NAVFAC P-1105

SEABEE

SKILLS ASSESSMENT MANUAL

1 AUGUST 1997

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FOREWORD

The Seabee Skills Assessment Manual provides procedures and skill interview questions for all primary and secondary naval warfare mission related skills that units may award individuals for practical experience or undocumented training. Primary or secondary skills listed in the COMSECONDNCB/COMTHIRDNCBINST 1500.1 which are not listed here, are only attainable through attending training conducted by an approved source. These interviews are important to units, as they provide a method for awarding skills obtained by means other than established schools. Additionally, individuals benefit from interviews by avoiding repetitive training and earning credit for on-the-job training. Interviews need to be conducted at appropriate times to assist in units' training plan.

This publication is certified as an official Command publication and has been reviewed and approved in accordance with SECNAV Instruction 5600.16.

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INTRODUCTION AND GENERAL INFORMATION

INTRODUCTION

This manual is issued to implement a new skill assessment program and replaces the former Personnel Readiness Capability Program (PRCP) NAVFAC P-458 for interviewers. It is designed to provide NCF units, and other units with Occupational Field THIRTEEN (OF-13) personnel, the steps and information necessary to conduct interviews and identify in-rate skills obtained through practical experience or undocumented training. The NCF will be assured that personnel granted a skill through this process will have at least a minimum working knowledge of the skill. It is not intended to be a training management system, or an overall inventory of skill descriptions for all required Naval Construction Force (NCF) training. Training management for NCF units is specified in applicable joint or individual SECOND and THIRD Naval Construction Brigades directives. Skill descriptions for courses are provided in the training commands' course catalog or the Navy Enlisted Classification (NEC) System Manual.

The Seabee Skill Assessment Manual provides procedures and skill interview questions for all primary and secondary naval warfare mission related skills that units may award individuals for practical experience or undocumented training. (Primary or secondary skills listed in the COMSECONDNCB/COMTHIRDNCBINST 1500.IA which are not listed here, are only attainable through attending training conducted by an approved source.) These interviews are important to units, as they provide a method for awarding skills obtained by means other than established schools. Additionally, individuals benefit from interviews by avoiding repetitive training and earning credit for on-the-job training. Interviews need to be done at appropriate times to assist in units' training plan.

GENERAL INFORMATION

The Seabee skill assessment interview process significantly improves the previous program. Interviewers are provided specific skill questions, which allow the interviewee to verbally demonstrate his or her knowledge of the skill. Additionally, critical skill requirements within each skill are identified, and overall pass/fail guidelines are provided. Part II of this manual describes in detail the steps in the interview process.

PART II

STEPS FOR INTERVIEWING

The steps that follow specifically outline the procedure to be followed when conducting an interview. Figure 1 provides a process flow chart of the interview process. For training departments that use skill assessment coordinators, it is their responsibility to develop and maintain a list of subject matter experts available to conduct interviews.

Step 1 Set Atmosphere. Conduct interviews at the most convenient place for the interviewee. Actual work sites or shops will work for practical demonstrations. However, if work sites or shops are used, a work space with a table and chairs, limited distractions, and minimal noise is required. The interviewer should be prepared to adjust to the situation, not the interviewee.

Step 2 Explain the Scope. It's important for the interviewee to understand why they are being interviewed. Explain to the interviewee the importance of the interview, both for them and the unit.

a. Individual - The Seabee receives credit for skills obtained through practical experience and avoids attending a class for a skill already mastered. Additionally, the interview provides skill attainment to help for advancement and job assignments; and documents your training.

b. Unit - Eliminates redundant training, provides accurate accounting of skills, and provides information for assigning skilled personnel to specific jobs.

During this explanation, provide the interviewee with their training skill list and review it with them. Be prepared to answer questions related to non-interviewable as well as interviewable skills. Also, briefly describe how the interview will be conducted. (A general skill definition will be read to the interviewee, then specific questions will be asked, if warranted.)

