

CHAPTER 1

TECHNICAL ADMINISTRATION

When you achieve the status of PETTY OFFICER, it becomes your most important advancement in the Navy. Sewing on your first chevron carries many responsibilities with it. Among these responsibilities is the commitment to become an effective supervisor/leader, instructor, and administrator in all military, technical, and safety areas of your rating.

As a petty officer, you will begin to develop your ability to manage the work that is done by your personnel as well as to supervise/lead them.

As you gain experience as a petty officer and increase your technical abilities as a Steelworker, your skill as leader becomes more and more important as you lead/supervise personnel assigned to you. At each rating level, you will be given more responsibility and will be expected to seek the responsibility associated with that particular rating level. The intent of this chapter is to help you understand the importance of leadership, to show you the practical aspects of applying leadership principles coupled with sound administrative practices, and to help you use and prepare the administrative “paperwork” that you will be involved with as a crew leader.

CONSTRUCTION ADMINISTRATION

As your crew leader or supervisor experience grows, you begin to assume greater responsibility for the work of others. As this is occurring, you will also assume greater administrative duties. For this reason, you must understand that proper administration is the backbone of any project. You will have personnel assigned to your project who must be employed effectively and safely. Therefore, you not only have to meet production requirements and conduct training but also must know and apply the procedures required to process “paperwork” correctly,

Administration is the mechanical means that a person or an organization uses to plan, organize, supervise, manage, and document activities. It provides a means of telling you such things as what has been planned, what is required, what has occurred, what is completed, what personnel are assigned, and so on. Try keeping all that information in your head

for even a small assignment/project. You will begin to understand the variety of methods used to administer the job. Administration ranges from just keeping a notebook in your back pocket to filling out a variety of reports and forms.

As a growing leader in the Navy, you must learn about and become effective in the use of administrative tools as well as the tools of your trade. Once you become comfortable with using these tools, you will then develop the skill of a successful administrator who can lead and direct people in getting the job done right and done well.

PLANNING PERSONNEL WORK ASSIGNMENTS

While planning for a small or large project, you must consider the abilities of your crew. Use PRCP data, which will be discussed later in the chapter. Next, consider any special tools and equipment you will need and arrange to have them at the jobsite when the work is started. Determine who will use these tools, and ensure the crew members assigned know how to use them Properly and safely.

To assure that the project is done properly and on time, you should consider the method of accomplishment as well as the skill level (PRCP level) of your crew. When there is more than one way of constructing a particular project, you must analyze the methods and choose the one best suited to the project conditions and the skill levels of your crew. Listen to suggestions from others. If you can simplify a method and save time and effort, by all means do it.

As the petty officer in charge of a crew, you are responsible for crew member time management as well as your own. You must plan constructive work for your crew. Always remember to PLAN AHEAD! A sure sign of poor planning is that of crew members standing idle each morning while you plan the events for the day. At the close of each day, you should confirm the plans for the next workday. In doing so, you will need answers on the availability and use of manpower, equipment, and supplies. Keep the following questions in mind:

1. **Manpower.** Who is to do what? How is it to be done? When is it to be finished? Since idleness will breed discontent, have you arranged for another job to start as soon as the first one is finished? Is every crew member fully used?

2. **Equipment.** Are all necessary tools and equipment on hand to do the job? Is safety equipment on hand?

3. **Supplies.** Are all necessary supplies on hand to start the job? If not, who should take action? What supply delivery schedules must you work around?

Have a definite work schedule and inspection plan. Set up realistic daily goals or quotas. Personally plan to check the work being done at intervals and the progress toward meeting the goals. Spot-check for accuracy, for workmanship, and the need for training.

Organizing

As a crew leader or supervisor, you must be able to ORGANIZE. This means that you must analyze the requirements of a job and structure the sequence of events that will bring about the desired results.

You must develop the ability to look at a job and estimate how many man-hours are required for completion. You will probably be given a completion deadline along with the job requirements. Next (or perhaps even before making your estimate of man-hours), plan the job sequences. Make sure that you know the answers to questions such as the following:

- What is the size of the job?
- Are the materials on hand?
- What tools are available, and what is their condition?
- Is anyone scheduled for leave?
- Will you need to request outside support?

After getting answers to these questions, you should be able to assign your crews and set up tentative schedules. If work shifts are necessary, arrange for the smooth transition from one shift to another with a minimum of work interruption. How well you do is directly related to your ability to organize.

Delegating

In addition to organizing, you must know how to DELEGATE. This is one of the most important characteristics of a good supervisor. Failure to

delegate is a common failing of a new supervisor. It is natural to want to carry out the details of a job yourself, particularly when you know that you can do it better than any of your subordinates. Trying to do too much, however, is one of the quickest ways to get bogged down in details and to slow down a large operation. On some projects, you will have crews working in several different places. Obviously, you cannot be in two places at the same time. There will be many occasions when a crew member needs assistance or instruction on some problem that arises. If he or she has to wait until you are available, then valuable time will be lost. Therefore, it is extremely important for you to delegate authority to one or more of your experienced crew members to make decisions in certain matters. However, you must remember that when you delegate authority, you are still responsible for the job. Therefore, it is very important that you select a highly qualified individual when you delegate authority.

Coordinating

A supervisor must be able to COORDINATE. When several jobs are in progress, you need to coordinate completion times so one can follow another without delay. Possessing coordinating skill is also very helpful when working closely with your sister companies or shops. Coordination is not limited to projects only. You would not want to approve a leave chit for a crew member and then remember a school during the same time period. Nor would you want to schedule a crew member for the rifle range only to find the range coaches unavailable at that time.

Production

The primary responsibility of every supervisor is PRODUCTION. You and your crew can attain your best by doing the following:

- Plan, organize, and coordinate the work to get maximum production with minimum effort and confusion.
- Delegate as much authority as possible, but remain responsible for the final product.
- Continuously supervise and control to make sure the work is done properly.
- Be patient (“Seabees are flexible and resourceful”).

Supervising/Leading Work Teams

Before starting the project, you should make sure your crew understands what is expected of them. Give your crew instructions, and urge them to ask questions. Be honest in your answers. If you do not know, say so; then find the correct answers and inform your crew. Establish goals for each workday and encourage your crew members to work together as a team while accomplishing these goals. Goals should be set that will keep your crew busy but also ensure these goals are realistic. Do not overload your crew or undertask them. During an emergency, most crew members will make an all-out effort to meet the deadline. But people are not machines, and when there is no emergency, they cannot be expected to work at an excessively high rate continuously.

While the job is underway, check from time to time to ensure that the work is progressing satisfactorily. Determine if the proper methods, the materials, the tools, and the equipment are being used. If crew members are doing the job incorrectly, stop them, and point out what is being done unsatisfactorily. Then explain the correct procedure and check to see that it is followed.

NOTE: When you check the work of your crew members, do it in such a way that they will feel that the purpose of checking is to teach, guide, or direct, rather than to criticize or find fault.

Make sure your crew members take all applicable safety precautions and wear/use safety apparel/equipment that is required. Also, watch for hazardous conditions, improper use of tools and equipment, and unsafe work practices that could cause mishaps and possibly result in injury to personnel. Many young personnel ignore danger or think a particular safety practice is unnecessary. This can normally be corrected by proper instruction and training. **Safety awareness is paramount**, and it must be a state of mind and enforced daily until the crew understands its importance. When this occurs, you **MUST NOT** allow the crew to become complacent in safety matters. Constant training and awareness is the key; therefore, conduct safety lectures daily!

When time permits, rotate crew members on various jobs within the project. Rotation gives them varied experience. It also helps you, as a crew leader, to get the job done when a crew member is out for any length of time.

As a crew leader, you should be able to get others to work together in getting the job accomplished. Maintain an approachable attitude toward your crew so that each crew member will feel free to seek your advice when in doubt about any phase of the work. Emotional balance is especially important; you must not panic before your crew, nor be unsure of yourself in the face of conflict.

Be tactful and courteous in dealing with your crew. Never show partiality to certain members of the crew. Keep your crew members informed on matters that affect them personally or concern their work. Also, seek to maintain a high level of morale because low morale can have a detrimental effect on safety awareness and the quality and quantity of the work your crew performs.

As you advance in rate, more and more of your time will be spent in supervising others. Therefore, learn as much as you can about the subject of supervision. Study books on supervision as well as leadership. Also, watch how other supervisors operate and do not be afraid to ASK QUESTIONS.

TOOL KITS AND REQUISITIONS

Tool kits contain all of the craft hand tools required by one four-member construction crew of a given rating to pursue their trade. The kits can be augmented with additional tools to complete a specific job requirement. However, kits must not be reduced in any type of item and must be maintained at 100 percent of the kit allowance.

As a crew leader, you are authorized to draw the tools required by the crew. In so doing, you are responsible for the following:

- Maintaining complete tool kits at all times
- Assigning tools within the crew
- Ensuring proper use and care of assigned tools by the crew
- Preserving tools not in use
- Securing assigned tools

TOOL KIT INVENTORIES

To ensure that the tools are maintained properly, the operations officer and the supply officer establish a formal tool kit inventory and inspection program. You, as a crew leader, must have a tool kit inventory performed at least once a month. Damaged and worn tools must be returned to the central toolroom (CTR)

for replacement. Tools requiring routine maintenance are turned in to CTR for repair and reissue. Requisitions will be submitted through prescribed channels for replacement items.

PREPARING REQUISITIONS

As a crew leader, you should become familiar with forms that are used to request material or services through the Naval Supply System. Printed forms are available that provide all the necessary information for physical transfer of the material and accounting requirements.

