Chapter 1
Engineering Aid Rating

Topics
1.0.0 Engineering Aid Rating
2.0.0 Administrative Duties
3.0.0 Professional Duties

To hear audio, click on the box.

Overview
Engineering Aids (EA) provide vital and continuous support in a variety of ways for construction projects throughout the Naval Construction Force (NCF). Your contributions as an EA may be in the form of direct labor, indirect labor, or both.

Depending on your individual assignment, your duties could range from staking out a project site to keeping its time records. Regardless of the labor category, all of which are important to the full completion and close out of a project, you will be part of a project’s team effort. This chapter will help prepare you by acquainting you with your duties and responsibilities as an EA.

Objectives
When you have completed this chapter, you will be able to do the following:
   1. Describe the Engineering Aid rating.
   2. Understand the administrative duties of the Engineering Aid rating.
   3. Understand the professional duties of the Engineering Aid rating.

Prerequisites
None
This course map shows all of the chapters in Engineering Aid Basic. The suggested training order begins at the bottom and proceeds up. Skill levels increase as you advance on the course map.

<table>
<thead>
<tr>
<th>Topographic Surveying and Mapping</th>
<th>Engineering Aid Basic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect Leveling/Level and Traverse Computations</td>
<td>ENG</td>
</tr>
<tr>
<td>Care and Adjustment of Survey Equipment</td>
<td>ENE</td>
</tr>
<tr>
<td>Materials Testing: Soil and Concrete</td>
<td>ERI</td>
</tr>
<tr>
<td>Direct Leveling and Basic Engineering Surveys</td>
<td>EER</td>
</tr>
<tr>
<td>Horizontal Control</td>
<td>AID</td>
</tr>
<tr>
<td>Direct Linear Measurements and Field Survey Safety</td>
<td>BAS</td>
</tr>
<tr>
<td>Surveying: Elements and Equipment</td>
<td>BAS</td>
</tr>
<tr>
<td>Construction Drawings</td>
<td>BAS</td>
</tr>
<tr>
<td>Electrical: Systems and Plans</td>
<td>BAS</td>
</tr>
<tr>
<td>Mechanical: Systems and Plans</td>
<td>BAS</td>
</tr>
<tr>
<td>Concrete and Masonry</td>
<td>BAS</td>
</tr>
<tr>
<td>Wood and Light Frame Structures</td>
<td>BAS</td>
</tr>
<tr>
<td>Drafting: Projections and Sketching</td>
<td>BAS</td>
</tr>
<tr>
<td>Drafting: Geometric Construction</td>
<td>BAS</td>
</tr>
<tr>
<td>Drafting: Fundamentals and Techniques</td>
<td>BAS</td>
</tr>
<tr>
<td>Drafting: Equipment</td>
<td>BAS</td>
</tr>
<tr>
<td>Mathematics and Units of Measurement</td>
<td>BAS</td>
</tr>
<tr>
<td>Engineering Aid Rating</td>
<td>BAS</td>
</tr>
</tbody>
</table>

**Features of this Manual**

This manual has several features which make it easy to use online.

- Figure and table numbers in the text are italicized. The figure or table is either next to or below the text that refers to it.
- The first time a glossary term appears in the text, it is bold and italicized. When your cursor crosses over that word or phrase, a popup box displays with the appropriate definition.
- Audio and video clips are included in the text, with italicized instructions telling you where to click to activate it.
- Review questions that apply to a section are listed under the Test Your Knowledge banner at the end of the section. Select the answer you choose. If the
answer is correct, you will be taken to the next section heading. If the answer is incorrect, you will be taken to the area in the chapter where the information is for review. When you have completed your review, select anywhere in that area to return to the review question. Try to answer the question again.

- Review questions are included at the end of this chapter. Select the answer you choose. If the answer is correct, you will be taken to the next question. If the answer is incorrect, you will be taken to the area in the chapter where the information is for review. When you have completed your review, select anywhere in that area to return to the review question. Try to answer the question again.
1.0.0 ENGINEERING AID RATING

Engineering Aid is one of seven Occupational Field 13 (construction) ratings in the Navy. All OF-13 ratings are general ratings.

1.1.0 Scope of Duties and Responsibilities

From concept to conclusion, Engineering Aids are involved in NCF projects.

EAs:

- Obtain field data necessary for engineering studies or for actual construction of any type of structure.
- Plan, supervise, and perform tasks required in construction drafting, construction surveying, planning and estimating; quality control.
  - Prepare, edit, and reproduce construction drawings
  - Make and control surveys: run and close traverses, run level circuits, stake out construction projects
  - Prepare progress reports, time records, construction schedules, material and labor estimates
  - Establish and operate a basic quality control system for testing soils, concrete, and other construction materials

1.2.0 Importance of the EA Rating

Each of the other six Occupational Field 13 ratings may or may not perform a function on a particular NCF project. A project may be primarily or solely vertical or horizontal in scope, with each project’s design requirements determining a different combination of skill needs. However, the function of the EA is significant on every project.

