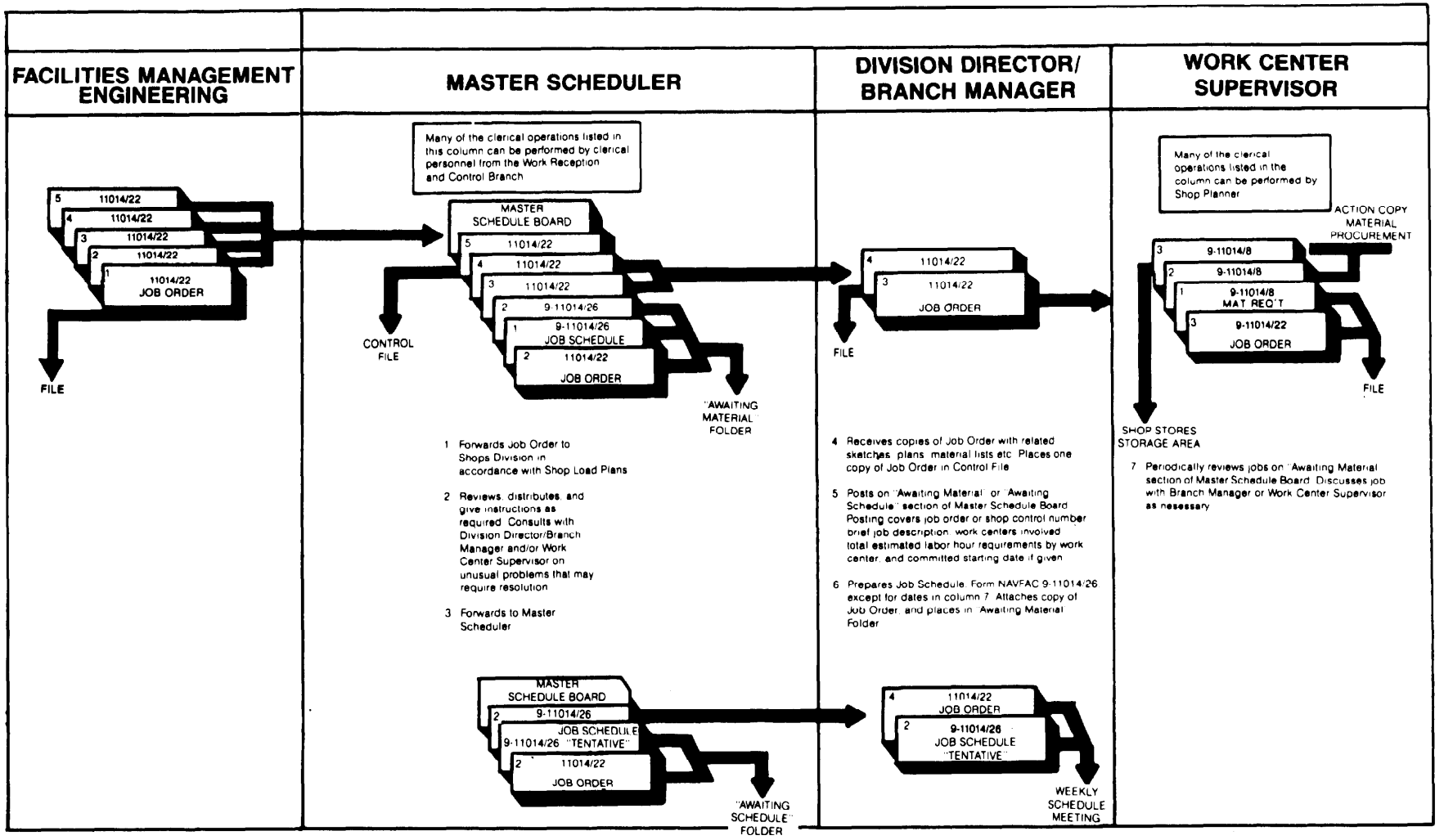


CHART NO. 7 (Continued)

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

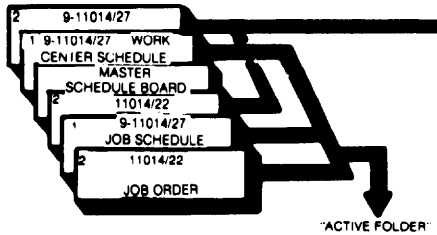
9 Transfers Job Order and Job Schedule from "Awaiting Material" Folder to "Awaiting Schedule" Folder