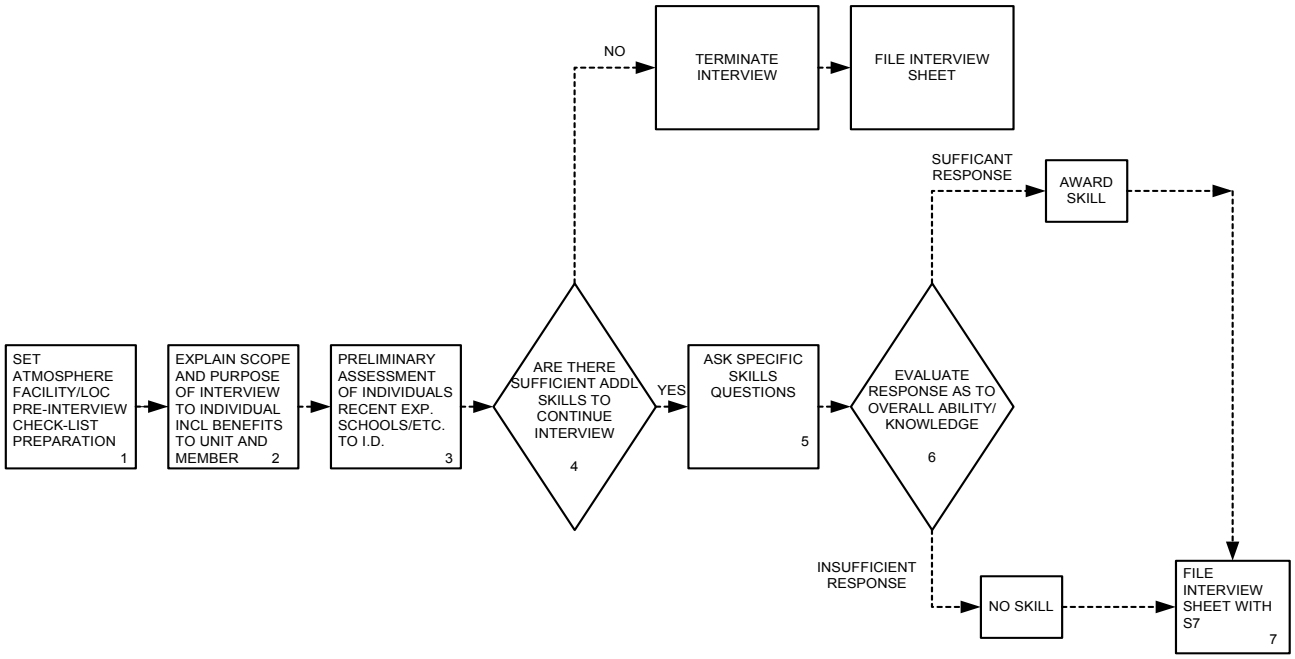
Step 3 Preliminary Assessment. During the review of the training skill list the interviewee should identify any schools attended that are not listed. If the interviewee cannot provide proof of approved course completion, the skill must be interviewed. Ask what work the interviewee has done, civilian or military, or other practical experience that relates to the skill. Ask questions that help focus on skills (i.e., Did you actually lay block or did you carry block and mix mortar?). During this assessment, use the back of the Interview Worksheet (Figure 2) and check the boxes within the interviewee's rate that will be interviewed.

Step 4 Continue the Interview. Based on this assessment, determine whether sufficient skills were gained since the last interview to continue. If so, go to step 5. If not, complete and file the interview sheet.

Step 5 Questions. Ask the interviewee the specific questions. Ask questions relating to the skill that closely follows the content of questions as they are written. Ask additional questions for clarification if necessary, but avoid asking questions in areas not covered. Skills identified by an asterisk are critical and must be correctly answered in order to award the skill. The date skill was obtained should be during the period of skill attainment, not the date of the interview. The answers given should be detailed enough to demonstrate thorough knowledge of the skill. If the interviewee cannot respond appropriately to the specific questions, the skill is not awarded.

Step 6 Evaluate Response. Evaluate the interviewee's response to each question. Ensure that complete detailed answers are provided to demonstrate interviewee's possession of the skill. If sufficient answers are given and the **minimum** number is met, including all critical skills, award the skill number.

SEABEE SKILL ASSESSMENT INTERVIEW PROCESS



SEABEE SKILL ASSESSMENT
INTERVIEW WORKSHEET

Date:

Interviewer:	Rate:	SSN:
Interviewee:	Rate:	SSN:

Interview Type: ☐ Initial ☐ Update

Date of Last Interview:

Schools Attended (and not listed on profile sheet):

Project(s) Assignment (since last interview):

Skills Interviewed (for individual's rate and 800 skills only):

Skills Awarded (include date of skill, **not** the interview date):

Note: As interviewer, by signing this form I certify that I possess the skills for which I am interviewing and I am qualified to conduct this interview.