EAs contribute directly or indirectly, to all construction projects in their entirety, whether vertical or horizontal. From a project’s conception to its completion report, the EA contributes to the team effort. Some efforts might not be measurable in terms of work-in-place such as surveying, staking, or establishing elevations, but an EA’s indirect labor could be a deciding factor in the accuracy and quality of a finished project. Accuracy in compiling man-hour expenditures and progress reports may alert the operations officer to a lagging work schedule. The operations officer could then adjust timetables and priorities to meet standing completion requirements.

An EA’s breadth of contributions to NCF projects translates into civilian construction in a multitude of ways: Drafting, Surveying, Materials Testing, Timekeeping, and Recordkeeping. These are just a few examples of an EA’s support to the mission of the NCF. You will learn a majority of your individual tasks through on-the-job training or informal schools. The tasks you perform will depend upon your particular duty station, your specific billet assignment, and the prevailing contingency—operational, logistical, or both, but your contributions will add to the tradition of the Seabee’s “Can-Do” performance.
1.3.0 Typical EA Billets

Most EA sea duty billets are in a Naval Mobile Construction Battalion, the “Green Machine.” This is where you will have the widest range of opportunities to develop and apply your skills through the varied projects of a battalion’s tasking.

Most EA shore duty billets are at public works activities. However, other types of independent sea, shore, or oversea billets are also available.

If you are a selected reservist, a Naval Construction Force Support Unit (NCFSU), providing augmented construction, engineering, and logistics support, is another unit with a significant number of EA billets.

1.3.1 Assignment to an NMCB Operations Department

Your sea duty assignment to an NMCB will usually place you in the operations department (S-3) of Headquarters Company.

With minor variations to suit the type of unit, its mission, and prevailing conditions, the organization of any Seabee operations department (staff, battalion, or detached unit) is similar in basic composition. To support construction, the operations department has specific functional areas:

- planning and estimating
- engineering
- monitoring/reporting
- quality control
- disaster preparedness
- minicomputer operations
- resource control

The operations officer may expand or modify the organization to suit the battalion’s mission and/or the available personnel.

The Naval Construction Force Manual, NAVFAC P-315 provides information on the organization of the operations department, and how your duties and responsibilities relate to its functions. Figure 1-1 shows a standard organizational chart of a Naval Mobile Construction Battalion operations department.
1.3.1.1 Engineering Division

The operations department assigns most EAs to the engineering division, so you need to be familiar with the overall organization of the division and the duties and responsibilities of personnel within it. Your specific assignment could encompass any one or more of these responsibilities. Study the following sections and visualize how your assignment can contribute to both the division’s mission and the larger mission of the operations department.

The engineering officer, normally a Civil Engineer Corps (CEC) officer, heads the operations department’s engineering division. The engineering officer and staff are responsible for providing all design and engineering services necessary for the successful conduct of the construction program.

Their specific responsibilities include:

- Providing guidance and support to company deployment planning teams
- Reviewing all plans for sound engineering practices and practicability of planning and construction
- Resolving field problems relative to errors or design revisions
- Briefing company commanders on engineering aspects of new projects
- Providing liaison with customers concerning engineering and design
- Providing liaison with other divisions within the operations department in the interest of the successful conduct of the construction program

In addition, the engineering division is responsible for, and renders technical support by:

- Providing technical engineering construction inspection (by the engineering officer on behalf of the operations officer) to ensure projects adhere to the plans and specifications, and that quality workmanship prevails at all times
- Providing survey services, as required, for the construction companies
- Providing up-to-date drawings and specifications for projects in progress
• Providing soils and materials testing and evaluation services
• Maintaining as-built drawings and providing copies, as appropriate, to customer commands

1.3.1.2 Monitoring/Reporting Division
The assistant operations officer heads the operations department’s monitoring/reporting division, sometimes referred to as the management division. The operations Yeomen and the battalion timekeeper normally staff this division but sometimes, capable EAs fill the position of timekeeper/computer. The monitoring/reporting division collects, compiles, and analyzes all information related to construction operations. The battalion uses this information to prepare construction operations reports, including the Deployment Completion Report, the Project Execution Report, the Monthly Situation Reports, and any other special reports required by higher authority. The engineering division assists the monitoring/reporting division in preparing these reports by supplying technical information concerning construction projects. Existing records may provide all the information for some reports, while others may require special investigation and research.