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



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 for a change in *scope* of work or except in the event of a general emergency which disorganizes the entire schedule

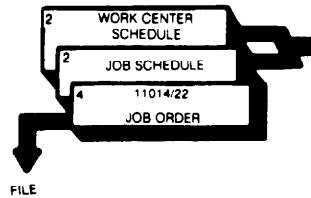
16 Collects all "Tentative" Job Schedules and destroys after preparing "Final" Job Schedules as a result of weekly scheduling meeting

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

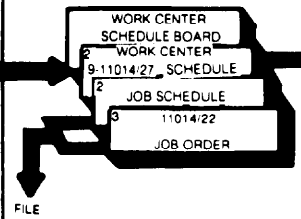
13 Reviews tentative job schedules prior to weekly scheduling meeting

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)

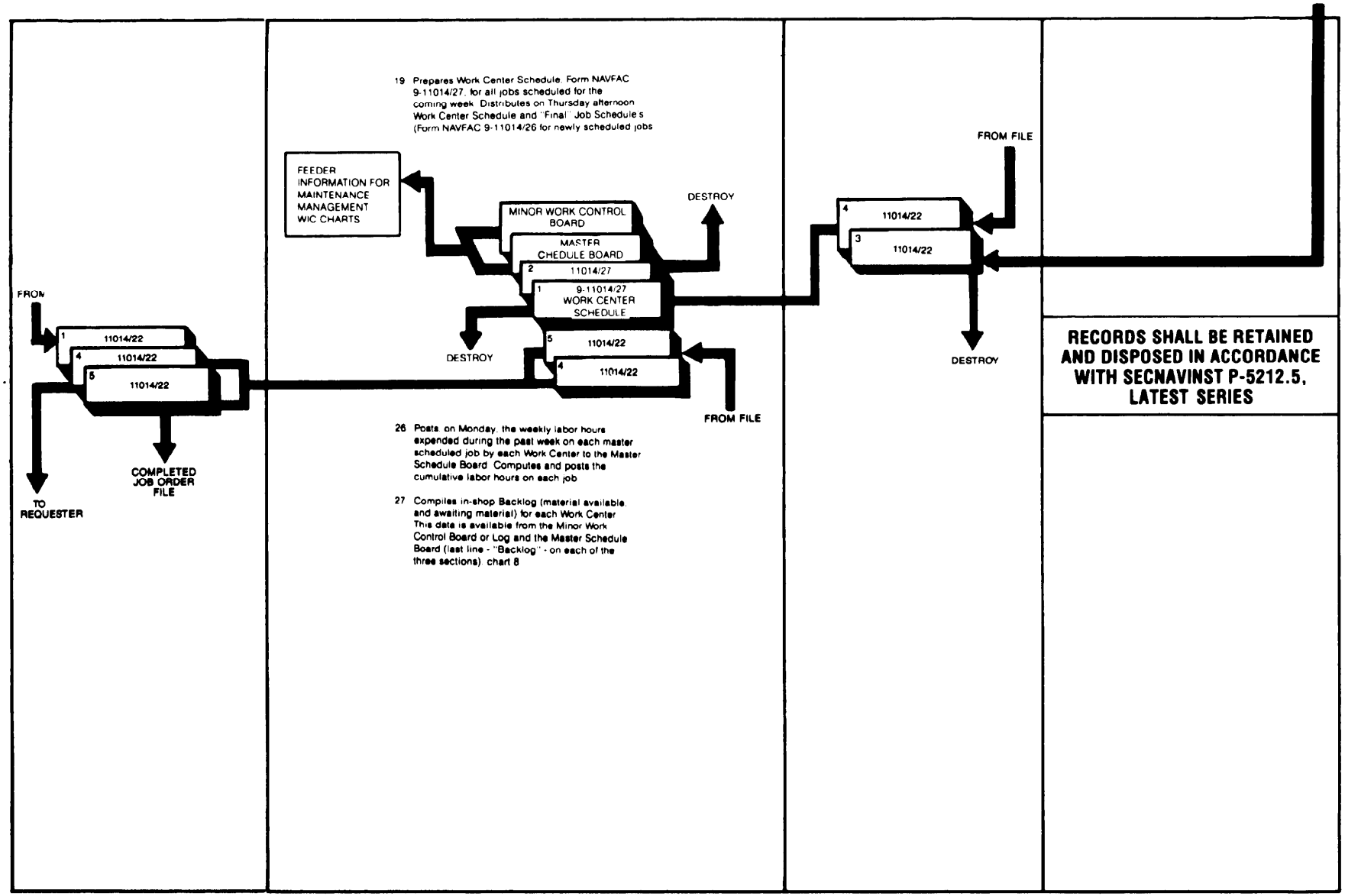


CHART NO. 8
SUBSEQUENT PROCESSING OF COMPLETED SPECIFIC JOB ORDERS)
(SEE CHARTS NO. 5 AND 7 FOR PROCESSING PRIOR TO COMPLETION)