Two forms used for ordering materials are the Single-Line Item Consumption/Management Document (Manual), NAVSUP Form 1250 (fig. 1-1), and the Requisition and Invoice/Shipping Document, DD Form 1149 (fig. 1-2).

As a crew leader, you are not usually required to make up the entire NAVSUP Form 1250; however, you must list the stock number (when available) of the item, the quantity required, and the name or description of each item needed. This form is turned in to the company expediter, who will check it over, complete the rest of the information required, and sign it. Then it is forwarded to the material liaison officer (MLO) or supply department for processing.

You are not likely to use DD Form 1149 often since the items most frequently ordered are bulk fuels and lubricants. This form is limited to a single page and must contain no more than nine line items.

not necessary to fill in all the blocks on this form when it is used as a requisition.

When ordering material, you need to know about the national stock number (NSN) system. Information on the NSN system and other topics relating to supply is provided in *Military Requirements for Petty Officer Third Class*, NAVEDTRA 10044-A.

TIMEKEEPING

In a battalion deployed overseas, as well as at shore-based activities, your duties can involve the posting of entries on time cards for military personnel. Therefore, you should know the type of information called for on time cards and understand the importance of accuracy in labor reporting. You will find that the labor reporting system primarily used in Naval Mobile Construction Battalions (NMCBs) and the system used at shore-based activities are similar.

A labor accounting system is mandatory to record and measure the number of man-hours that a unit spends on various functions. In this system, labor utilization data is collected daily in sufficient detail and in a way that enables the operations officer to compile the data readily. This helps the operations officer manage manpower resources and prepare reports to higher authority.

A unit must account for all labor used to carry out its assignment, so management can determine the amount of labor used on the project. Labor costs are figured and actual man-hours are compared with

SINGLE LINE ITEM CONSUMPTION/REQUISITION DOCUMENT (MANUAL)
NAVSUP FORM 1250-1 (1 PT) (REV. 7/79) SIN 0184-501-5608

1. REQ. DATE	2. DEPT. NO.	3. URGY	4. ROD	5. LOCATION	6. SIM <input type="checkbox"/>	NON SIM <input type="checkbox"/>	7. ISSUE DATE	A. REQN. QTY.	D. REQN. NO.	
8. NOUN NAME OR REF SYM		9. FPR <input type="checkbox"/>	10. APL/AEL/CD		11. INV QTY		12. NIS <input type="checkbox"/>	MIC <input type="checkbox"/>	D. POSTED	
13. UIC		14. WIC		15. JSN	16. EIC		17. EQUIP CUBAL SUPPLY YES <input type="checkbox"/> NO <input type="checkbox"/>		C. OBL AMT	
18. SC		19. COG	20. MCC	21. FSC	22. STOCK NUMBER NIN		23. SMD	24. LI	25. QUANTITY	
26. UNH PRICE		27. EXTENDED PRICE		28. FUND		29. APPROVED BY:				
30. RECEIVED BY:		31. RECEIVED BY:		32. RECEIVED BY:		33. RECEIVED BY:				
1	2	3	4	5	6	7	8	9	10	
11	12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	30	
31	32	33	34	35	36	37	38	39	40	
41	42	43	44	45	46	47	48	49	50	
51	52	53	54	55	56	57	58	59	60	
61	62	63	64	65	66	67	68	69	70	
71	72	73	74	75	76	77	78	79	80	
81	82	83	84	85	86	87	88	89	90	
91	92	93	94	95	96	97	98	99	100	
DOC IDENT	RTG IDENT	M & S	SIN	U	QTY	SVC	UIC	JUL DATE	SERIAL	
DOCUMENT NUMBER										
D	F	M	C	S	V	C	SUPPL ADDRESS	S	I	G
FUND	DIST	PROJ	PRI	ROD	ADV					

Figure 1-1.—NAVSUP form 1250.

REQUISITION AND INVOICE/SHIPPING DOCUMENT										SHEET NO.	NO. OF SHEETS	3. REQUISITION DATE	6. REQUISITION NUMBER
1. FROM										7. DATE MATERIAL REQUIRED (YYMMDD)			8. PRIORITY
2. TO										9. AUTHORITY OR PURPOSE			
3. SHIP TO - MARK FOR										10. SIGNATURE			11a. VOUCHER NUMBER AND DATE
										12. DATE SHIPPED (YYMMDD)			b. -----
										13. MODE OF SHIPMENT			14. BILL OF LADING NUMBER
										16. AIR MOVEMENT DESIGNATOR OR PORT REFERENCE NO.			
4. APPROPRIATION AND SUBHEAD		OBJ. CL.	BUR. CONT. NO.	SUBAL LOT	AUTHORIZATION ACCT'G ACTIVITY	TRANS. TYFF	PROPERTY ACCT'G ACTIVITY	COUNTRY	COST CODE	AMOUNT			
ITEM NO. (a)	FEDERAL STOCK NUMBER, DESCRIPTION, AND CODING OF MATERIAL AND/OR SERVICES (b)					UNIT OF ISSUE (c)	QUANTITY REQUESTED (d)	SUPPLY ACTION (e)	TYPE OF TANKER (f)	CON. TANKER NOS. (g)	UNIT PRICE (h)	TOTAL COST (i)	
16. TRANSPORTATION VIA MATS OR MSTs CHARGEABLE TO										17. SPECIAL HANDLING			
RECAPITULATION OF SHIPMENT	ISSUED BY	TOTAL CONTAINER	TYPE CONTAINER	DESCRIPTION	TOTAL WEIGHT	TOTAL CUBE	RECEIPT	18. CONTAINERS RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	SHEET TOTAL		
	CHECKED BY							QUANTITIES RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	GRAND TOTAL		
	PACKED BY							POSTED	DATE (YYMMDD)	BY	20. RECEIVER'S VOUCHER NO.		
← TOTAL →													

DD 1149, MAR 89 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Previous editions are obsolete. **ORIGINAL**

Figure 1-2.—DD Form 1149.

previous estimates based on jobs of a similar nature. When completed, this information is used by unit managers and higher commands for developing planning standards. Although labor accounting systems can vary slightly from one command to another, the system described here can be considered typical.

CATEGORIES OF LABOR

The type of labor performed must be broken down and reported by category to show how labor has been used. For timekeeping and labor reporting purposes, all labor is classified as either productive or overhead.

Productive Labor

PRODUCTIVE LABOR includes labor that directly or indirectly contributes to the accomplishment of the

mission of the unit, including construction operations, military operations, and training. Productive labor is accounted for in three categories: direct labor, indirect labor, and military, which is called "other" on some timekeeping cards.

1. DIRECT LABOR includes labor expended directly on assigned construction tasks either in the field or in the shop that contributes directly to the completion of an end product. Direct labor must be reported separately for each assigned construction task.

2. INDIRECT LABOR comprises labor required to support construction operations but does not produce an end product itself.

3. MILITARY or "Other" includes military functions and training necessary to support the mission.

Overhead Labor

OVERHEAD LABOR is not considered to be productive labor because it does not contribute directly or indirectly to the completion of an end product. Included is labor that must be performed regardless of the assigned mission.

LABOR CODES

During the planning and scheduling of a construction project, each phase of the project considered as direct labor is given an identifying code. Because there are many types of construction projects involving different operations, codes for direct labor reporting can vary from one activity to another. For example, excavating and setting forms can be assigned code R-15; laying block, code R- 16; and installing

bond beams, code R-17. You will use direct labor codes to report each hour spent by each of your crew members during each workday on assigned construction tasks.

Codes are also used to report time spent by crew members in the following categories: indirect labor, military operations and readiness, disaster control operations, training, and overhead labor. The codes shown in figure 1-3 are used at most activities to indicate time spent in these categories.

TIMEKEEPING CARDS

Your report is submitted on a Daily Labor Distribution Report form (timekeeping card), like the one shown in figure 1-4. The form provides a breakdown by man-hours of the activities in the various labor codes for each crew member for each

PRODUCTIVE LABOR. Productive labor includes all labor that directly contributes to the accomplishment of the Naval Mobile Construction Battalion, including construction operations and readiness, disaster recovery operations, and training.			
DIRECT LABOR. This category includes all labor expended directly on assigned construction tasks, either in the field or in the shop, and which contributes directly to the completion of the end product			
INDIRECT LABOR. This category comprises labor required to support construction operations, but which does not produce in itself. Indirect labor reporting codes are as follows:			
X01 Construction Equipment Maintenance, Repair and Records	X04 Project Expediting (Shop Planners)	X06 Project Material Support	X07 Tool and Spare Parts Issue
X02 Operation and Engineering	X05 Location Moving	X08 Other	
X03 Project Supervision			
MILITARY OPERATIONS AND READINES. This category comprises all manpower expended in actual military operations, unit embarkation, and planning and preparations necessary to insure unit military and mobility readiness. Reporting codes areas follows:			
M01 Military Operations	M04 Unit Movement	M06 Contingency	M08 Mobility & Defense
M02 Military Security	M05 Mobility Preparation	M07 Military Administrative Functions	Exercise
M03 Embarkation			M09 Other
DISASTER CONTROL OPERATIONS			
D01 Disaster Control Operations		D02 Disaster Control Exercise	
TRAINING. This category includes attendance at service schools, factory and industrial training courses, fleet type training, and short courses, military training, and organized training conducted within the battalion. Reporting codes are as follows:			
T01 Technical Training	T03 Disaster Control Training	T05 Safety Training	
T02 Military Training	T04 Leadership Training	T06 Training Administration	
OVERHEAD LABOR. This category includes labor which must be performed regardless of whether a mission is assigned and which does not contribute to the assigned mission. Reporting codes are as follows			
Y01 Administrative & Personnel	Y06 Camp Upkeep& Repairs	Y10 personal Affairs	
Y02 Medical& Dental Department	Y07 security	Y11 Lost Time	
Y03 Navy Exchange and Special Semites	Y08 Leave& Liberty	Y12 TAD not for unit	
Y04 Supply& Disbursing	Y09 Sickcall, Dental& Hospitalization	Y13 Other	
Y05 commissary			

Figure 1-3.—Labor codes.