For example, each battalion submits a Monthly Situation Report (SITREP) of operations to its Immediate Superior in Command (ISIC) with copies to Commander, NAVFAC, and to any other administrative, military, and operational commanders concerned. This report is a concise review of the battalion’s activities during the month regarding accomplishments, problems, and capabilities. It includes such information as planning, construction, welfare, morale, discipline, safety, training, and equipment. It includes the numbers of officers and enlisted personnel for the battalion headquarters site and for all its detachments, including specifying the methods of movements for personnel traveling.

Commander NCF specifies the enclosures to the Monthly SITREP, and they generally include:
• Progress and performance reports
• Progress photographs
• Labor distribution reports
• Financial reports
• Equipment status reports
• Training reports
• Summary of important events that occurred during the reporting period

There are detailed instructions covering the preparation of the Monthly SITREP and other reports, so if your assignment is to the monitoring/reporting division, your only problem will be the compilation of data for a specific report.

The monitoring/reporting division is also responsible for the following:
• Maintaining a complete status folder on each project
• Maintaining complete and accurate timekeeping records and labor analysis reports
• Maintaining and updating visual status boards required for effective construction management including:
- company personnel strength
- project status
- labor analysis
- project schedules

- Preparing project completion letters according to applicable instructions from higher authority
- Maintaining constant liaison with the material liaison officer

In addition, the monitoring/reporting division maintains constant coordination and works closely with the quality control/planning and estimating division as well as the company deployment planning team concerning the technical aspects of a project, its progress reports, and the master scheduling.

1.3.2 Assignment to a Typical Public Works Department

If you receive orders to a shore or overseas shore activity other than a Seabee staff or school command, you will normally find yourself assigned to the public works department (PWD) of the activity. Depending on the organization of the department and individual personnel capabilities, EAs assigned to PWDS may fill several different types of billets. Although civilians fill most PWD jobs, military billets do exist to implement the rotation of Occupational Field 13 personnel from sea to shore duty. Most public works EA billets are in the PWD engineering division, where the EA works with civil service personnel in performing drafting and/or surveying tasks.

However, senior EAs with planning and estimating or inspecting experience may work in the facilities management engineering division as planners and estimators or maintenance inspectors. Sometimes when there is a shortage of senior military personnel in the facilities management engineering division, EAs and other OF-13 petty officers may train for the planning and estimating or maintenance inspecting billets.

A unique situation exists at most public works departments. Your military duties and responsibilities will fall under military supervision, whereas a civilian engineer will directly supervise your professional work.

Adjusting to this situation may be difficult at first, but an alert EA will benefit from the wider experience of the civilian engineer. A good working relationship between you and your civilian co-worker is of the utmost importance. Once this relationship is established, duty at a public works department can be interesting and rewarding. Figure 1-2 shows a standard organizational chart for a public works department.
1.3.2.1 Engineering Division

The public works engineering division is responsible for the following:

- All matters pertaining to engineering studies and reports, including preliminary designs and estimates for special repair and improvement projects
- Engineering design, including development of plans and specifications
- Maintenance of technical plan files and records

This division is responsible for preparation of shore facilities development reports and for the submission of basic data required by the NAVFAC Engineering Field Division (EFD) director for preliminary engineering studies.

The PW officer establishes the engineering division to handle only routine work. He relies upon the NAVFAC regional EFD for:

- Design of major public works and public utilities
- Preparation of specifications in connection with the design
- Engineering investigations in specialized fields

Whenever the workload justifies or requires such action, the engineering division may subdivide into branches of specific engineering disciplines:

- Electrical
- Mechanical
- Architectural and structural
- Civil
- Plans and specifications

Some PW departments may combine the mechanical and electrical branches or merge the civil branch into the architectural and structural branch, but in all cases, surveying work remains a part of the civil component. PW departments with limited workload and staffing may combine the engineering and maintenance components into a single engineering division.
Regardless of the PW activity’s size or workload, most EAs will work in the engineering division, and as such, your tasks, (design, reproduction, surveying, etc.) will be similar to those performed in the engineering division of the NMCB, with the exception of supervision. Often, you may be the only EA assigned to a particular public works activity; therefore, you may not have any supervisory duties.

1.3.2.2 Facilities Management Engineering Division

This PWD division’s tasking is maintenance management.

Its responsibilities include:

- Integration of a maintenance work load program
- Screening and classifying all work requests, including emergency-service type work, before submission to shops for accomplishment
- Continuous inspection of public works and public utilities to reveal the need for maintenance work
- Preparation of manpower and material estimates for job orders
- Determining the need for engineering advice and assistance
- Initiation of requests to the public works officer for approval to perform work by contract

The facilities management engineering division may include specific branches:

- Inspection
- Planning and estimating
- Work reception and control

At some public works departments, experienced BUs, CEs, UTs, SWs, and a few EAs with broad construction experience, supplement the inspection branch. PWDs staffed primarily with Seabees may have senior or master chief petty officers as supervisors for the inspection branch and/or the planning and estimating branch.