Interviewer Signature

Interviewee Signature

SUBMIT TO S7 WHEN COMPLETED

INTERVIEWABLE SKILLS LISTING

103.1 Planning and Estimating
130.2 Concrete Forming and Reinforcing II
132.2 Mixing, Placing, and Finishing Concrete II
140.2 Masonry Unit Construction II
150.2 Light Frame Construction II
162.1 Roofing
164.1 Finish Carpentry I
170.1 Heavy Construction I
170.2 Heavy Construction II
190.2 Painting and Preservation II

203.1 Planning and Estimating
212.2 Advanced Base Power Plant Maintenance
216.2 Electric Motors and Controllers II
220.2 Electric Power Distribution Systems II
231.2 Telephone Exchange and distribution Systems II
240.2 Interior Wiring II
251.1 Solid State Fundamentals
252.1 Bucket Truck/Auger Truck Operation

311.1 Technical Librarian
313.1 Preventive Maintenance Clerk
315.1 Equipment Inspector
317.1 Direct Turnover Clerk
325.2 Engine Overhaul II
332.2 Engine Tune Up (Gasoline) II
334.2 Engine Tune Up (Diesel) II
334.3 Engine Tune Up (Diesel) III
345.2 Equipment Electrical II
345.3 Equipment Electrical III
355.2 Equipment Power Train II
365.2 Equipment Chassis II
365.3 Equipment Chassis III
375.1 Cost Control Clerk (Auto & Const Equipment)
385.1 Repair Parts Storeman
396.1 Radiator Repairing
397.1 Equipment Hydraulic Repair

403.1 Planning and Estimating
410.2 Surveying II
420.2 Drafting II (Architectural)
440.2 Soils and Pavement Analysis II (Concrete)
441.1 Soils and Pavement Analysis II (Soils)
442.1 Soils and Pavement Analysis II (Bitumens)

503.1 Planning and Estimating
515.2 Truck, Tractor, and Trailer Operations
519.1 Wrecker Operations (Tactical)
522.3 Asphalt Paving Operations III
523.1 Crushing and Screening Operations
523.2 Crushing and Screening Operations II
526.1 Soil Stabilization I
526.2 Soil Stabilization II
530.1 Water Well Drilling
536.1 Rock Drilling Operation
542.1 Scraper Operation
544.2 Grader Operation II
546.2 Crawler Tractor and Attachments II
548.1 Ditcher Operation
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590.1 Driver's License Examining and Mishap Reporting
592.1 Equipment Yard Supervisor
594.1 Dispatcher
596.1 Collateral Equipment Custodian
597.1 Tire Shop Custodian

603.1 Planning and Estimating
610.2 Arc Welding (Structural) II
612.1 Arc Welding (Pipe)
615.2 Gas Cutting and Welding II
615.3 Gas Cutting and Welding III
618.1 Shielded Inert Gas Welding
619.1 Maintenance Welder
620.2 Sheet Metal Work II
630.2 Steel Reinforcing II
634.2 Rigging II

703.1 Planning and Estimating
710.2 Plumbing and Pipefitting II
720.2 Shore-Based Boilers II
730.2 Pumps and Compressors
750.1 Sewage Disposal and Field Sanitation
760.1 Air Conditioning and Refrigeration

PART III

RATE INTERVIEW QUESTIONS

SECTION I

103.1 Planning and Estimating
130.2 Concrete Forming and Reinforcing II
132.2 Mixing, Placing, and Finishing Concrete II
140.2 Masonry Unit Construction II
150.2 Light Frame Construction II
162.1 Roofing
164.1 Finish Carpentry I
170.1 Heavy Construction I
170.2 Heavy Construction II
190.2 Painting and Preservation II

SECTION I

103.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package; identify and explain the activity/work element estimates; levels I, II, and III; interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams; demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook; and describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Describe what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

* d. Describe the three sections of a division in job specifications.

   e. Describe the terms in figure 1.

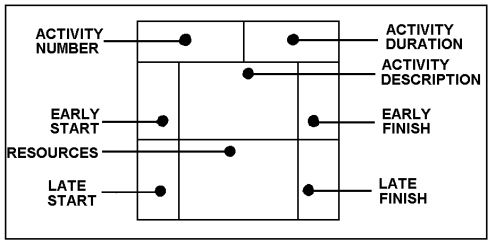


Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

* g. Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

i. Describe the following forms:

1) Master Activity Summary Sheet
2) Construction Activity Summary Sheet
3) Quality Control Plan
4) Safety Plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

k. Develop an equipment and tool estimate from a set of drawings and specifications.