CREW LEADER SMITH UT1		CREW		CREW SIZE 6		TRANSFERS THIS DATE NONE				
PROJECT POL SYSTEM		DATE 15 NOV 1970								
NAME	DIRECT		PRODUCTIVE		OVERHEAD					
	LABOR CODE		INDIRECT		MILITARY			ADMINISTRATIVE		MISCELLANEOUS
	R	R	X					Y	Y	
	9C	9D						01	04	
SMITH	4	4								8
AARON		6		2						8
FRITZ		8								8
GONDA		7							1	8
SANTZ		8								8
MANUEL		7							1	8
TOTAL										

DAILY LABOR DISTRIBUTION

SWNP0003

Figure 1-4.—Typical timekeeping card.

day on any given project. It is reviewed at the company level by the staff and platoon commander and then initialed by the company commander before it is forwarded to the operations department. It is tabulated by the management division of the operations department, along with all of the daily labor distribution reports received from each company and department in the unit. This report is the means by which the operations office analyzes the labor distribution of total manpower resources for each day. It also serves as feeder information for preparation of the monthly operations report and any other source reports required of the unit. This information must be accurate and timely. Each level in the company organization should review the report for an analysis of its own internal construction management and performance.

PERSONNEL READINESS CAPABILITY PROGRAM

The Personnel Readiness Capability Program (PRCP) was developed for use within the Naval Construction Force (NCF). The PRCP is based upon skill inventories of personnel and provides personnel

information to all levels of management within the NCF. It increases the ability of management to control, to plan, and to make decisions concerning the readiness of each unit. The PRCP is also used to identify the rating skills required and to determine the formal training and individual skills required by the Naval Facilities Engineering Command. Figure 1-5 is an example of a PRCP.

NAVFAC P-458

Guidance for the PRCP has been published in a one volume publication, NAVFAC P-458, to ease its use by staff personnel and PRCP interviewers. The PRCP contains standard skill definitions applicable to the NCF, Standards and Guides, that consist of seven separate manuals (one for each Seabee rating), and is the primary tool of the interviewer in collecting and updating data.

SKILL INVENTORIES

An accurate and current skill inventory is the backbone of PRCP. Without this information, any planning done would be questionable. The PRCP is

FASCO RPT/SYM NO. 0404082060R01
GEMS REPORT NO. 1200-0

PRCP SKILL UPDATE RECORD

FOR OFFICIAL USE ONLY
PAGE 1
84 FEB 15

NCTC PORHUE UIC 0612A CET COMPANY

UIC	PNEC 0000	SNEC 9502	TNEC 0000
COMPANY CHANGE			
DET / TEAM CHANGE			
SKILL CATEGORY	SKILL TITLE	SKILL CODE	SKILL LEVEL YEAR
GENERAL	GENERAL MATHEMATICS	000	1 81
	PLANNING, ESTIMATING AND SCHEDULING	030	1 84
	INSTRUCTING	080	3 84
UTILITIESMAN	SAFETY	090	1 81
	PLUMBING	710	2 81
	SHORE BASED BOILERS	720	2 81
	WATER TREATMENT	740	3 81
	SEWAGE DISP AND FIELD SANITATION	750	2 81
SPECIAL	AIR-CONDITIONING AND REFRIGERATION	760	1 81
	DRIVERS LICENSE	801	1 81
MILITARY	DISEASE VECTOR PEST CONTROL	812	1 81
	AMPHIBIOUS EMBARKATION	901	1 81
	FIREFIGHTING	904	1 81
	CIVIL DISTURBANCE	907	1 81
	MILITARY INSTRUCTOR	909	1 81
	SQUAD LEADERS	942	1 81
	M-16 RIFLE	953	2 84
	.45 CAL PISTOL	954	1 84
	COMBAT COMMUNICATIONS	964	1 84
	SURVIVAL, EVASION, RESIST, ESCAPE (SERE)	974	1 81
	MINES AND BOOBY TRAPS	978	1 81
	DISASTER RECOVERY, HEAVY RESCUE	979	1 84
	CBR PERSONAL PROTECTION AND DECONTAMINATION	980	1 84
DISASTER RECOVERY, CNTRL COMMCTN	981	1 81	

SKILL ADD / CHANGE / DELETE			
SKILL CODE	SKILL LEVEL	SKILL CODE	SKILL LEVEL

INSTRUCTIONS:
 1. DET/TEAM CHANGE - valid entry is two position alphanumeric
 2. ADD/CHANGE SKILL - enter skill code and skill level 1, 2, or 3
 3. DELETE SKILL - enter skill code, leave skill level blank
 4. FORWARD CHANGES TO CBC PORHUE, CODE 18112
 REFER to navfac p-466 (standard & guides for skill codes.)
 SKILL YEAR is computer generated and identifies year skill level assigned
 SHELF LIFE will be computed from skill year

SWNP0004

Figure 1-5.—PRCP Skills Update Record.

the management tool used to determine the readiness of the unit and identify skill deficiencies in which the troops must be trained. It is used with the requirements established by the Commander, Second Naval Construction Brigade (COMSECONDNCB), and Commander, Third Naval Construction Brigade (COMTHIRDNCB), which are issued in their joint instruction COMSECOND/COMTHIRDNCBINST 1500.1 (series). This instruction identifies and defines the skills required to meet peacetime and contingency operations and specifies the required number of personnel that must be trained in each skill.

NOTE: A “skill” is a specific art or trade. For PRCP purposes, skills are described as either a “manipulative” or “knowledge” skill.

SKILL CATEGORIES

Skills required by the PRCP have been classified into five major categories as follows:

1. **Individual General Skills (PRCP 040-090).** These are essentially nonmanipulative skills (knowledge) related to two or more ratings, such as material liaison office operation (PRCP 040), instructing (PRCP 080), and safety (PRCP 090).

2. **Individual Rating Skills (PRCP 100-760).** These are primarily manipulative skills associated with one of the seven Seabee ratings. Some examples areas follows: pipe welding (PRCP 612), for the Steelworker rating; cable splicing (PRCP 237), for the Construction Electrician rating; and shore-based boiler operation (PRCP 720), for the Utilitiesman rating.

3. **Individual Special Skills (PRCP 800-830).** These are technical skills performed by personnel in several ratings, including personnel that are not Occupational Field 13 (Seabees). Examples are as follows: forklift operation (PRCP 800), ham radio operation (PRCP 804), and typing (PRCP 803).

4. **Military Skills (PRCP 901-981).** Military skills are divided into three subcategories: mobilization, disaster recovery, and Seabee combat readiness.

Examples are aircraft embarkation (PRCP 902), M-16 rifle use and familiarization, disaster recovery, and heavy rescue (PRCP 979).

5. **Crew Experience Skills** (PRCP 1000A-1010A). These skills are attained by working with others on specific projects. Most of these projects are related to advanced base construction, such as an observation tower (PRCP 1002A), fire fighting (PRCP 1009A), and bunker construction (PRCP 1008A).

A skill inventory has three principal steps. First, each skill is accurately defined and broken down into task elements. Second, a standard procedure for obtaining the information is developed. This procedure helps to ensure that the information, regardless of where it is collected or by whom, meets standards of acceptability. The third step is the actual collection of the skill data and includes the procedures for submitting the data to the data bank.

When you become a crew leader, it will be your responsibility to your crew members to provide them with the opportunity to learn new skills. This can be done through training or by assigning your crew to various types of work whenever possible. You and your crew members can gain a higher skill level by determining the training requirements needed and satisfying them. Then you, as the crew leader, should report these newly acquired skills to the PRCP coordinator, who will add them to your other skills and to the skills of each crew member. It is your responsibility to see that this skill information is kept current and accurate. For additional information on the PRCP program, interview techniques, and procedures, refer to the *NCF/SEABEE 1 and C*, NAVEDTRA 12543.

SAFETY PROGRAM

As a petty officer, you must be familiar with the safety program at your activity. You cannot perform effectively as a petty officer unless you are aware of the importance of the safety program. You should know who (or what group) comprises and establishes the safety policies and procedures you must follow. You should also know who provides guidelines for safety training and supervision. Every NCF/NMCB unit and shore command are required to implement a formal safety organization.

In the Seabees, everyone is responsible for safety. According to the *NCF Safety Manual*, COM-SECONDNCB/COMTHIRDNCBINST 5100.1 (series), the battalion safety office administers the

battalion safety program and provides technical guidance. Overall guidance comes from the *Navy Occupational Safety and Health Program Manual* (NAVOSH), OPNAVINST 5100.23 (series). If you have any questions concerning safety on the jobsite, the safety office is the place to get your questions answered.

It is not the responsibility of the safety office to prevent you from doing something you know or suspect is unsafe, but they do have the authority to stop any operation where there is impending DANGER of injury to personnel or damage to equipment or property. Safe construction is your responsibility, and ignorance is no excuse. It is your responsibility to construct safely.

SAFETY ORGANIZATION

The safety organization of the NMCB provides for (1) the establishment of safety policy and (2) control and reporting. As shown in figure 1-6, the Battalion Safety Policy Organization is made up of the policy committee, supervisors' committee, equipment, shop, and crew committees. The SAFETY POLICY COMMITTEE is presided over by the executive officer. Its primary purpose is to develop safety rules and policy for the battalion. This committee reports to the commanding officer, who must approve all changes in safety policy.