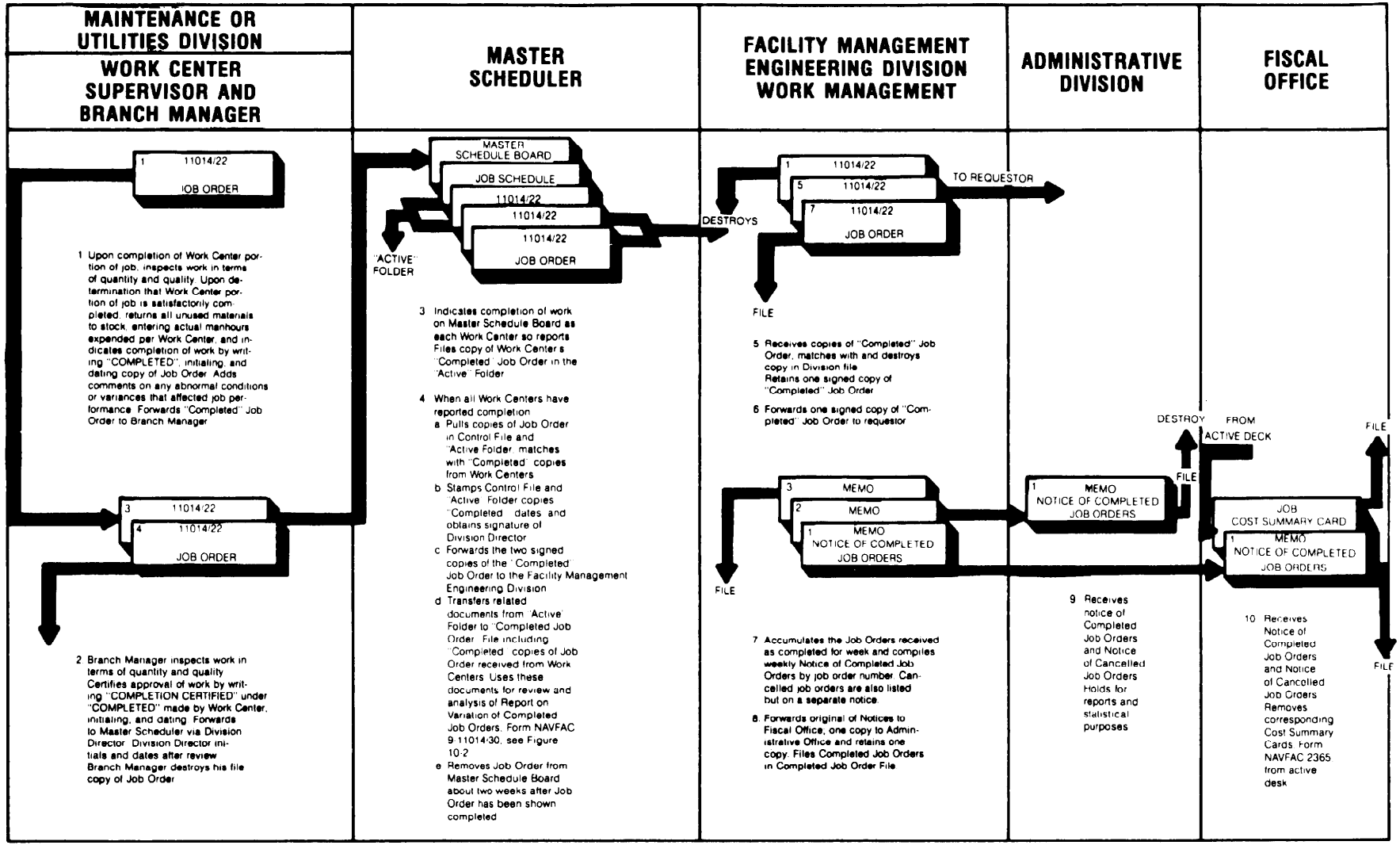
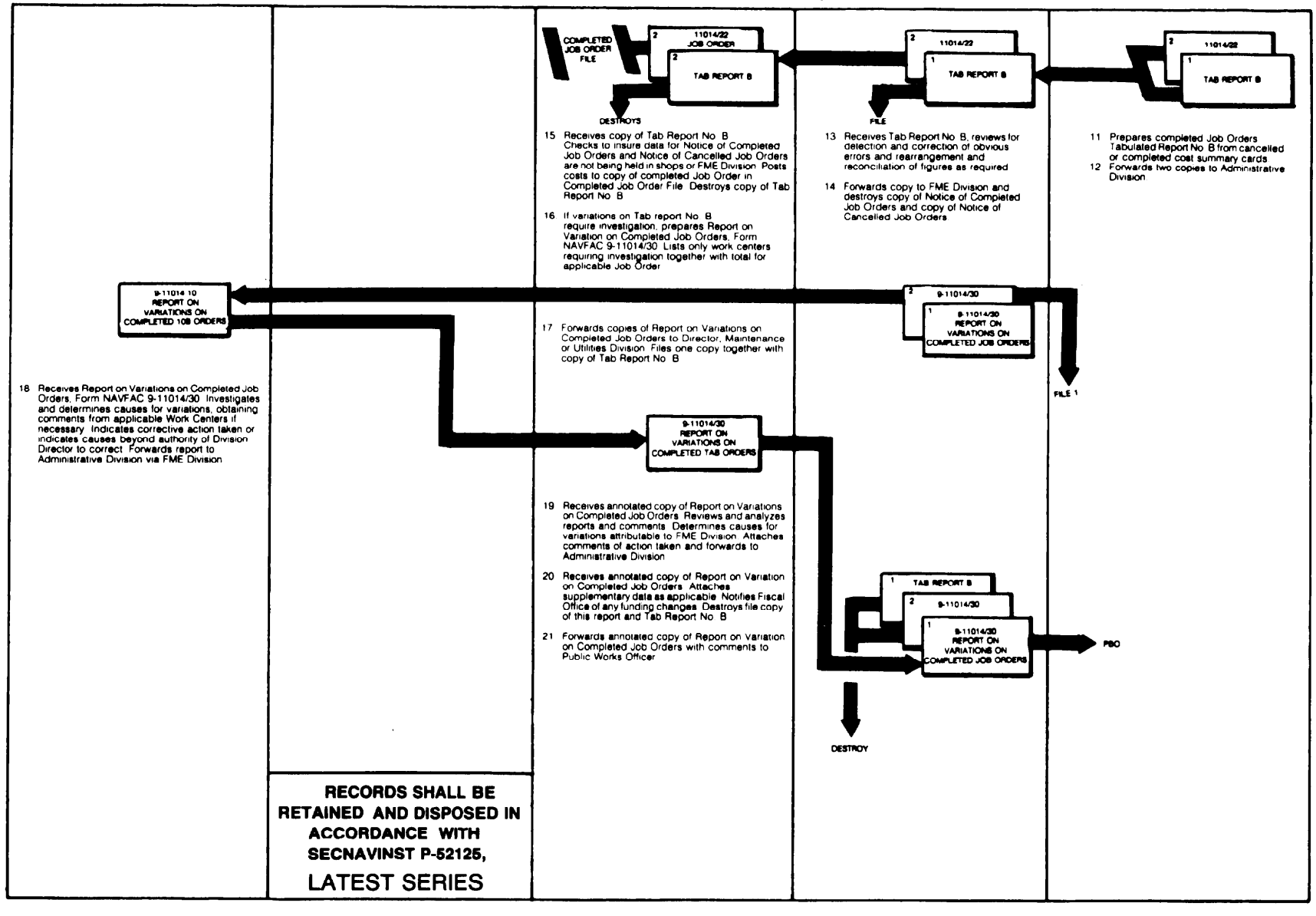