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

a. Describe or explain what common line conventions represent on a building trade blueprint.

b. Describe or explain what must be understood in order to read building trade blueprints, drawings, and sketches.

c. Describe or explain what center line long and short dashes represent on a blueprint.

d. Describe or explain orthographic projections on a drawing.

e. Describe or explain the different types of sections that can be found on a blueprint.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

130.2 Concrete Forming and Reinforcing II

1. Skill Definition.

   Individual must use and explain common concrete forming and reinforcing terms; read and interpret construction drawings and specifications; prepare sketches to indicate all structural features, particularly the location of all embedded members and openings; use and care of the engineer's level; lay out work for constructing wall, column, beam, and overhead slab forms and related bracing, which have been designed for strength by engineering; properly position and secure anchor bolts, and other inserts; direct construction of forms for multiple precasting operations.

2. Specific Skill Questions.

* a. Explain what information can be obtained from:

   1) Foundation Plan
   2) Floor Plan
   3) Elevations
   4) Sections and Details

   b. Describe the three sections of a division in job specifications.

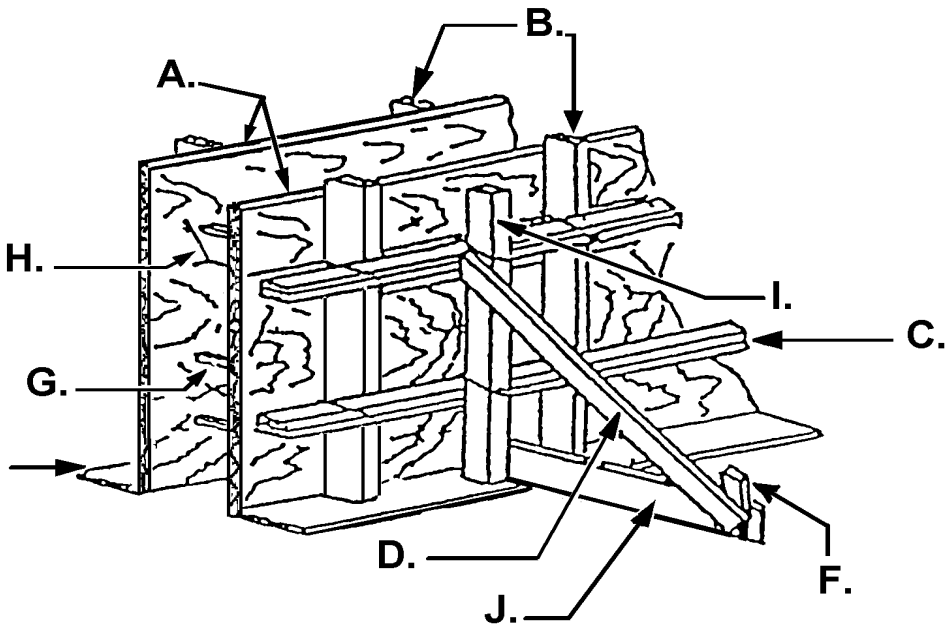
   c. Explain the procedure for building layout and setting of batter boards using a builders level.

   d. Explain the difference between plain bars and deformed bars.

   e. Explain how reinforcing bar is sized.

   f. Explain the three numbers used to designate wire spacing and gauge of Welded Wire Fabric (WWF).

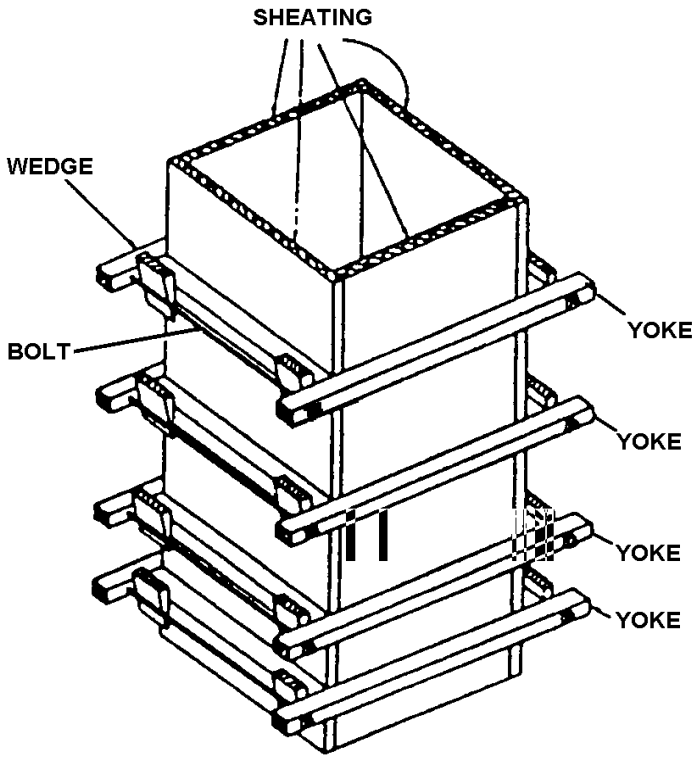
* g. Identify and explain the purpose for each member of formwork from the drawing below and the procedures for plumbing, leveling, squaring and bracing.