The SAFETY SUPERVISORS' COMMITTEE is presided over by the battalion's safety chief and includes safety supervisors assigned by company commanders, project officers, or officers in charge of detail. This committee provides a convenient forum for work procedures, safe practices, and safety suggestions. Its recommendations are sent to the policy committee.

The EQUIPMENT, SHOP, AND CREW COMMITTEES are assigned as required. Each

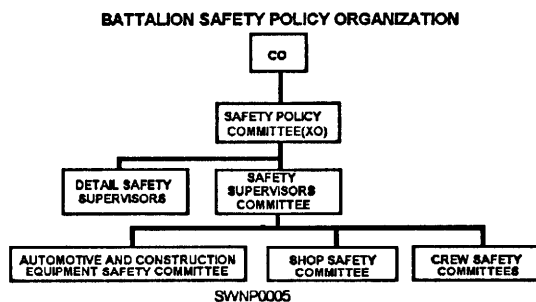


Figure 1-6.—The Safety Organization Chart of the NMCB.

committee is usually presided over by the company or project safety supervisor. The main objective of the committee is to propose changes in the battalion's safety policy to eliminate unsafe working conditions or prevent unsafe acts. These committees are your contact for recommending changes in safety matters. In particular, the equipment committee reviews all vehicle mishap reports, determines the cause of each mishap, and recommends corrective action. As a crew leader, you can expect to serve as a member of the equipment, shop, or crew safety committee. Each committee forwards reports and recommendations to the Safety Supervisors' Committee.

CONSTRUCTION SITE SAFETY

The work involved in construction and maintenance/repair is inherently dangerous, and many of the functions that must be performed contain elements hazardous to personnel. The type of work performed on construction sites is broad and encompasses areas for which substantial material on safety has been written.

General Safety Concerns

This chapter addresses the major areas of general safety concerns and references other publications that are used by NCF/PHIBCB safety and supervisory personnel.

"Safety is everybody's responsibility." This is a rule that must be adhered to during all phases of construction, maintenance and repair, and battalion operations. Training at all levels and enforcement of safety regulations during all types of work is the ongoing responsibility of each Seabee.

Safety at the construction site has elements of general construction, steel erection, high work, and rigging and weight handling. Specialized and detailed areas of safety include weight-handling operations, construction and use of scaffolding, and welding and cutting. Numerous safety manuals and publications provide detailed procedures and regulations for these types of work.

Safety References

Some of the more useful manuals and handbooks applicable to tasks performed on construction sites and maintenance shops are as follows:

1. *Naval Construction Force Safety Manual*. This manual is applicable to COMSECONDNCB/

COMTHIRDNCB units and also covers many areas useful to PHIBCBs.

2. *General Safety Requirements Manual, Corps of Engineers, EM 385*. This field manual contains guidance primarily concerning construction.
3. *Occupational Safety and Health Standards for the Construction Industry (29 CFR 1926)*.

Safety Procedures/Standards

Major safety procedures/standards that are required on a jobsite that apply to both construction sites and construction/repair of pontoon structures are as follows:

1. Hard hats must be worn by all personnel in the area, including visitors.

2. Post the site with a hard hat area sign and warning signs (red for immediate hazards and yellow for potential hazards).

3. The safety manuals, EM 385 and the 29 CFR 1926, are required to be kept on the jobsite.

4. Housekeeping is important. Keep materials well sorted, stacked, and accessible. Remove excess items. Keep discarded items and trash picked up. Watch and remove tripping hazards.

5. Designate and mark vehicle/forklift traffic lanes and areas.

6. Each jobsite must have emergency plans posted, containing the location of the nearest phone, the telephone numbers, and the reporting instructions for the ambulance, the hospital, the physician, the police, and the fire department personnel.

7. If a medical facility is not readily accessible (due to time or distance), two crew members must be both first aid and CPR qualified.

8. For every 25 personnel or less, one first-aid kit must be on site and checked weekly for consumable items.

9. If toilet facilities are not readily available, you must provide portable facilities,

10. Drinking water must be provided from an approved source and labeled for "drinking only." Common use cups are not allowed.

11. Temporary fencing is required as a safety measure to keep unauthorized personnel away from potential hazards if the jobsite is in an area of active use.

12. Eyewash stations are required on all jobsites.

Fire Extinguishers

An adequate number of fire extinguishers are required to be on site. The number required is determined by the types of extinguisher required to extinguish the various types of materials, such as paint, corrosives, and other flammables, on the jobsite. Also, the size of the jobsite must be considered, and there must be one extinguisher at each welding station. Refer to the EM 385 for further guidance.

- Material Safety Data Sheets are required to be on site for all hazardous material. (MSDS will be discussed in this chapter.)
- All high work is serious business. Work above 5 feet in height must be particularly well planned and personnel safety constantly enforced.

Scaffolds

Accidents occur when high work becomes so routine that safety measures become lax and inspection of scaffolds is not performed. A healthy respect for the hazards must be maintained. References (1) and (3) contain detailed safety information on scaffolds, and additional safety guidance can be found in reference (2). Scaffold safety is also discussed in chapter 6 of this manual. Some of the more general precautions are the following:

- Work above 5 feet must have scaffolding provided.
- People working above 12 feet and not on scaffolding must have a safety belt and lifeline.
- Ground personnel must be kept clear of high work.
- Never use makeshift, expedient scaffolding.
- Inspect scaffold members and equipment daily before work is started. Keep all members in good repair without delay.
- Do not use scaffolds for storage space.
- Use handlines for raising and lowering objects and tools.
- Do not paint scaffolds since painting can conceal defects.

Welding and Cutting

A significant part of construction and maintenance/repair work is welding and cutting. Safety was addressed in volume 1 of this manual and is addressed here as a part of general on-site safety concerns. Safety precautions required for this work are extensive and specialized. The importance be shown by the extent of guidance on welding safety provided in references (1), (2), and (3). One point to bear in mind is that welding safety must be concerned with other personnel on the jobsite as well as the people performing the work. A list of some of the more basic precautions and procedures welders must be aware of or adhere to should include the following:

- Eye injury.
- Burns.
- Toxic vapors.
- Electric shock (when applicable).
- Fire and explosion.
- All welding equipment should be inspected daily. Remove the defective items immediately from service.
- personnel protective equipment and clothing must be considered an integral part of the work and must be inspected and maintained accordingly. No compromises in the protection of welders is allowed.
- Areas should be marked with Danger - Welding and Eye Hazard Area signs.
- Welders working above 5 feet must be protected by railings or safety belts and lifelines.
- When welding any enclosed space or pontoons, ensure that a vent opening is provided and that the space is free of flammable liquids and vapors.
- Do not weld where flammable paint or coating can cause a fire hazard.
- After welding is completed, mark the area of hot metal or provide some means of warning other workers.

SAFETY RESPONSIBILITIES

Figure 1-7 shows the Battalion Safety Control and Reporting Organization. As a crew leader, you will report to the safety supervisor, who directs the safety program of a project. Duties of the safety supervisor

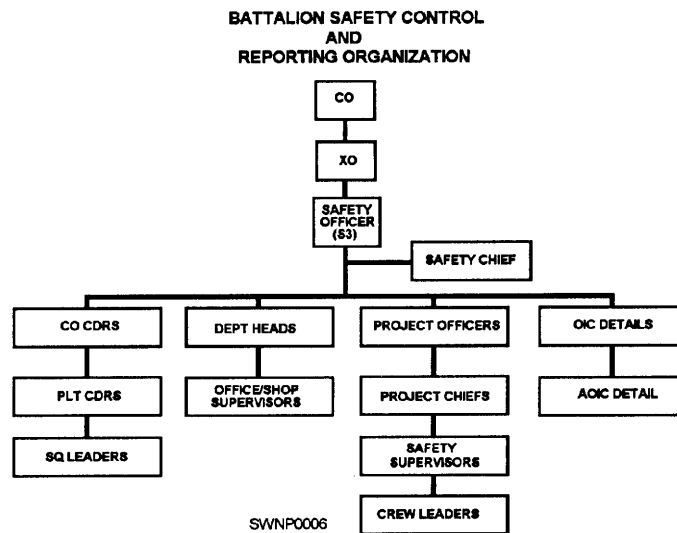


Figure 1-7.—Battalion Safety Control and Reporting Organization.

include indoctrinating new crew members, compiling mishap statistics for the project, reviewing mishap reports submitted to the safety office, and comparing safety performances of all crews.

The crew leader is responsible for carrying out safe working practices under the direction of the safety supervisor or others in position of authority (project chief, project officer, safety chief, and safety officer). You, as the crew leader, must be sure each crew member is thoroughly familiar with these working practices, has a general understanding of pertinent safety regulations, and makes proper use of protective clothing and safety equipment. Furthermore, be ready at all times to correct every unsafe working practice you observe and report it immediately to the safety supervisor or the person in charge. When an unsafe condition exists, the safety supervisor (or whoever is in charge) has the power to stop work on the project until the condition is corrected.

In case of a mishap, you must ensure that anyone injured gets proper medical care as quickly as possible. Investigate each mishap involving crew members to determine its cause. Remove or permanently correct defective tools, materials, and machines as well as environmental conditions that contribute to the cause of a mishap. Afterwards, you are required to submit the required written reports.

SAFETY TRAINING

New methods and procedures for safely maintaining and operating equipment are constantly being developed. Therefore, you must keep abreast of

the latest techniques in maintenance and operational safety and then pass them onto your crew members. Keep them informed by holding daily standup safety meetings. As crew leader, you are responsible for conducting each meeting and for passing on information that the safety supervisor has organized and assembled. Information (such as the type of safety equipment to use, where to obtain it, and how to use it) is often the result of safety suggestions received by the Safety Supervisors' Committee. Encourage your crew members to submit their ideas or suggestions to this committee.