CHART NO. 8 (Continued)



11 Prepares completed Job Orders Tabulated Report No B from cancelled or completed cost summary cards
12 Forwards two copies to Administrative Division

13 Receives Tab Report No B, reviews for detection and correction of obvious errors and rearrangement and reconciliation of figures as required

14 Forwards copy to FME Division and destroys copy of Notice of Completed Job Orders and copy of Notice of Cancelled Job Orders

15 Receives copy of Tab Report No B Checks to insure data for Notice of Completed Job Orders and Notice of Cancelled Job Orders are not being held in shops or FME Division Posts costs to copy of completed Job Order in Completed Job Order File Destroys copy of Tab Report No B

16 If variations on Tab report No B require investigation, prepares Report on Variation on Completed Job Orders, Form NAVFAC 9-11014/30 Lists only work centers requiring investigation together with total for applicable Job Order

17 Forwards copies of Report on Variations on Completed Job Orders to Director, Maintenance or Utilities Division Files one copy together with copy of Tab Report No B

18 Receives Report on Variations on Completed Job Orders, Form NAVFAC 9-11014/30 Investigates and determines causes for variations, obtaining comments from applicable Work Centers if necessary Indicates corrective action taken or indicates causes beyond authority of Division Director to correct Forwards report to Administrative Division via FME Division

19 Receives annotated copy of Report on Variations on Completed Job Orders Reviews and analyzes reports and comments Determines causes for variations attributable to FME Division Attaches comments of action taken and forwards to Administrative Division

20 Receives annotated copy of Report on Variation on Completed Job Orders Attaches supplementary data as applicable Notifies Fiscal Office of any funding changes Destroys file copy of this report and Tab Report No B