1.3.3 Other EA Billets

In addition to the NMCB “Green Machine” and the Public Works Departments, as an EA, you will have a variety of billet options, as they are available. Alternatively, you may receive orders to a particular unit as a need arises. Other types of billets for EAs include assignment to Construction Battalion Maintenance Units (CBMU’s), Naval Amphibious Construction Battalions (ACB’s), Underwater Construction Teams (UCT’s), Seabee teams, and various other commands.

Senior EAs may do a tour on a regimental staff, a Seabee Readiness Group (SRG), or at Seabee headquarters. They may also fill a billet as an instructor at one of the Naval Construction Training Centers (NCTC’s), a personnel detailer at Naval Manpower Procurement Center (NMEAB01PC), or a writer for advancement examinations and training manuals at the Naval Education and Training Program Management Support Activity (NETPMSA).

2.0.0 ADMINISTRATIVE DUTIES

If you are an EA3, you are just beginning to develop your professional skills, such as drafting, surveying, materials testing, quality control, and eventually planning and
estimating. However, from time to time, you will also need to demonstrate your supervisory abilities. Initially limited, your duties and responsibilities as a supervisor will gradually increase as you advance in your career.

Becoming a Petty Officer Third Class is a major milestone in your naval career, and the Navy now imposes special trust and confidence in you. In return, the Navy expects you to be professionally competent and capable of instructing and supervising subordinates.

As a Petty Officer, your leadership will influence others, so you must always exhibit a strong sense of personal integrity and dedication to both your work and the Navy. Sometimes you may be unaware of your own influence, but as a Petty Officer, you will always be leading by example.

Adjusting to your role as a supervisor will be one of your greater challenges, so start preparing now. Prior knowledge of both your administrative and professional duties will put you ahead. Your early training and study will prove beneficial when you need to lead others. Consider your training and studies as placing additional tools in your personal tool kit. You will be able to draw on them whenever you need them.

To help prepare you for the job ahead, this manual will acquaint you with some of the common administrative and professional duties of an EA3. It will not attempt to present material on basic leadership techniques for a PO3. That topic is already adequately covered in Military Requirements for Petty Officer Third Class, NAVEDTRA 10044, and Military Requirements for Petty Officer Second Class, NAVEDTRA 10045 (latest revisions). As a Petty Officer Third Class, you will also need to study those basic leadership techniques and apply them in your role as a supervisor when called upon.

In this section, you will also learn to recognize the scope of other general duties and responsibilities associated with an EA3 in a typical Seabee billet.

2.1.0 Assignment as Team Leader

Although EA2s normally serve as team, party, or crew leaders, in a case where you hold seniority in years over the rest of the junior personnel assigned to your team or section, the section leader may assign you to perform those duties and occupy a position of higher responsibility.

Survey party crew chief or drafting room leader are two typical supervisory assignments that may come to you as an EA3. In general, your duties as a survey party chief or crew leader will involve planning work assignments, supervising, coordinating your work with the work of other teams, initiating requisitions, and keeping time cards. The following will help you prepare for your supervisory assignment.

2.1.1 Planning Work Assignments

Proper planning saves time, effort, and money for the Navy and makes the job easier for all concerned parties. The following will help you in planning day-to-day work assignments.

2.1.1.1 Understand the Task Clearly

When you receive a tasking, either written or oral, the first thing you need to do is make sure you fully understand exactly what you need to accomplish. Do not be afraid to ask questions and find answers. Approach as information resources those in a position to supply the information you need.

Make sure you know the tasking’s priority, required time of completion, and any special instructions you must follow. If the task is an oral assignment, take detailed notes. Do
not leave anything to memory; you might forget important information or instructions. A good supervisor always carries a notebook and pen/pencil.

2.1.2 Know the Capability of Your Crew
As you plan to accomplish your assigned tasks, always consider the capability of your crew. As you assign tasks to your crew, you can determine who is to do what and how long it should take to finish the job. Idleness tends to breed boredom and discontent, so when crewmembers finish one job, always have another one ready to start.

2.1.3 Establish Daily Goals
Encourage your crew to work together as a team to accomplish daily goals. Your goals should keep your crew busy but make sure they are “realistic” goals.
During a contingency, people will make a tremendous effort to meet deadlines, but people are not machines. When there is no anticipated urgency, do not expect them to maintain an excessively high rate of production.
In your planning, be sure you allow for those things that do not contribute directly to the accomplishment of the assigned task, such as in-house technical training, safety stand-down, and other administrative matters.