FORMWORK

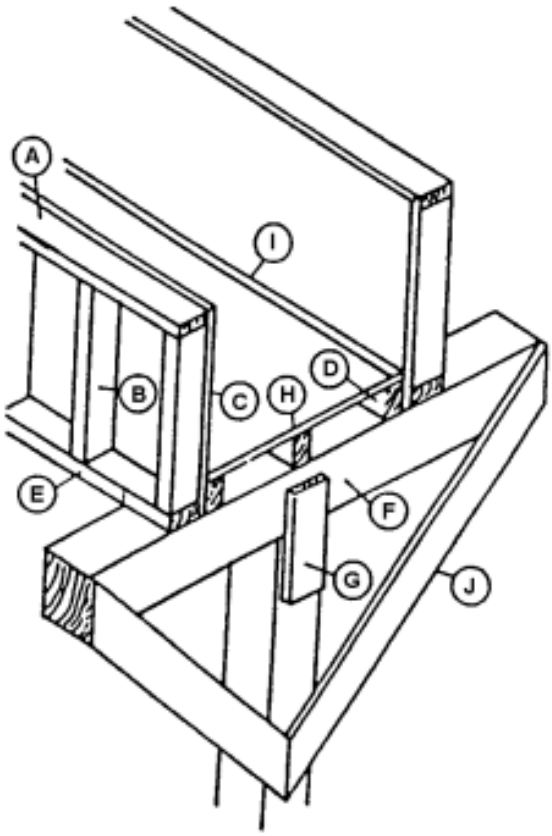
h. Explain the single and double waler system using tie wire and/or snap ties.

* i. Identify and explain the purpose for the members of column formwork from the drawing below.



TYPICAL COLUMN FORM

* j. Identify and explain the purpose for the members of overhead formwork from the drawing.



OVERHEAD FORMWORK

k. Identify the two main types of precast.

l. Identify and explain the purpose of bond breakers.

m. Identify the types of equipment, lifting inserts, lifting hardware for inserts and bracing for tilt up construction.

Skills marked with an * denote critical skill. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill level is 9 of 13 specific questions.

132.2 Mixing, Placing and Finishing Concrete II

1. Skill Definition.

   Individual must use and explain common concrete construction terms; operate and perform operator's maintenance on typical portable concrete mixers, hand held finishing machines, and concrete saws; and designate standard mix and determine proportion of materials by "rule of thumb".

2. Specific Skill Questions.

   a. Describe the standard mix proportions and ingredients required to produce concrete using rule 41 and rule 42.

   b. Explain types (I,II & III) portland cements and their uses.

   c. Describe or perform pre-start and safe operating procedures for the 11S mixer.

   d. Explain the sequence of material for loading the skip on the 11S mixer (water, cement, sand and aggregate).

   e. Explain commonly used mixes:

      1) 1-2-4 (carpenters mix)
      2) 1-1-2 (very rich mix)
      3) 1-2-5 (medium mix)

* f. Explain water-cement ratio and why it is important.

* g. Describe the procedures for placing, consolidating and finishing of a slab by hand and mechanical finishing machine.

* h. Describe the procedures for placing and consolidating of concrete for wall forms and columns.

* I. Describe the procedures for placing, consolidation and finishing of an overhead pour.

   j. Explain different methods of finishing and curing concrete.

   k. Describe or perform pre-start and safe operating procedures for concrete saws.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses to award skill is 8 of 11 specific questions.

140.2 Masonry Unit Construction II

1. Skill Definition.

   Individual must use masonry construction terms and state the purpose of various concrete masonry units; use construction drawings/sketches to determine vertical and horizontal alignment of courses; measure distances from reference points and make guidelines on working surfaces, including location of embedded items and openings; chase out bond and lay up corner leads, piers, pilasters, and walls at designated locations, and finish joints by tooling or raking; determine thickness of vertical and horizontal joints, designate mortar proportions within given specification, and estimate man-hours and material requirements.