21 Forwards annotated copy of Report on Variation on Completed Job Orders with comments to Public Works Officer

RECORDS SHALL BE RETAINED AND DISPOSED IN ACCORDANCE WITH SECNAVINST P-52125,

LATEST SERIES

CHART NO. 9
LABOR REPORTING PROCEDURE

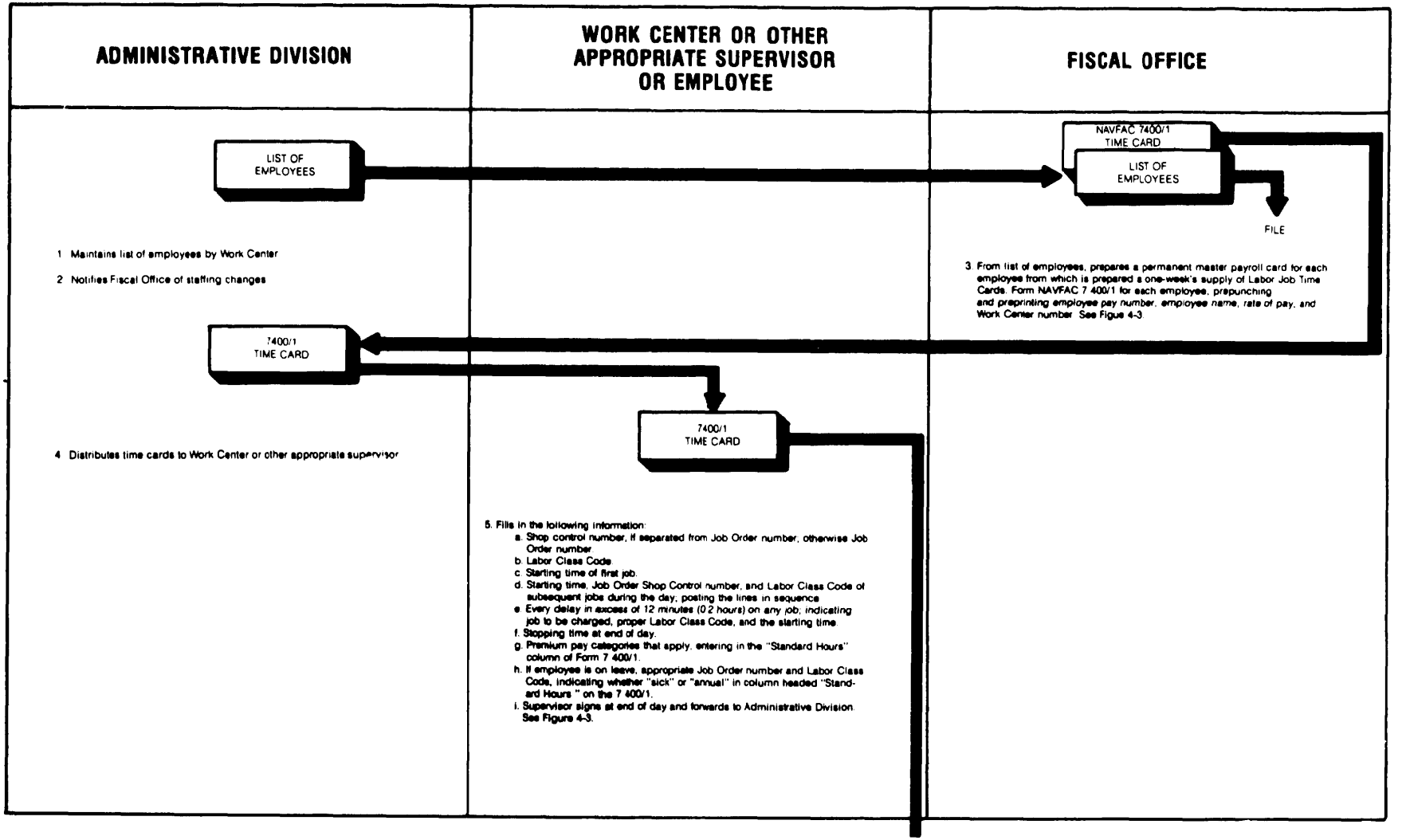


CHART NO. 9 (Continued)

NOTE
All Parts of step 5, except h and i, may be completed by employee

7400/1
TIME CARD

6 Converts time to nearest tenth of an hour (0.1 hours)

7 Computes actual hours to be charged to each Job Order, verifying total times to be accounted for

8 Enters premium pay for appropriate Job Order, when so authorized by Fiscal Office

9 Reviews for apparent errors and forwards to Fiscal Office

7400/1
TIME CARD

FILE

10 Converts and extends labor hours to labor hours

11 Verifies time cards against payroll clock cards, as outlined in Vol. III of Navy Comptroller Manual.

12 Keypunches Detail Card for each line entry on Daily Time and Labor Distribution Card, and verifies accuracy of key punching

13 Merges Detail Cards with Cost Summary Cards.

RECORDS SHALL BE RETAINED AND DISPOSED IN ACCORDANCE WITH SECNAVINST P-5212.5, LATEST SERIES

APPENDIX C

BEST MAINTENANCE CONTROL SUBSYSTEM

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 (PHI) 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 valid 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

GUIDELINE TO DIVISION OF PROCUREMENT RESPONSIBILITY

APPENDIX D

GUIDELINE TO DIVISION OF PROCUREMENT RESPONSIBILITY

NAVSUP COGNIZANCE	NAVFAC COGNIZANCE
Purchase or Supply Contract	Facility Support Contract (Service or Construction)
Collateral Equipment when the equipment is not an integral part of the building or facility being constructed. Examples: Typewriters, adding machines and computers.	Collateral Equipment when they constitute an integral part of the completed facility. Examples: Water fountains, church pews; free standing partitions.
Engineering Studies that are related to the design and development on nonpublic works type collateral or minor equipment, except where such equipment is being developed as a part of an integrated facility.	Engineering Studies that are primarily designed to procure public works type equipment.