2.1.4 Select Proper Methods, Equipment, and Supplies
In planning to accomplish an assigned task, consider every possible method. If there is more than one way of doing a particular job, make sure you select the best method.
After making your selection, analyze it to see if you can simplify it to save time and/or effort.
One of the most common mistakes new supervisors make is forgetting to bring certain equipment or supplies to the jobsite. When you are planning for surveying operations, selecting the required equipment and supplies is a vital step. Nothing is more frustrating than to arrive at the jobsite and discover that “someone” forgot to bring a tripod for the transit. The best way to minimize this embarrassing situation is to prepare an equipment and supply checklist for each job assignment and, after gathering all the items, double-check the list to make sure nothing is missing. If you are planning more than one job, include sufficient equipment and supplies to accomplish all the jobs.
The same planning steps apply to drafting assignments. As you gain experience, you will devise methods that will enable you to improvise with the equipment and supplies you have on hand, but certain drafting assignments are difficult to accomplish without proper equipment and supplies.

2.1.2 Supervision
Once you have properly planned for accomplishing a task, you need to supervise the job carefully to ensure its proper, safe, and timely completion. The following will aid you in supervising work teams.

2.1.2.1 Keep the Crew Well Informed
A crew performs much more efficiently when it is well informed. Before starting a job, make sure your crew knows what it needs to accomplish. Inform them of the tasking and give instructions on any steps or methods that may be unique or necessary for this task or outside of normal procedures. Encourage questions about any points that may not be clear to them. Explain how the job relates to other jobs and to the overall
mission. Make sure all crewmembers know exactly what you expect of them and what their responsibilities are.

Be sure each crewmember knows all pertinent safety precautions and wears any required safety apparel. Check all equipment and tools before use to ensure they are in a safe condition. Do not permit the crew to use dangerously defective tools or equipment; be sure the crew turns them in for repair immediately.

While the job is under way, check from time to time to ensure that the work is progressing satisfactorily. Determine if the team is using the proper methods, tools, and equipment. If team members are doing a procedure or step incorrectly, stop them and point out the mistakes. Then explain the correct procedure and check to see that they follow it. When you check your crew’s work, try to do it in such a way that the members feel the purpose of your checking is to teach, guide, and direct instead of just finding fault and criticizing.

When time permits, rotate your crewmembers to various jobs. Rotation gives them varied experience and will help ensure you have a backup member who can do the work if another is hospitalized, transferred, or on leave.

2.1.2.2 Seek Teamwork

Good supervisors get others to work together to get the job accomplished. Maintain an approachable attitude towards your crew. During the project, make them feel free to come to you and seek your advice whenever they are in doubt.

Good supervisors display emotional balance. They do not become panicky before their crewmembers or become unsure in the face of conflicting forces. Use tact and courtesy in dealing with your team. Do not show partiality to any particular member or become pliable with influence. Keep them informed on matters that affect them personally or concern their work. In addition, seek to maintain a high level of morale; low morale can have a definite effect upon a crew's work in both quality and quantity.

This is only a brief treatment of the subject of supervision. As you advance in rate, you will spend more and more of your time supervising others, so make a continuing effort to learn more about the subject. Study some of the many books on supervision, as well as those on leadership. Also, read articles that concern supervisors. They appear from time to time in trade journals and other publications on topics such as safety, training, job planning, and so forth.

The Navy always has a big need for petty officers who are skilled supervisors and team leaders. So consider the role of supervisor a challenge and endeavor to become proficient in all areas of the supervisor’s job—to get the best efforts from a team.

2.1.3 Cooperation

For a project to run smoothly and finish on time, all crew leaders and supervisors, must coordinate their work efforts and cooperate as one big team. For example, most surveying operations guide the work done by other construction crews. Therefore, you must work closely with the other crew leaders to ensure that your surveys are timely and do not delay the overall project. Cooperation with other supervisors will eliminate many problems that could otherwise arise when you are coordinating your own team’s work efforts. In effect, you are merging your ideas and efforts into the bigger picture to make the project run smoothly.

Cooperation is also essential to your success as a drafting supervisor. Consult the Builder crew supervisor on any design problems and construction methods. If the
Builders need a particular set of drawings, spending too much time on unnecessary details could delay their delivery and the job. So right from the start, get into the habit of cooperating with other supervisors and you will gain their respect as well as the respect of your superiors and crewmembers.

2.2.0 Maintaining Files
Maintaining records, or simply “filing,” is one job an EA needs to learn fast and well. When you transfer to a new unit or command, chances are good that one of your assignments will be to organize and keep track of the large variety of engineering drawings normally found in the drafting and reproduction section.

Your biggest filing challenge will be to make any single drawing (sheet), as well as the record pertaining to that particular drawing, readily available.