At times, you will hold a group discussion to pass the word on specific mishaps that are to be guarded against or have happened on the job. Be sure to give plenty of thought to what you are going to say beforehand. Make the discussion interesting and urge the crew to participate. The final result should be a group conclusion as to how the specific mishap could have been prevented.

Your daily standup safety meetings also give you the chance to discuss matters pertaining to safe operation and any safety items, such as riding in the back of a vehicle, prestart checks, and maintenance of automotive vehicles, assigned to a project. Since these vehicles are used for transporting crew members as well as cargo, it is important to emphasize how the prestart checks are to be made and how the vehicles are to be cared for.

In addition to standup safety meetings, you are also concerned with day-to-day instruction and on-the-job training. Although it is beyond the scope

of this manual to describe teaching methods, a few words on your approach to safety and safety training at the crew level are appropriate. Getting your crew to work safely, like most other crew leader functions, is basically a matter of leadership. Therefore, do not overlook the power of personal example in leading and teaching your crew members. Soon you will discover that they are quick to detect differences between what you say and what you do. It is unreasonable to expect them to maintain a high standard of safe conduct if you do not. As a crew leader you must be visible at all times and show your sincere concern for the safety of your crew. Although it is not the only technique you can use, leadership by example has proven to be the most effective of those available to you.

HAZARDOUS MATERIAL

Various materials are used in shops and jobsites throughout the NCF, some of which can be hazardous. The key to the NAVOSH program is to inform the workers about these hazards and the measures necessary to control hazardous materials. To track all hazardous materials, the Department of Defense (DoD) has established the Hazardous Material Information System (HMIS), OPNAVINST 5100.23 (series), which is designed to obtain, store, and distribute data on hazardous materials procured for use. This information is readily available through every supply department.

MATERIAL SAFETY DATA SHEET

A Material Safety Data Sheet (MSDS), OSHA Form 174 or an equivalent form (fig. 1-8), shall be completed for each hazardous item procured and shall be submitted to the procuring activity by the contractor/manufacturer/vendor.

Upon drawing any hazardous material, MLO provides the crew leader with an MSDS. The MSDS identifies all hazards associated with exposure to that specific material. It also will identify any personnel protective equipment or other safety precautions required as well as first-aid/medical treatment required for exposure. The crew leader is required by federal law to inform crew members of the risks and all safety precautions associated with any hazardous material present in the shop or on the jobsite. This can be done during each daily safety lecture as the material is drawn and delivered to the jobsite/shop. All hands must be informed before the material can be used;

therefore, it is a good practice to have a sign-off sheet on the actual MSDS. Additionally, the MSDS must be posted conspicuously, and all hands are aware of its location-at the jobsite, shop spaces, and any other approved hazardous material storage area.

HAZARDOUS MATERIAL CONTROL PROGRAM

The Hazardous Material Control Program is a Navy-wide program to administer the correct storage, handling, usage, and disposition of hazardous material. Steel workers are tasked with monitoring and complying with this program. Hazardous waste disposal has become a serious concern for the Naval Construction Force today. Cleaners, acids, fluxes, mastics, sealers, and *even* paints are just a few of the hazardous materials that can be present in your shop/jobsite. As a crew leader, you are responsible for the safety and protection of your crew. You are equally responsible for the protection of the environment. There are stiff fines and penalties that apply to NCF work as well as civilian work for not protecting the environment ! You are not expected to be an expert in this area. You should, however, immediately contact the environmental representative or the safety office in case of any environmental problem (spill, permits, planning, and such).

HAZARDOUS WARNING MARKINGS AND LABELS

Specific hazards can be determined at a glance by referring to warning markings and labels that identify hazardous materials. Hazardous warning markings and labels are necessary to show clearly the hazardous nature of the contents of packages or containers at all stages of storage, handling, use, and disposal. When unit packages (marked packages that are part of a larger container) are removed from shipping containers, the continuity of the specific hazard warning must be preserved. This is normally done by applying the appropriate identifying hazardous label to the hazardous material container or package.

The Department of Transportation (DOT) labeling system shown in figure 1-9 is a diamond-shaped symbol segmented into four parts. The upper three parts reflect hazards relative to health, fire, and reactivity. The lower part reflects the specific hazard that is peculiar to the material.

Material Safety Data Sheet
 May be used to comply with
 OSHA's Hazard Communication Standard,
 29 CFR 1910.1200. Standard must be
 consulted for specific requirements.

U.S. Department of Labor
 Occupational Safety and Health Administration
 (Non - Mandatory Form)
 Form Approved
 OMB No. 1218 - 0072



IDENTITY (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City, State, and Zip Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer (Optional)

Section II — Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity ; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Optional)

Section III — Physical / Chemical Characteristics

Boiling Point	Specific Gravity (H ₂ O = 1)
Vapor Pressure (mm Hg)	Melting Point
Vapor Density (Air = 1)	Evaporation Rate (Butyl Acetate = 1)
Solubility in Water	
Appearance and Odor	

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Extinguishing Media			
Special Fire Fighting Procedures			
Unusual Fire and Explosion Hazards			

(Reproduce Locally)

OSHA 174, Sept. 1985

SWNP0007

Figure 1-8A.—Material Safety Data Sheet (front).

Section V — Reactivity Data			
Stability	Unstable		Conditions to Avoid
	Stable		
Incompatibility (<i>Materials to Avoid</i>)			
Hazardous Decomposition or Byproducts			
Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur		
Section VI — Health Hazard Data			
Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
Health Hazards (Acute and Chronic)			
Carcinogenicity:	NTP?	IRAC Monographs?	OSHA Regulated?
Signs and Symptoms of Exposure			
Medical Conditions Generally Aggravated by Exposure			
Emergency and First Aid Procedures			
Section VII — Precautions for Safe Handling and Use			
Steps to Be Taken in Case Material is Released or Spilled			
Waste Disposal Method			
Precautions to Be Taken in Handling and Storing			
Other Precautions			
Section VIII — Control Measures			
Respiratory Protection (<i>Specify Type</i>)			
Ventilation	Local Exhaust	Special	
	Mechanical (<i>General</i>)	Other	
Protective Gloves	Eye Protection		
Other Protective Clothing or Equipment			
Work / Hygienic Practices			
Page 2			SWNP0008

Figure 1-8B.—Material Safety Data Sheet (back).

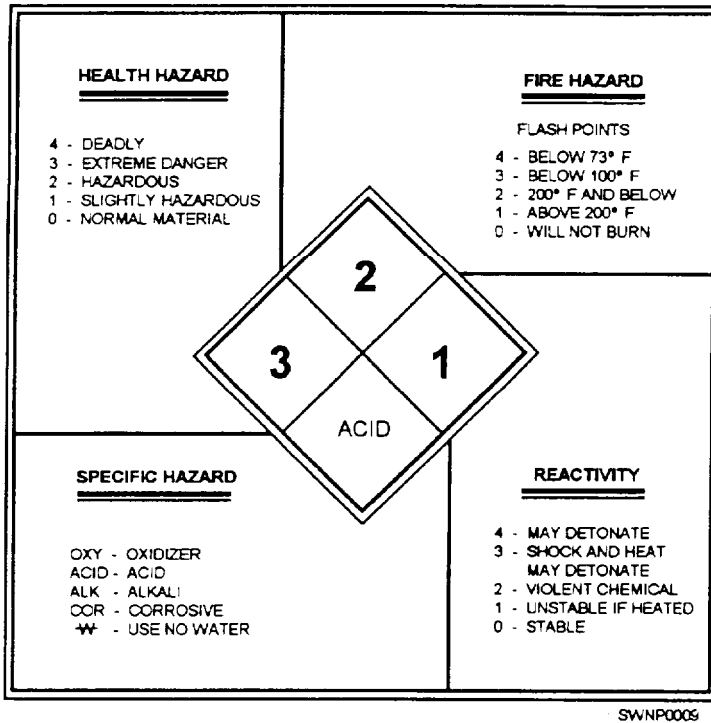


Figure 1-9.—Hazardous Code Chart.

The four specific hazards that the labels are designed to illustrate are as follows:

Health Hazard—the ability of a material to either directly or indirectly cause temporary or permanent injury or incapacitation.

Fire Hazard—the ability of a material to burn when exposed to a heat source.

Reactivity Hazard—the ability of a material to release energy when in contact with water. This term can be defined as the tendency of a material, when in its pure state or as a commercially produced product, to polymerize, decompose, condense, or otherwise become self-reactive and undergo violent chemical changes.

Specific Hazard—this term relates to a special hazard concerning the particular product or chemical that was not covered by other labeled hazard items.

The degree of hazard is expressed in numerical codes as follows:

- 4 = extremely dangerous material
- 3 = dangerous hazard
- 2 = moderate hazard
- 1 = slight hazard

0 = no hazard

The example shown in figure 1-10 describes the hazards of methyl ethyl ketone. Methyl ethyl ketone is usually found mixed with paints, oils, and greases from solvent cleaning, paint removers, adhesives, and cleaning fluid residues. The numbers on the label identify this chemical compound as follows:

- Health Hazard 2, “Hazardous”
- Fire Hazard 4, “Flash point below 73°F, extremely dangerous material”
- Reactivity 3, “Shock or heat may detonate, dangerous material”
- Specific Hazard, “None”

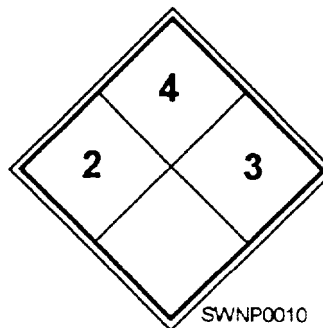


Figure 1-10.—Hazard warning label for methyl ethyl ketone.