Maintenance of nonpublic works type collateral equipment, except where such equipment is being developed as a part of an integrated facility. Examples: 1. Non-public-works-type technical or minor equipment such as: a. Locksmith for safes and vaults (built-in) b. Electronic controls and devices traveling calibration portable equipments or medical support equipment	Maintenance. Work that is either (1) normally performed by the public works forces, such as regular routine recurring maintenance and upkeep work, when the civil service work force requires assistance to handle the work load; (2) specialized and occasional maintenance work or economics dictates. Examples: 1. Built-in and installed equipment when it is an integral part of the completed facility, such as: a. Fire alarms and communication systems b. Electronic controls and devices for boiler combustion and feed-water or automatic temperature controls, thermostats and humidistats (including calibration) or water treatment systems and chlorination.
2. Technical or minor equipment that replaces existing equipment, provided that the replacement does not involve major construction modifications.	2. Specialized and occasional maintenance work. a. Inspection and repair of boilers b. Diver services for inspection of underwater structures. c. Steeple Jack services

NAVSUP COGNIZANCE

3. Collateral equipment repair

   a. Office equipment

Miscellaneous

1. Laundry and dry cleaning
2. Food service
3. Operation of warehouses

NAVFAC COGNIZANCE

Facility maintenance

   a. Elevators and dumbwaiters
   b. Grounds
   c. Buildings
   d. Painting
   e. Pavement patching
   f. Lighting

Miscellaneous

1. Guard services
2. Janitorial services and glass cleaning
3. Bus service
4. Snow removal
5. Trash, debris, and garbage - collection and disposal
6. Moving of structures and heavy equipment
7. Pest control
8. Electric cranes, conveyors and weightlifting machines
9. Transportation equipment
10. Motor pool - use and operation
11. Fire protection
12. Telephone services

REFERENCES

A listing of pertinent manuals and directives is included in NAVFAC DOCUMENTATION INDEX (Keywords Out of Context - KWOC), Instructions, Publications, Forms and Reports, NAVFAC P-349 (latest issue).