Since most filing cabinets or protected stowage receptacles are limited in space, you may need to develop an ingenious approach to a highly organized filing system. Keep in mind that each agency (such as NAVFACENGCOM) that makes an engineering drawing identifies it with an assigned number. The first major file breakdown then, is a separate file for drawings by each of the different agencies. Within each agency’s file, the most convenient way to file their drawings and prints is by the numerical sequence they assigned.

2.2.1 Filing Original Copies
File original drawings flat-NEVER fold them. For large size originals, use shallow-drawer file cabinets of the type shown in Figure 1-3.

Figure 1-3 – Typical shallow-drawer cabinet for large, original drawings, tracings, and negatives.
Typically, you can store smaller size drawings on edge in the standard deep-drawer-type cabinet shown in Figure 1-4. Stationary partitions divide each drawer into compartments, and each compartment has a “compressor spring” to keep the drawings on edge in a compressed stack.

Figure 1-4 – Typical deep-drawer cabinet for small original drawings, tracings, and negatives.

2.2.2 Filing Prints and Data
Current status determines the manner in which you maintain other prints and drawings. Usually, you will place active project prints and drawings on stick files (Figure 1-5) for easy access and reference. Stick files can be either manufactured metal components or locally prepared strips of wood. Sometimes you can stow extra sets of project drawings by rolling and placing them in a cylindrical plastic or cardboard tube.
Figure 1-5 – Stick File used for filing active project prints and drawings.

Depending on your unit’s available configuration, you can stow inactive prints, such as those from completed projects or as-built drawings, either in the flat shallow-drawer file cabinet or in the standard deep-drawer cabinet. If you stow inactive drawings in the deep cabinet, there are specific folding instructions, see Figure 1-6.

For large, inactive prints, fold them in an accordion-pleat manner, ensuring that the drawing number is outside when finished. Final folded size should be 8 1/2 by 11 inches. Make or procure a plastic or plywood “folding guide” measuring 8 3/8- by 10 7/8 inches and follow these steps to prepare the drawings for stowage.

1. Lay the print face down. Using the folding guide, start by turning the edge containing the drawing number and fold the print into a 10 7/8-inch lengthwise fold. Use a small block of wood to compress the crease.

2. Turn the print over, make the next lengthwise accordion-pleat fold, and continue to turn over and fold until you have used up the width of the drawing.

3. Lay the lengthwise-folded drawing so the drawing number is face down. Using the folding guide again, begin at the end containing the drawing number and make the first 8 1/2-inch crosswise fold. Turn the print over; make the next accordion-pleat fold, and continue to turn over and fold until you have used up the length of the drawing.

Figure 1-6 – Folding prints accordion style for storage.
File any data related to drawings, such as correspondence, according to Department of the Navy *Standard Subject Identification Codes Manual*, SECNAVINST 5210.11 series. If you maintain a separate folder or drawer file for each project, file the data in the appropriate projects folder. However, if the data or correspondence affects a limited number of drawings, you can file it in a separate drawer or cabinet according to their respective drawing numbers.

**2.2.3 Recording Files**

Keep a record of each drawing on an INDEX CARD in a suitable file drawer.

You can use a card similar to the sample in *figure 1-7* and enter the information in the numbered spaces as follows:

1. **Standard Subject Identification Code (SSIC)** (numerical and/or name title). The SECNAVINST 5210.11 series prescribes these classification codes. A copy of this instruction is available in your personnel office and in your technical library.

   The classification system in this manual meets the needs of the entire Department of the Navy for a single, standard, subject scheme for numbering, arranging, filing, and referencing various types of Navy and Marine Corps documents.

   Generally, large shore activities, such as public works departments, Naval Construction Battalion Centers, or regimental headquarters use the SSIC system. Smaller mobile units (NMCBs, drafting room supervisors, quality control (QC) staff, EAs assigned to detachments) may devise their own indexing system for drawings according to the volume of records they handle.

2. **Agency drawing number** (NAVFACEENGCOM DWG No.)

3. **Title of the drawing**, taken from the title block

4. **Cross-index references to any related correspondence or data**

5. **Number of any agency letter forwarded with the drawing**

6. **Number of the A & E firm, contractor, naval shipyard, or other agency that actually made the drawings**

7. **Name of the A & E firm, contractor, naval shipyard, or other agency that actually made the drawings**

8. **Applicable unit** (NMCB, Détachements, ETC.)