2. Specific Skill Questions.

   a. Explain or perform prestart and safe operating procedure for:

      1) Block Saw
      2) Mortar Mixer

   b. Explain where and when to use the following block:

      1) Stretcher/Corner block
      2) Lintel block
      3) Bond beam block
      4) Sill block
      5) Jamb/Sash block

   c. Identify materials and mix designs used for mortar.

* d. Describe the following terms:

      1) Bed joint
      2) Head joint
      3) Common bond
      4) Stack bond
      5) Leads

* e. Explain the importance of the following terms

1) Vertical alignment
2) Horizontal alignment
3) Vertical reinforcement/core fill
4) Horizontal reinforcement/intersecting walls
5) Chasing the bond

f. Describe the procedure and explain the reason for the thickness of vertical and horizontal joints and finishing joints.

* g. Given a NAVFAC P-405, estimate material and man-days for a 20'X 40'X 8' building with two 3'-0" X 6'-8" doors, using 8" x 8" x 16" blocks, using a running bond with 3/8" joints and all mortar mixed by machine, with a mix design of 1-3 utilizing Rule 38.

h. Explain or perform proper mixing, safe handling, personal protective gear and cleaning procedures to clean masonry unit construction.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 8 specific questions.

150.2 Light Frame Construction II

1. Skill Definition.

   Individual must use and state purpose of individual wood frame roof members, including trusses; read and interpret construction drawings to layout, cut and erect rafters for an intersecting wood frame structure; layout, cut and erect service type stairs; set up, operate and perform operators maintenance on trailer mounted field saws including prime movers.

2. Specific Skill Questions.

   a. Explain or perform safe transportation procedures and setup for the trailer mounted field saw.

   b. Explain or perform prestart and safe operating procedures for trailer mounted field saw.

   c. Describe or draw roof types:

      1) Gable
      2) Hip
      3) Intersecting

         a) Hip and Valley
         b) Gable and Valley
         c) Dormer

   d. Describe or perform layout procedures for common rafters and hip rafters.

* e. Describe or draw roof frame members:

      1) Ridge board
      2) Common rafter
      3) Hip rafter
      4) Valley rafter
      5) Hip jack rafter
      6) Valley jack rafter
      7) Barge rafter
      8) Collar ties

f. Describe parts of a rafter:

1) Plumb cut
2) Birds mouth
3) Body
4) Fascia or tail cut

* g. Explain rafter layout terms:

1) Unit of run
2) Unit of rise
3) Total run
4) Total rise
5) Span
6) Projection
7) Shortening allowance
8) Line length
9) Bridge measure
10) Pitch

* h. Describe the unit of run for hip and valley jack rafters.

I. Describe the shortening allowance and side cuts for hip, valley and jack rafters.

j. Describe parts of a truss:

1) Top chord
2) Bottom chord
3) King Post
4) Web members
5) Gussets

* k. Describe or perform procedures for determining:

1) Tread run
2) Total run
3) Tread rise
4) Total rise
5) Stair carriage length

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

162.1 Roofing

1. Skill Definition.

   Individual must understand principles of roof designs in order to select the best roof covering for various pitches and types; use and care of tools, equipment, and materials required to apply various wood and composition shingles, using accepted trade standards; apply various roll roof coverings; operate and perform operators's maintenance on asphalt kettles; and direct application of hot built-up roof coverings.

2. Specific Skill Questions.

   a. Describe or sketch the following types of roofs.

      1) Flat
      2) Shed
      3) Gable
      4) Hip
      5) Intersecting
      6) Dormer

   b. Describe the tools ,equipment and materials for various roof coverings.

   c. Describe or perform layout procedures for:

      1) Composition shingle roof
      2) Rolled roof covering
      3) Built-up roof

* d. Describe or list the sequence of steps for the application of a 3-ply built-up roof.

* e. Describe or perform safe operating procedures and prestart for the hot tar kettle.

* f. Describe safety procedures and personnel protective equipment used in the application of built-up roofing.

   g. Describe safety practices while working on a roof or around a roof project.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 5 of 7 specific questions.

164.1 Finish Carpentry I

1. Skill Definition.

   Individual must use and explain terms related to finish carpentry; select, use and care of common hand tools and power tools used to perform finish carpentry, including metal studs and fastening devices; lay out, cut and install interior trim and finish materials such as composition floor tile, plywood and gypsum wallboard, including the taping and finishing of gypsum wall board; cut, fit, and install millwork products such as door, windows, finish stairs, and cabinets, including applicable hardware items; lay out, cut, and install exterior trim including siding, cornices, casings, baseboards, doorjambs, etc.; lay out and direct the installation of suspended ceiling systems.