MO-321 REFERENCES

1.	Maintenance Maintenance of Shore Facilities for Small Activities	NAVFAC MO-321.1
2.	Inspection of Shore Facilities, Volumes 1-4	NAVFAC MO-322
3.	Organizations and Functions for Public Works Departments	NAVFAC P-318
4.	Contracting Manual	NAVFAC P-68
5.	Service Contracts: Specifications and Surveillance	NAVFAC MO-327
6.	Navy Family Housing Manual	NAVFAC P-930
7.	Department of the Navy Facility Category Codes	NAVFAC P-72
8.	Unit Price Standard Handbook	NAVFAC P-716.0
9.	Detailed Inventory of Naval Shore Facilities	NAVFAC P-164
10.	DOD Real Property Maintenance Activities Program	DOD Inst 4165-2, SECNAVINST 11014.11A
11.	Command Responsibility for Shore Activity Land and Facilities	OPNAVINST 11000.16
12.	Operation of Commercial and Industrial Type Activities	DOD Inst 4100.33
13.	Navy Comptroller Manual, Volumes 2, 3	NAVSO P-1000
14.	Supply Systems Command and Accounts Manual Volume 2	
15.	Request for Performance of Work	NAVCOMPT Form 2275

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NAVAL FACILITIES ENGINEERING COMMAND PUBLICATIONS TRANSMITTAL

1. TITLE	NUMBER	DATE
Facilities Management - NAVFAC MO-321	Change 1	16 July 1987

2. ATTACHMENTS

Page 8-19 Replacement Page
Page 8-20 Replacement Page
Page 10-5 Replacement Page
Page 10-6 Replacement Page
Page 10-11 Replacement Page
Page 10-12 Replacement Page

3. EXPLANATION

Remove	Replace With
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Page 10-5	Attach New Page 10-5
Page 10-6	Attach New Page 10-6
Page 10-11	Attach New Page 10-11
Page 10-12	Attach New Page 10-12

4. DISTRIBUTION

See attached

DISTRIBUTION: Public Works departments, Centers and Offices; Claimants; and Shore Facilities Maintenance Support Activities

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Return for Credit. Material planning is very important in relation to maximum utilization of assigned dollar. Too much material awaiting scheduling or surplus to needs reduces the dollars available to perform needed repairs. Jobs should be planned to permit scheduling as soon as possible after all material is received. It is essential that any direct-procurement material left over from a job be returned to shop stores or the Supply Department. With the increasing use of the Navy Stock Fund to finance shop-stores stocks, it may be possible to obtain an allotment credit as well as a statistical cost accounting credit for returned material in ready-for-issue condition. In any event, the cost accounting charge for material shown on the tabulated reports should be an accurate record of the material actually used on the Specific Job Order rather than that originally ordered for it. Shop supervisors should assure that material credit is made to the proper job.

24. MATERIAL SUPPORT. Having the right material in the right quantity, at the right time, and at the right place is one of the most important requirements for efficient work accomplishment and good customer relations. Proper material support, however, requires the joint efforts of both the Supply and Public Works Departments. Unfortunately, the joint responsibility of these two departments is, all too frequently, not clearly stated or understood. The result is poor material support. Activities that define these responsibilities and establish procedures for carrying them out will have responsive material support resulting in increased Public Works Department efficiency.

25. SUPPLY DEPARTMENT. The Supply Department should perform the following functions:

a. Accept, for material reservation, properly prepared and authenticated material lists from approved job orders.

b. Procure, assemble, and segregate Specific Job Order materials by utilizing blanket purchase orders, imprest funds, retail issue procedures, and other means available to meet planned delivery dates.

Keep the Public Works Department informed of material procurement status and give prompt notification of "ready" lists.

d. Provide informal notification regarding reservation status of auxiliary stores issues daily to Public Works Department representatives.

Accept all returnable materials, provided the quantities are at least equal to the minimum retail unit of issue, and give credit where allowable.