If you maintain a separate folder or drawer file for each project, you must make a notation on the index card as to where to find the drawings related to that project. Project numbers will appear in the cross-index block of the index card but you can also modify your index card to accommodate any additional information your unit requires.
3.0.0 PROFESSIONAL DUTIES

If you are an EA3 assigned to a typical Seabee battalion, you are very likely to perform your professional duties from within the engineering division of Operations (S-3). The Engineering Officer will assign you, or you may have a choice, to one of the sections within the division: drafting/print-reproduction, surveying, or materials testing. The following are some of the duties and responsibilities while assigned to these sections.

3.1.0 Assignment to Drafting/Reproduction Section

When you are first assigned to the drafting section, the drafting supervisor will usually task you with the simplest drafting or reproduction jobs so the experienced drafting crew can be free for the more complicated work. These simple tasks also serve as training for the inexperienced draftsman. In general, your assignments will probably include a variety of engineering services requests, such as reproducing prints, preparing charts, revising working drawings, preparing simple construction and fabrication drawings from sketches, and performing other EA-related office jobs. Other related tasks may include preparing overlay maps for operational, logistics, and/or contingency needs; performing operator’s maintenance of the Plotter, plastic and metal engraving, maintaining a complete up-to-date technical library, and assisting other divisions and sections within the operations department as directed by the drafting supervisor.

3.1.1 Reproducing Project Drawings

Often, during homeport periods, the bulk of your job in the drafting section will be to reproduce several project drawings the different construction crews and details need for project planning and material estimates. Any failure to produce the required quantity of prints on time could have an adverse effect on an entire construction project’s planning and execution. To achieve maximum production, every draftsman in the section should train to perform this essential task. An experienced EA3 must be able to plan ahead, ensuring that sufficient quantities of basic reproduction materials, such as print paper and toner are on hand, and that the Plotter is in good working condition.
3.1.2 Maintaining a Technical Library

Another important responsibility of the drafting section is to establish and maintain an engineering technical library of current reference publications.

All operations department personnel, as well as anyone else in the battalion, may need to use the library to research technical information. To render service to others, one member of the drafting section must maintain the library in an orderly manner. Normally, this collateral duty assignment as librarian falls to an EA3 working in the drafting room. He is responsible for arranging the publications, indexing them, checking-out/checking-in borrowed publications, and ensuring replacement of missing publications. He is also responsible for packing the entire library for embarkation during overseas deployment.

A current COMCBPAC/LANT 5070 series instruction contains the minimum requirements for a technical library. The instruction includes all administrative, military, and technical library requirements each battalion must meet.

Appendix II of this manual includes additional publications not listed in the COMCBPAC/LANT instruction. Depending on the particular mission of each deployment, the battalion may require additional publications.

The librarian must constantly monitor the technical library and know where each publication is at all times. Loss of important reference publications could cause delays in solving engineering problems. Security of frequently borrowed publications and a good check-out/check-in system will help prevent the loss of important publications.

3.2.0 Assignment to Surveying Section

One of the main units of the engineering division is the surveying or field engineering section. This section, like the drafting reproduction section, falls under the direct supervision of an EA1, depending on the number of senior EAs on board with surveying experience. The size and organization of the entire surveying section will vary with the anticipated workload.

Your job, along with the other crew members in this section, is to carry out the scope of the tasks and responsibilities required of the surveying section.

Depending on the overall mission of the battalion, typical surveying tasks may include:

- Collecting field data and sketches for design purposes
- Conducting surveys for horizontal construction (roads, airfields, aboveground and belowground utilities)
- Conducting layout surveys for vertical construction (buildings, retaining walls, waterfront structures, and so forth)
- Developing level nets and level loops to establish vertical control
- Developing triangulation networks to establish horizontal control
- Measuring structures in place to prepare as-built drawings

Versatility in the surveying section is essential to accomplish all of the assigned tasks.

Sometimes the survey crew supervisor will use all crews for one phase of the surveying task; at other times, crews will shuttle from one phase to another. For most surveying tasks, there will be two types of surveying parties: the transit party and the level party, so named for the type of surveying instrument they will use.
3.3.0 Assignment to Materials Testing Section

EAs assigned to the soils laboratory perform tests on such items as subbase materials, aggregates, and concrete and bituminous mixes to determine if these materials meet specified quality requirements. You may perform some of these tests together with a more experienced EA. As you gain experience in testing different types of materials used in construction, you may also work with the quality control (QC) section of the operations department.