Other specific labeling requirements are provided in the NAVSUPINST5100.27 (series). All supervisors should carefully review the contents of this instruction.

HAZARDOUS MATERIAL STORAGE

The safest practice concerning hazardous material is to draw only the amount of material that can be used that day. Storing hazardous materials on the jobsite requires the use of approved storage containers. These containers must be placed a minimum of 50 feet away from any ignition device or source. Plan for the delivery of proper storage equipment before having hazardous materials delivered to the jobsite. Since many hazardous materials require separate storage containers (as an example, corrosives and flammables cannot be stored together), consult your safety office

HAZARDOUS MATERIAL TURN-IN

Any excess material must be disposed of through an authorized hazardous material disposal facility. Proper labeling of hazardous materials is critical. Properly labeled, waste can be disposed of for a relatively low price. Unidentified material must first be analyzed, which is extremely expensive. Anytime you turn-in hazardous material, an MSDS must accompany the material and ensure the MSDS is legible. This will save valuable time and expense and make the job easier for supply.

Avoid mixing unlike types of waste. Do not mix waste paint thinner in a waste oil drum. The Navy sells uncontaminated waste oil for a profit. If only minor amounts of any other substance are present in the waste oil, the Navy must pay high prices for analysis and disposal. The best method for disposal is properly labeling the materials and returning them, unmixed, to the supply department. Each container must be clearly labeled, preferably with the BM line item or other supply tracking documentation. It is always best to check with the battalion MLO staff or safety office for proper disposal procedures.

PLANNING AND ESTIMATING (P&E)

Good construction planning and estimating procedures are essential for any Seabee. This section is intended to give crew leaders helpful information for planning, estimating, and scheduling construction projects. This material is designed to help you understand the concepts and principles and is NOT intended to be a reference or establish procedures.

There are Special Construction Battalion Training classes (SCBT) specifically for Steelworker P&E as well as C-1 Advanced P&E school (NEC 5915) for Seabees.

NOTE: There are various techniques for planning, estimating, and scheduling. The procedures described herein are suggested methods that have been proved with use and result in effective planning and estimating.

PLANNING

Planning is the process of determining requirements and devising and developing methods and actions for constructing a project. Good construction planning is a combination of many elements: the activity, material, equipment, and manpower estimates; project layout; project location; material delivery and storage; work schedules; quality control; special tools required; environmental protection; safety; and progress control. All of these elements depend upon each other. They must all be considered in any well-planned project. Proper planning saves time and effort, making the job easier for all concerned.

ESTIMATING

Estimating is the process of determining the amount and type of work to be performed and the quantities of material, equipment, and labor required. Lists of these quantities and types of work are called estimates.

Preliminary Estimates

Preliminary estimates are made from limited information, such as the general description of projects or preliminary plans and specifications having little or no detail. Preliminary estimates are prepared to establish costs for the budget and to program general manpower requirements.

Detailed Estimates

Detailed estimates are precise statements of quantities of material, equipment, and manpower required to construct a given project. Underestimating quantities can cause serious delays in construction and even result in unfinished projects. A detailed estimate must be accurate to the smallest detail to quantify requirements correctly.

Activity Estimates

An activity estimate is a listing of all the steps required to construct a given project, including specific descriptions as to the limits of each clearly definable quantity of work (activity). Activity quantities provide the basis for preparing the material, equipment, and manpower estimates. They are used to provide the basis for scheduling material deliveries, equipment, and manpower. Because activity estimates are used to prepare other estimates and schedules, errors in these estimates can multiply many times. Be careful in their preparation!

Material Estimates

A material estimate consists of a listing and description of the various materials and the quantities required to construct a given project. Information for preparing material estimates is obtained from the activity estimates, drawings, and specifications. A material estimate is sometimes referred to as a Bill of Material (BM) or a Material Takeoff (MTO) Sheet.

Equipment Estimates

Equipment estimates are listings of the various types of equipment, the amount of time, and the number of pieces of equipment required to construct a given project. Information, such as that obtained from activity estimates, drawings, specifications, and an inspection of the site, provides the basis for preparing the equipment estimates.

Manpower Estimates

The manpower estimate consists of a listing of the number of direct labor man-days required to complete the various activities of a specific project. These estimates will show only the man-days for each activity, or they can be in sufficient detail to list the number of man-days for each rating in each activity—Builder (BU), Construction Electrician (CE), Equipment Operator (EO), Steelworker (SW), and Utilitiesman (UT). Man-day estimates are used in determining the number of personnel and the ratings required on a deployment. They also provide the basis for scheduling manpower in relation to construction progress.

When the *Seabee Planner's and Estimator's Handbook*, NAVFAC P-405, is used, a man-day is a unit of work performed by one person in one 8-hour day or its equivalent. One man-day is equivalent to a

10-hour day when the *Facilities Planning Guide*, NAVFAC P-437, is used.

Battalions set their own schedules, as needed, to complete their assigned tasks. In general, the work schedule of the battalion is based on an average of 55 hours per man per week. The duration of the workday is 10 hours per day, which starts and ends at the jobsite. This includes 9 hours for direct labor and 1 hour for lunch.

Direct labor ("Timekeeping" as previously discussed) includes all labor expended directly on assigned construction tasks, either in the field or in the shop, that contributes directly to the completion of the end product. Direct labor must be reported separately for each assigned construction item. In addition to direct labor, the estimator must also consider overhead labor and indirect labor. Overhead labor is considered productive labor that does not contribute directly or indirectly to the product. It includes all labor that must be performed regardless of the assigned mission. Indirect labor includes labor required to support construction operations but does not, in itself, produce an end product.

SCHEDULING

Scheduling is the process of determining when an action must be taken and when material, equipment, and manpower are required. There are four basic types of schedules: progress, material, equipment, and manpower.

Progress schedules coordinate all the projects of a Seabee deployment or all the activities of a single project. They show the sequence, the starting time, the performance time required, and the time required for completion.

Material schedules show when the material is needed on the job. They can also show the sequence in which materials should be delivered.

Equipment schedules coordinate all the equipment to be used on a project. They also show when it is to be used and the amount of time each piece of equipment is required to perform the work.

Manpower schedules coordinate the manpower requirements of a project and show the number of personnel required for each activity. In addition, the number of personnel of each rating (Steelworker, Builder, Construction Electrician, Equipment Operator, and Utilitiesman) required for each activity for each period of time can be shown. The time unit

shown in a schedule should be some convenient interval, such as a day, a week, or a month.

NETWORK ANALYSIS

In the late 1950s, a new system of project planning, scheduling, and control came into widespread use in the construction industry. The critical path analysis (CPA), critical path method (CPM), and project evaluation and review technique (PERT) are three examples of about 50 different approaches. The basis for each of these approaches is the analysis of a network of events and activities. The generic title of the various networks is network analysis.

The network analysis approach is now the accepted method of construction planning in many organizations. Network analysis forms the core of project planning and control systems and is accomplished by completing the following steps:

1. Develop construction activities. After careful review of the plans and specifications (specs), your first step is to break the job down into discreet activities. Construction activities are generally less than 15 days in duration and require the same resources throughout the entire duration.

2. Estimate construction activity requirements. Evaluate the resource requirements for each construction activity. Identify and list all of the materials, tools, equipment (including safety-related items), and manpower requirements on the Construction Activity Summary (CASS) Sheet.

3. Develop logic network. List the construction activities logically from the first activity to the last, showing relationships or dependencies between activities.

4. Schedule construction activities. Determine an estimated start and finish date for each activity based on the sequence and durations of construction activities. Identify the critical path. This will help focus attention of management on those activities that cannot be delayed without delaying the project completion date.

5. Track resources. As the crew leader, you must be sure the necessary resources are available on the project site on the day the work is to be performed. For materials on site, this will be as easy as submitting a material request, NAVSUP Form 1250-1, to the material liaison office (MLO) several days in advance. For local purchase requirements, such as a concrete

request to MLO, a request can be required 2 to 3 weeks in advance.

6. Control resources. As the crew leader, you are also responsible for on-site supervision of all work performed. Productive employment of available resources to accomplish assigned tasking is your greatest challenge.

PROGRESS CONTROL

Progress control is the comparing of actual progress with scheduled progress and the steps necessary to correct deficiencies or to balance activities to meet overall objectives.

CONSTRUCTION DRAWINGS

In planning any project, you must be familiar with construction drawings and specifications. The construction of any structure or facility is described by a set of related drawings that gives the Seabees a complete sequential graphic description of each phase of the construction process. In most cases, a set of drawings shows the location of the project, boundaries, contours, and outstanding physical features of the construction site and its adjoining areas. Succeeding drawings give further graphic and printed instructions for each phase of construction.

TYPES OF CONSTRUCTION DRAWINGS

Drawings are generally categorized according to their intended purposes. Some of the types commonly used in military construction are discussed in this section.

Master Plan Drawings

MASTER PLAN DRAWINGS are commonly used in the architectural, topographical, and construction fields. They show sufficient features to be used as guides in long-range area development. They usually contain section boundary lines, horizontal and vertical control data, acreage, locations and descriptions of existing and proposed structures, existing and proposed surfaced and unsurfaced roads and sidewalks, streams, right-of-way, existing utilities, north point indicator (arrow), contour lines, and profiles. Master plan and general development drawings on existing and proposed Navy installations are maintained and constantly upgraded by the

resident officer in charge of construction (ROICC) and by the Public Works Department (PWD).