2. Specific Skill Questions

   a. Describe the procedures for installation of gypsum drywall sheets.

* b. State the minimum/maximum nail spacing for the following.

      1) Single nailing technique

         a) Ceilings
         b) Walls

      2) Double nailing technique

         a) Ceiling
         b) Walls

   c. Describe or perform the procedures for installation for door and window jambs.

   d. Describe the following drywall tools.

      1) Drywall hammer
      2) Drywall carrier
      3) Footlift
      4) Drywall knives
      5) Corner tape creaser
      6) Corner taping tool
      7) Corner bead crimper
      8) Surform

   e. Describe or perform the three coat rule for taping of drywall joints.

f. Describe the following terms used for the construction of an acoustical suspended ceiling.

1) Main runner
2) Cross tee
3) Wall angle
4) Suspension wire
5) Splice plate
6) Acoustical tile

g. Describe the "half-tile" rule as it applies to:

1) Suspended ceiling tile
2) Composition floor tile

* h. Describe the following exterior trim components.

1) Cornice
2) Fascia
3) Lookouts
4) Soffit
5) Soffit vents
6) Frieze board

I. Describe or perform the layout and cutting of interior trim using mitered and/or coped joints for:

1) Door casings
2) Window casings
3) Baseboards
4) Crown moldings

j. Describe the swing of the following doors.

1) Left-Hand door (LH)
2) Left-Hand Reverse door (LHR)
3) Right-Hand door (RH)
4) Right-Hand Reverse door (RHR)

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses to award skill is 8 of 10 specified questions.

170.1 Heavy Construction I

1. Skill Definition.

   Individual must use heavy construction terms and state the purpose of various structural members used in heavy construction, including those used in waterfront construction; use and care of engineering level; operate and perform operators maintenance on portable gasoline, pneumatic power tools, and air compressors; use construction drawings and sketches to lay out and assemble and erect heavy timber construction; use and care for tools, equipment and materials for the Bridge and Dock builders tool kit (80041).

2. Specific Skill Questions.

   a. Describe or perform the safe operators maintenance and operation of:

      1) Air compressors
      2) Portable gas tools
      3) Pneumatic power tools

   b. Explain the purpose and describe or demonstrate the use of the following heavy construction hand tools:

      1) Adz
      2) Slick
      3) Cant and peavy hooks
      4) Timber carrier
      5) Spike mall
      6) Flat foot auger
      7) Ship auger

* c. Describe or demonstrate the handling, set up, and operation of an engineer's level to include:

      1) Nomenclature
      2) Care
      3) Setting tripod
      4) Attaching level
      5) Leveling the level
      6) Reading a Philadelphia rod

d. Identify the structural members of a heavy timber bridge from figure 1 operations:

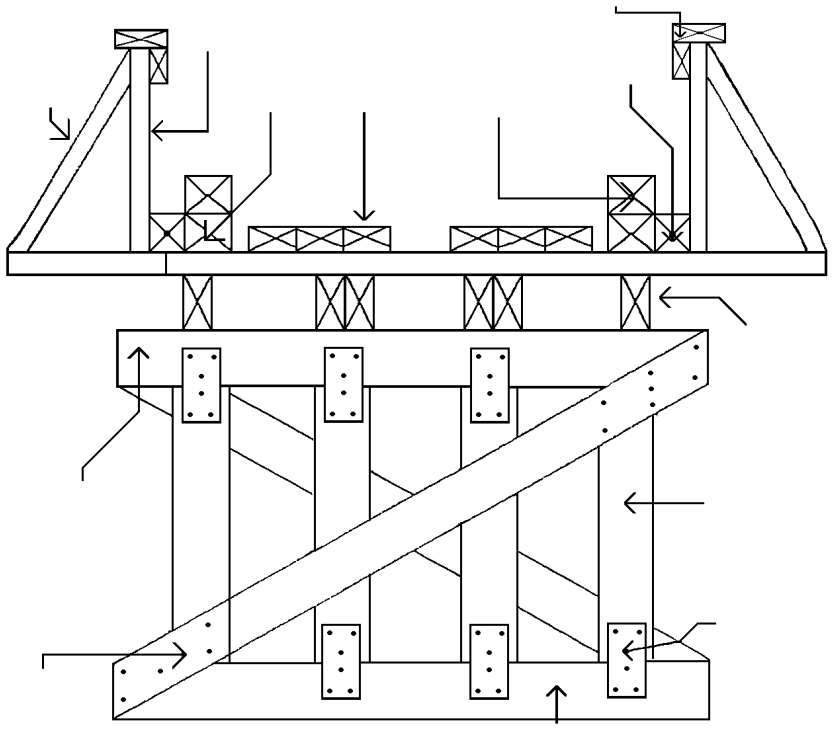


Figure 1

* e. Explain the layout, construction and erection procedures of a heavy timber bridge to include:

1) Trestle substructure (abutments, footings, and bents)
2) Trestle superstructure (stringers, decking, tread way, curbs, handrails)

f. Describe the safety precautions associated with heavy timber construction, including:

1) Material handling by hand and equipment
2) Personal protective devices
3) Rigging and hoisting operations
4) Hand signals

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 5 of 6 specific questions.