EAs assigned to the material testing section work closely with the QC staff in several areas, such as:

- Testing materials to ensure that their inherent character meets minimum requirements
- Interpreting results of tests conducted on soil, concrete, and asphalt
- Preparing reports of the tests performed by the testing section

Summary

Your opportunities as an Engineering Aid will be many and varied as you transition from the probable sea duty “Green Machine” tour to a typical shore duty Public Works Activity. Each will provide experiences that can broaden your professional growth. Both your direct labor (contribution in the field) and your indirect labor (from your assigned unit’s spaces) will contribute to a project’s and a unit’s success.
Review Questions (Select the Correct Response)

1. The Engineering Aid rating is a ______ rating.
   A. specialty
   B. warfare
   C. general
   D. fleet

2. (True or False) Engineering Aids have limited and only specific functions on projects.
   A. True
   B. False

3. (True or False) Engineering Aids contribute only to vertical construction projects.
   A. True
   B. False

4. (True or False) While the functions of the other Seabee ratings may relate to the whole of a construction project, the EA’s functions relate only to the site preparation and layout phases.
   A. True
   B. False

5. Most EA sea duty billets are in the ______.
   A. Public Works Activities
   B. Amphibious Seabees
   C. Naval Mobile Construction Battalions
   D. Engineering Field Divisions

6. Assignment to a Seabee Battalion will usually place you in ______.
   A. Alfa Company
   B. Bravo Company
   C. Charlie Company
   D. Headquarters Company

7. Assignment to a Seabee Battalion will usually place you in the ______ department.
   A. administration
   B. training
   C. operations
   D. supply
8. Which of the following tasks are an NMCB engineering division’s responsibilities?
   A. Providing as-built copies of drawings to customer activities
   B. Maintaining construction project status boards
   C. Both A and B

9. Which of the following tasks are an NMCB monitoring/reporting division’s responsibilities?
   A. Maintaining project status records
   B. Timekeeping and labor analysis
   C. Preparing project completion letters
   D. All of the above

10. At most public works departments, your military duties will fall under ______ supervision, and your professional work will fall under ______ supervision.
    A. military; military
    B. civilian; civilian
    C. civilian; military
    D. military; civilian

11. (True or False) An EA assigned to a Public Works Activity may not have any supervisory duties.
    A. True
    B. False

12. (True or False) Engineering Aid billets are limited to Naval Mobile Construction Battalions and Public Works Activities.
    A. True
    B. False

13. ______ or ______ are two typical supervisory assignments that may come to you as an EA3.
    A. Survey party crew chief; planning and estimating supervisor
    B. Quality control supervisor; materials testing supervisor
    C. Planning and estimating supervisor; quality control supervisor
    D. Survey party crew chief; drafting room leader

14. (True or False) A crew leader/supervisor who asks questions relative to assigned tasking is demonstrating weak leadership.
    A. True
    B. False
15. Your survey crew is not being efficient in performing assigned tasks. Which of the following conditions may be an underlying cause of this inefficiency?

A. Crew members were not properly briefed as to the scope of their assigned tasks  
B. Crew members did not understand their assigned responsibilities  
C. The importance of assigned tasks in relation to overall mission of the unit was not emphasized  
D. All of the above

16. Original drawings should always be ______.

A. folded and filed in deep drawers  
B. rolled and stowed  
C. hung on stick files  
D. filed flat without folding

17. In which of the following ways should you store small prints in a standard deep-drawer cabinet?

A. On edge  
B. Flat  
C. Rolled  
D. Folded

18. What is the final folded size of prints in accordion-pleat type of folds?

A. 8 3/8 by 10 7/8 inches  
B. 8 1/2 by 11 inches  
C. 8 3/4 by 11 inches  
D. 9 by 11 inches

19. In which of the following ways should you store prints or drawings of active projects for easy reference?

A. In folders  
B. In stick files  
C. In deep-drawer cabinets  
D. Rolled

20. Which of the following shore activities generally use the Standard Subject Identification Codes System for the filing of drawing records?

A. Public Works Centers  
B. Naval Construction Battalion Centers  
C. Naval Construction Regiments  
D. All of the above
21. Which of the following information should you always record on the index card for your drawing files?

A. Drawing title and number  
B. Cross-referenced correspondence relating to the drawing(s)  
C. Name of agency that made the drawing  
D. All of the above  

22. (True or False) During homeport periods, there will be less need to reproduce project drawings.

A. True  
B. False  

23. Which of the following tasks are you responsible for as the Engineering Technical Library librarian?

A. Ensuring that the publications are all in their proper location  
B. Maintaining an efficient check-out/check-in system  
C. Taking action, as necessary, to ensure that any lost or missing required publications are obtained  
D. All of the above  

24. For most surveying tasks, there will be two types of surveying parties: the _____ party and the _____ party.

A. staking; measuring  
B. transit; level  
C. aligning; sighting  
D. elevation; distance  

25. EAs assigned to the material testing section work closely with the _____ staff.

A. quality control  
B. surveying  
C. planning and estimating  
D. file reproduction
Additional Resources and References

This chapter is intended to present thorough resources for task training. The following reference works are suggested for further study. This is optional material for continued education rather than for task training.


CSFE Nonresident Training Course – User Update

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