Shop Drawings

SHOP DRAWINGS are drawings, schedules, diagrams, and other related data to illustrate a material, a product, or a system for some portion of the work prepared by the construction contractor, subcontractor, manufacturer, distributor, or supplier. Product data include brochures, illustrations, performance charts, and other information by which the work will be judged. As an SW, you will be required to draft shop drawings for minor shop and field projects. You can draw shop items, such as doors, cabinets, and small portable structures (prefabricated berthing quarters, and modifications of existing buildings), or perhaps you will be drawing from portions of design drawings, specifications, or from freehand sketches given by the design engineer.

Working Drawings

A WORKING DRAWING (also called project drawing) is any drawing that furnishes the information required by a Steelworker to manufacture a part or a crew to erect a structure. It is prepared from a freehand sketch or a design drawing. Complete information is presented in a set of working drawings, complete enough that the user will require no further information. Project drawings include all the drawings necessary for the different Seabee ratings to complete the project. These are the drawings that show the size, quantity, location, and relationship of the building components.

A complete set of project drawings consists of general drawings, detail drawings, and assembly drawings. General drawings consist of "plans" (views from above) and "elevations" (side or front views) drawn on a relatively small defined scale, such as 1/8 inch = 1 foot. Most of the general drawings are drawn in orthographic projections, although sometimes details can be shown in isometric projections. Detail drawings show a particular item on a larger scale than that of the general drawing in which the item appears, or it can show an item too small to appear at all on a general drawing. Assembly drawings are either an exterior or a sectional view of an object showing the details in the proper relationship to one another. Usually, assembly drawings are drawn to a smaller scale than are detail drawings. This procedure

provides a check on the accuracy of the design and detail drawings and often discloses errors.

Red-lined Drawings

RED-LINED DRAWINGS are the official contract drawings that you will mark up during construction to show as-built conditions. Red-lined drawings are marked in color "red" to indicate either a minor design change or a field adjustment.

As-built Drawings

AS-BUILT DRAWINGS are the original contract drawings (or sepia copies) that you will change to show the as-built conditions from the red-lined drawings. Upon the completion of the facilities, the construction contractor or the Naval Military Construction Force (NMCB) is required to provide the ROICC with as-built drawings, indicating construction deviations from the contract drawings. All of the as-built marked-up prints must reflect exact as-built conditions and must show all features of the project as constructed. After the completion of the project, as-built marked-up prints are transmitted by the ROICC to the engineering field division (EFD).

ORDER OF PROJECT DRAWINGS

Project drawings for buildings and structures are arranged in the following order:

1. TITLE SHEET AND INDEX—Contain specific project title and an index of drawings. (Used only for projects containing 60 or more drawings.)
2. SITE or PLOT PLANS—Contain either site or plot plans or both, as well as civil and utility plans. For small projects, this sheet should include an index of the drawings.
3. LANDSCAPE AND IRRIGATION (if applicable).
4. ARCHITECTURAL (including interior design as applicable).
5. STRUCTURAL.
6. MECHANICAL (heating, ventilation, and air conditioning).
7. PLUMBING.
8. ELECTRICAL.
9. FIRE PROTECTION.

Title Blocks

The title block identifies each sheet in a set of drawings. (See fig. 1-11.) Generally, the title block is located at the bottom right corner of the drawing regardless of the size of the drawing (except for vertical title block). For further information on the layout of title blocks, refer to the *Engineering Aid 3*.

The information provided in the title block is important information that a Steelworker **MUST** understand. The information includes the following:

- Architect's name
- Architect's seal
- Drawing title
- Date prepared
- Revisions
- Designed by
- Checked by
- Drawing numbers
- Name of local activity
- Code ID number (80091 NAVFAC)
- Letter designation
- Size of drawing
- Scale of drawing
- ABFC drawing number (if applicable)
- Approved by

There are many variations to title blocks. Depending on the preparing activity (NAVFAC, NCR, NMCB, etc.), all title blocks should contain the same information listed above.

Drawing Revisions

A Revision block contains a list of revisions made to a drawing. The Revision block is located in the upper right-hand corner. The Revision block can include a separate "PREPARED BY" column to indicate the organization, such as an architectural engineering firm, that prepared the revision. Like title blocks, revision blocks can vary in format with each command.

Graphic Scales

Graphic scales are located in the lower right-hand corner of each drawing sheet, with the words *Graphic Scales* directly over them. The correct graphic scales must be shown prominently on each drawing because, as drawings are reduced in size, the reductions are often NOT to scaled proportions. Remember, scaling a drawing should be done as a "last resort."

Drawing Notes

NOTES are brief, clear, and explicit statements regarding material use and finish and construction methods. Notes in a construction drawing are classified as specific and general.

SPECIFIC notes are used either to reflect dimensional information on the drawing or to be explanatory. As a means of saving space, many of the terms used in this type of note are often expressed as abbreviations.

GENERAL notes refer to all of the notes on the drawing not accompanied by a leader and an arrowhead. As used in this book, general notes for a set of drawings covering one particular type of work are placed on the first sheet of the set. They should be

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NUMBER ASSIGNED BY NAVFACENGCOW WESTERN DIVISION

Figure 1-11.—Title block.

placed a minimum of 3 inches below the space provided for the revision block when the conventional horizontal title block is used. When the vertical title block is used, you can place the general notes on the right side of the drawing. General notes for architectural and structural drawings can include, when applicable, roof, floor, wind, seismic, and other loads, allowable soil pressure or pile-bearing capacity, and allowable unit stresses of all the construction materials used in the design. Notes for civil, mechanical, electrical, sanitary, plumbing, and similar drawings of a set can include, when applicable, references for vertical and horizontal control (including soundings) and basic specific design data.

General notes can also refer to all of the notes grouped according to materials of construction in a tabular form, called a SCHEDULE. Schedules for items, like doors, windows, rooms, and footings, are somewhat more detailed. Their formats will be presented later in this chapter.

MAJOR CATEGORIES OF PROJECT DRAWINGS

Generally, working or project drawings can be divided into the following major categories: civil, architectural, structural, mechanical, electrical, and fire protection. In Seabee construction, however, the major categories most commonly used are as follows: CIVIL, ARCHITECTURAL, STRUCTURAL, MECHANICAL, and ELECTRICAL sets of drawings.

Regardless of the category, working drawings serve the following functions:

- They provide a basis for making material, labor, and equipment estimates before construction begins.
- They give instructions for construction, showing the sizes and locations of the various parts.
- They provide a means of coordination between the different ratings.
- They complement the specifications; one source of information is incomplete without the others.
- Civil working drawings encompass a variety of plans and information to include the following:
 - Site preparation and site development
 - Fencing
 - Rigid and flexible pavements for roads and walkways
 - Environmental pollution control

- Water supply units (that is, pumps and wells)

Depending on the size of the construction project, the number of sheets in a set of civil drawings can vary from a bare minimum to several sheets of related drawings. Generally, on an average-size project, the first sheet has a location map, soil boring log, legends, and it sometimes has site plans and small civil detail drawings. (Soil boring tests are conducted to determine the water table of the construction site and classify the existing soil.) Civil drawings are often identified with the designating letter C on their title blocks.

SITE PLANS

A SITE PLAN furnishes the essential data for laying out the proposed building lines. It is drawn from notes and sketches based upon a survey. It shows the contours, boundaries, roads, utilities, trees, structures, references, and other significant physical features on or near the construction site. The field crews (Equipment Operators) are able to estimate and prepare the site for conduction and to finish the site (including landscaping) upon completion of construction by showing both existing and finished contours. As an SW, you should be familiar with the methods and the symbols used on maps and topographic drawings.

Site plans are drawn to scale. In most instances, the engineer's scale is used, rather than the architect's scale. For buildings on small lots, the scales normally used are 1 inch = 10 feet.

PROJECT FOLDERS

The intent of this section is to acquaint you with the basic concepts and principles of project management and is NOT intended to be a reference but also to make you familiar with the contents of a project folder.

The project folder, or package, consists of nine individual project files. These files represent the project in paper format—a type of project history from start to finish.

File No. 1-General Information File

File No. 1 is the General Information File and contains the following information:

LEFT SIDE—The left side of the General Information File basically contains information

authorizing the project. The file should have the following items:

- Project scope sheet.
- Tasking letter (fig. 1-12).
- Project planning checklist.
- Project package sign-off sheet.

RIGHT SIDE—The right side of the General Information File contains basic information relating to coordinating the project. The file should have the following items:

- Project organization.

- Deployment calendar.
- Preconstruction conference notes.
- Predeployment visit summary.

File No. 2—Correspondence File

File No. 2 is the Correspondence File and consists of the following items:

LEFT SIDE—The left side contains outgoing messages and correspondence.

RIGHT SIDE—The right side of the file contains incoming messages and correspondence.

Date: _____	
MEMORANDUM	
From: Operations Officer	
To:	
Subj: PROJECT _____	
1. _____ Company is tasked as the prime contractor for the subject project. Project planning and estimating should be accomplished by the crew leader and/or project crew, in accordance with current battalion procedures. Plans, specs, and master activity description (if applicable) are available from S3QC.	
2. The CBPAC manday estimate for NMCB-74's tasking is _____	
3. Project scope:	
4. The following dates are established as milestones to be met for your project planning:	
<u>ITEM</u>	<u>DUE DATES</u>
Familiarization with project	
Establish Detail Activities	
Complete Front of cas Sheets	
Prepare MTO	
Finalize Mini Computer Input	
Prepare Level II	
Safety Plan	
Quality Control Plan	
Final Package Review	
5. Sub-contractor (s) for the subject project is/are _____	
6. Regress will be monitored by S3 at short informal meetings. Contact S3 or S3A, if you have any questions.	
copy to:	

Figure 1-12.—Project tasking letter.