26. PUBLIC WORKS DEPARTMENT. The Public Works Department should perform the following functions:

a. Submit material lists in duplicate, for approved job orders, prepared in sufficient detail to insure full and proper identification of materials. The lists should specify the data materials required, normally using a lead time of four weeks or the lead time specified by local directive, and should be signed by an authorized Public Works Department representative. The Supply Department is authorized to obligate a 10 percent increase on material reservations to cover price increases on the entire material list, except that on local purchase items the 10 percent limitations apply on a line item basis.

b. Furnish supplementary information on material lists as required, advise on substitutions, and assist in identification and inspection of materials.

c. Draw, receive, and return materials promptly, as appropriate or required.

d. Provide adequate physical security for materials issued.

e. Provide adequate administrative controls to assure that materials are used on the jobs to which they were originally charged.

27. COST RECORDING AND REPORTING. Material cost recording is the Supply Department's responsibility. Reporting of, and accounting for, material costs are Fiscal Office responsibilities. The continued cooperation of both is needed for accurate and timely material cost reporting. As noted in the NAVCOMPT Manual, NAVSO P-1000, it is most important that job orders be closed out and reported on Tabulated Report B promptly upon completion of the work. Therefore, in many instances it will be necessary to use material commitments or obligations data rather than to delay reporting final job costs pending receipt of final expenditure data. For example, this procedure may be used frequently for direct-procurement material that comes from outside purchase sources when the Fiscal Office must await the arrival of an abstracted public voucher from the Navy Regional Finance Office. Separate cost reporting is generally in effect for shop-stores material and direct-procurement material.

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 12 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 9-11014/30 (6-67)
Supersedes NAVDOCKS 1171

For Instructions on use of Form see NAVFAC P-301

REPORT ON VARIATIONS ON COMPLETED JOB ORDERS

DATE: 14 AUGUST 1984

JOB ORDER NO.	BRIEF DESCRIPTION OF JOB	ESTIMATE LABOR (MH)	ESTIMATE MAT'L ($)	ACTUAL LABOR (MH)	ACTUAL MAT'L ($)	REASON FOR VARIATION AND ACTION TAKEN (If more space is needed use supplemental sheets)
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

D-30333

FIGURE 10-1
Report on Variations on Completed Job Orders

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:

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. The investigator designated 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 12, 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. In the case of labor cost variations, the investigator will include an assessment of the cause of the variation along with the corrective action that has been taken or has been recommended by the investigator to prevent recurrence. For material variations, the investigator will compare quantities of all items estimated with those issued and used. This procedure may be particularly significant in the case of standing job orders. If unused quantities of any item are at least equal to the minimum retail unit of issue, the investigator will insure that all excess quantities were returned to the Supply Department for credit to the job order. If material unit prices varied significantly from the estimate, this will be noted in Column 7, as will material substitutions. Since significant delays in material receipt may contribute to material variance, these should be noted. However, persistence of this issue would be more appropriately handled by a separate specific study in conjunction with the Supply Department. In addition, the investigator will also include a recommendation for any

warranted corrective action (procedural changes, increased controls, etc.). Copies of the completed report should be 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 still be performed. An alternate method is to have the shops identify the reasons for variation at the time the job is completed and forward this information with the closeout copy of the job order.

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 C 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 provides 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

REFERENCES

A listing of pertinent manuals and directives is included in NAVFAC DOCUMENTATION INDEX (Keywords Out of Context - KWOC), Instructions, Publications, Forms, and Reports, NAVFAC P-349 (latest issue).

MO-321 REFERENCES

1. Maintenance of Shore Facilities for Small Activities . . . NAVFAC MO-321.1
2. Inspection of Shore Facilities, Volumes 1-4. . . . . NAVFAC MO-322
3. Organizations and Functions for Public Works Departments . NAVFAC P-318
4. Contracting Manual . . . . . NAVFAC P-68
5. Service Contracts: Specifications and Surveillance. . . . NAVFAC MO-327
6. Navy Family Housing Manual . . . . . NAVFAC P-930
7. Department of the Navy Facility Category Codes . . . . . NAVFAC P-72
8. Unite Price Standard Handbook. . . . . NAVFAC P-716.0
9. Detailed Inventory of Naval Shore Facilities . . . . . NAVFAC P-164
10. DOD Real Property Maintenance Activities Program . . . . . DODINST 4165.64
    SECNAVINST 11014.110
11. Command Responsibility for Shore Activity Land and Facilities. . . . . OPNAVINST 11000.16
12. Operation of Commercial and Industrial Type Activities. . DODINST 4100.33
13. Navy Comptroller Manual, Volumes 2 - 3. . . . . NAVSO P-1000
14. Supply Systems Command and Accounts Manual Volume 2 . . .
15. Request for Performance of Work . . . . . NAVCOMPT Form 2275

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