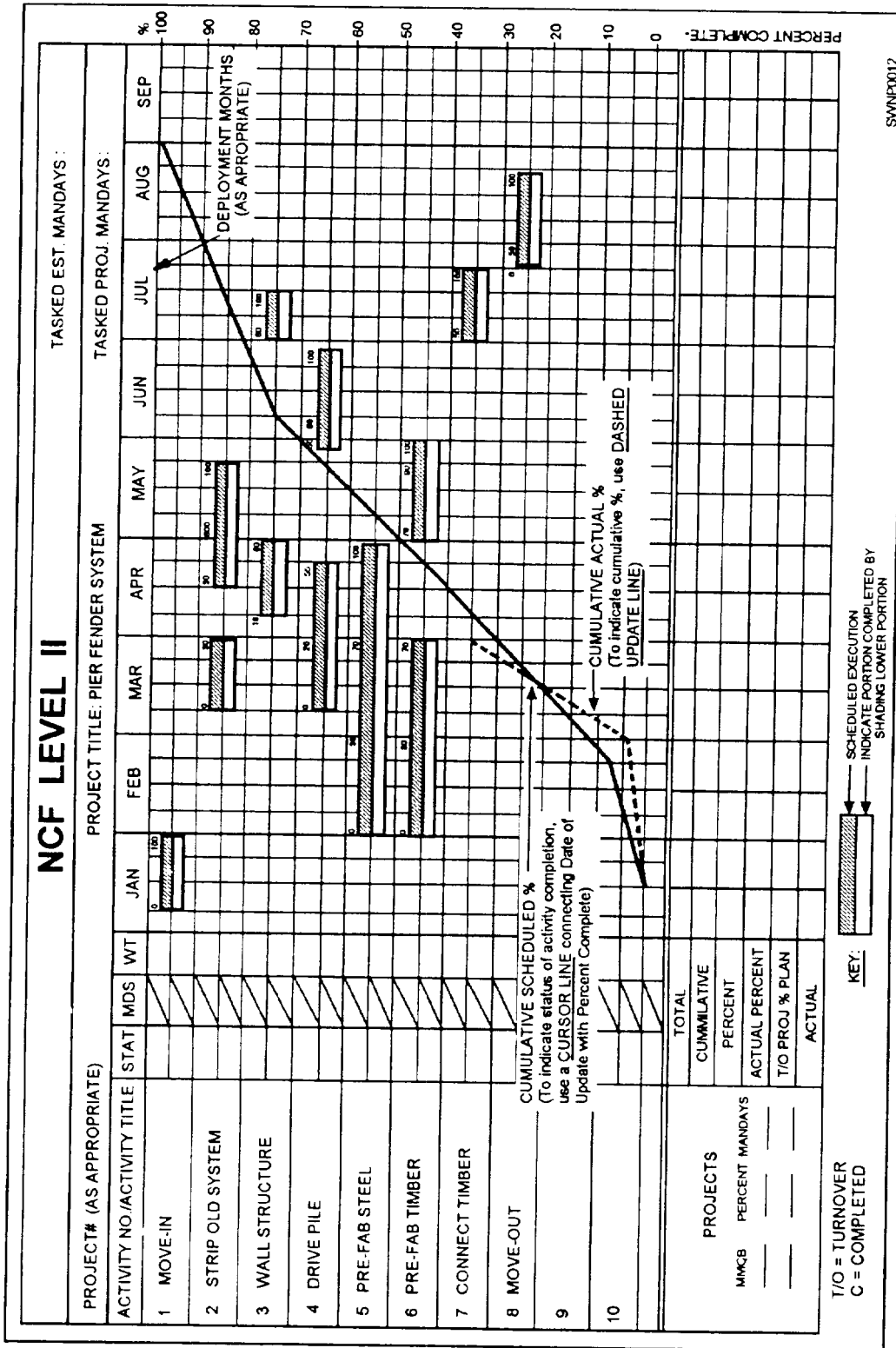


Figure 1-13.—Level II.

File No. 3—Activity File

File No. 3, the Activity File, contains the following information:

LEFT SIDE—The left side contains the Construction Activity Summary Sheets of completed activities.

RIGHT SIDE—The right side of the file contains the following form sheets:

- Master Activity Sheets.
- Level II. A general schedule for each project prepared for the operations officer by the company. It contains a general schedule for each project and contains all of the major work elements and a schedule for each prime contractor or project manager based upon major work (fig. 1-13).

- Level II Precedence Diagram.
- Master Activity Summary Sheets (fig. 1-14).
- Construction Activity Summary Sheets (fig. 1-15).

File No. 4—Network File

File No. 4 is the Network File. It contains the following information:

LEFT SIDE—The left side contains the following documents:

- Computer printouts.
- Level III is a detailed schedule for each project, developed by the company selected as prime contractor and assisted by the companies selected as subcontractor. The Level III not only serves as stool in which the prime contractor and subcontractor manage their projects but it also provides important data, enabling the operations officer to redistribute or reschedule assignments and to arrange for extra personnel, equipment, or special training required for the task. Level III shows such details as crew sizes, material delivery dates, and periods where special tools/equipment will be required on the project.

- Level III Precedence Diagram.

RIGHT SIDE—The right side of the Network File contains the following items:

- Resource leveled plan for manpower and equipment.
- Equipment requirement summary.

File No. 5—Material File

File No. 5 is the Material File. It contains the following information:

LEFT SIDE—The left side contains the work sheets that you, as a project planner, must assemble. The list includes the following items:

- List of long lead items (fig. 1-16).
- 45-day material list.
- Material transfer list.
- Add-on/reorder justification forms.
- Bill of Material/Material Takeoff Comparison Work Sheet (fig. 1-17).
- Material Takeoff Work Sheet (fig. 1-18).

RIGHT SIDE—The right side of the Material File contains the Bill of Material (including all add-on/reorder BMs) supplied by the Naval Construction Regiment.

File No. 6—Quality Control File

File No. 6, the Quality Control File, contains the following information:

LEFT SIDE—The left side of this file contains various quality control forms and the field adjustment request.

RIGHT SIDE—The right side of the Quality Control File contains the daily quality control inspection report and the quality control plan.

File No. 7—Safety/Environmental File

File No. 7 is the Safety/Environmental File and consists of the following information:

LEFT SIDE—The left side of the Safety/Environmental File contains the following items:

- Required safety equipment.
- Standup safety lectures.
- Safety reports.
- Accident reports.

RIGHT SIDE—The right side of the Safety/Environmental File contains the following:

- Safety plan, which you must develop.
- Highlighted EM 385.
- Environmental plan (if applicable).

File No. 8—Plans File

File No. 8 is the Plans File and contains the following information:

MASTER ACTIVITY SUMMARY SHEET

PROJECT TITLE: _____

B.M. CODE _____ PREPARED BY: _____ CHECKED BY: _____

START SCHEDULED: _____ FINISHED SCHEDULED: _____
 ACTUAL: _____ ACTUAL: _____

ACT. NO. _____ ACT. CODE _____

ACT. TITLE: _____

INCLUDES CONSTRUCTION ACTIVITIES:

ACT. NO.	ACT CODE	ACTIVITY TITLE	CREW SIZE	DURATION	MANDAYS

DURATION: ESTIMATED _____ MANDAYS: ESTIMATED _____ WORKWEEK: _____
 ACTUAL _____ ACTUAL _____

LABOR RESOURCES:

NO.	DESCRIPTION	QTY.		NO.	DESCRIPTION	QTY.

NO.	DESCRIPTION	QTY.		NO.	DESCRIPTION	QTY.

ASSUMPTIONS: _____

SEE REVERSE SIDE FOR LEVEL III PRECEDENCE DIAGRAM OF MASTER ACTIVITY SUBNET.

SWNPO013

Figure 1-14.—Master Activity Summary Sheet.

LEFT SIDE—The left side contains the following planning documents:

- Site layout.
- Shop drawings.
- Detailed slab layout drawings (if applicable).
- Rebar bending schedule.

RIGHT SIDE—The right side of the Plans File contains the actual project plans. Depending on thickness, plans should be either rolled or folded.

File No. 9—Specifications File

File No. 9 is the Specifications File; it contains the following information:

CONSTRUCTION ACTIVITY SUMMARY SHEET

PROJECT TITLE: _____

B.M. CODE _____ PREPARED BY: _____ CHECKED BY: _____

START SCHEDULED: _____ FINISHED SCHEDULED: _____

ACTUAL : _____ ACTUAL: _____

ACT. NO. _____ ACT. CODE _____

ACT. TITLE: _____

DESCRIPTION OF WORK METHOD: _____

DURATION: ESTIMATED _____ MANDAYS: ESTIMATED _____ WORKWEEK: _____
 ACTUAL _____ ACTUAL _____

PRODUCTION EFFICIENCY FACTOR: _____ RESULTING DELAY FACTOR: _____

LABOR RESOURCES:

NO.	DESCRIPTION	QTY.		NO.	DESCRIPTION	QTY.

EQUIPMENT RESOURCES:

NO.	DESCRIPTION	QTY.		NO.	DESCRIPTION	QTY.

MATERIAL RESOURCES:

NO.	DESCRIPTION	QTY.		NO.	DESCRIPTION	QTY.

ASSUMPTIONS: _____

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Figure 1-15.—Construction Activity Summary Sheet

LEFT SIDE—The left side of this File is reserved for technical data.

RIGHT SIDE—The right side of the Specifications File has highlighted project specifications.