170.2 Heavy Construction II

1. Skill Definition.

   Individual directs operations of all types of pile driving rigs using all types of piles: prepares simple designs, sketches and specifications: makes estimates of material, equipment, and manpower requirements and establishes and maintains a standard pile driving log.

2. Specific Skill Questions.

   a. Describe the use, purpose and characteristics of the following types of piles:

      1) End bearing pile
      2) Friction pile
      3) Batter pile
      4) Compaction pile
      5) Angular pile
      6) Test pile
      7) Guide pile
      8) Sheet pile

   b. Explain the purpose, advantages and disadvantages of the three types of pile driving leads:

      1) Swinging lead
      2) Underhung lead
      3) Extended 4-way lead

* c. Describe the operation, application, and characteristics of the following types of pile driving hammers:

      1) Drop hammer
      2) Single acting
      3) Double acting
      4) Vibrator driver/extractor
      5) Diesel hammers

d. Describe the methods and procedures for reeving the pile driver attachment including:

1) Removal of the hookblock assembly
2) Connecting the leads
3) Reeving the pile driver line main drum
4) Reeving the pile driver line secondary drum
5) Raising the leads
6) Installing the catwalk

* e. Describe what is involved in performing the following pile driving operating steps:

1) Positioning the crane
2) Final set of the leads
3) Raising the hammer
4) Raising the pile into the leads
5) Lowering the pile point
6) Lowering the pile line
7) Starting the hammer
8) Driving the pile
9) Stopping the hammer

f. Name and describe three methods used to straighten and align piles.

1) Block and tackle
2) Jetting
3) Aligning frame

g. Name and describe three methods of pile extraction.

1) Direct lift
2) Tidal lift
3) Mechanical extractor

h. Describe the entries required in a pile driving log.

170.2 Heavy Construction II

I. Describe estimating methods used in heavy construction to include:

1) Interpretation of drawings and specifications
2) Standard forms used
3) References and handbooks
4) Production factors
5) Waste factors

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 9 specific questions.

190.2 Painting and Preservation II

1. Skill Definition.

   Individual must use and explain common painting and surface preparation terms; select, use, and care of tools, equipment, and materials required to prepare surfaces for painting; prepare (thin and stir) ready-mixed paints, enamels, varnishes, shellacs, and synthetic coatings, and apply them by brushing, rolling, and dipping; operate and maintain sandblasting and spray painting equipment; and the process of and elements involved in paint tinting.

2. Specific Skill Questions.

   a. Describe the reasons for painting, paint ingredients, primary colors of tinting and reasons for paint failures.

   b. Explain what a MSDS is and some of the important information obtained from it.

* c. Describe or perform proper prestart and maintenance of an air compressor.

   d. Describe or perform safe setup and maintenance of sand blasting equipment.

* e. Explain personal safety equipment and proper measures to control dust and material being sandblasted during sand blasting operations.

* f. Describe the procedures for safe operation of an air compressor while performing sand blasting operations.

   g. Describe or perform safe setup, operation and proper maintenance of spray painting equipment.

* h. Explain personal safety equipment used during spray painting operations

   I. Describe the difference of air pressures when using a latex verses enamel and why.

   j. Describe the primary ingredients of paints, and the primary colors used when tinting paints.

   k. Explain some primary reasons for painting.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 11 specific questions.

SECTION II

203.1 Planning and Estimating
212.2 Advanced Base Power Plant Maintenance
216.2 Electric Motors and Controllers II
220.2 Electric Power Distribution Systems II
231.2 Telephone Exchange and Distribution Systems II
240.2 Interior Wiring II
251.1 Solid State Fundamentals
252.1 Bucket Truck/Auger Truck Operation

SECTION II

203.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package; identify and explain the activity/work element estimates; levels I, II, and III; interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams; demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook; and describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, and manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Describe what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

* d. Describe the three sections of a division in job specifications.

   e. Describe the terms in figure 1.

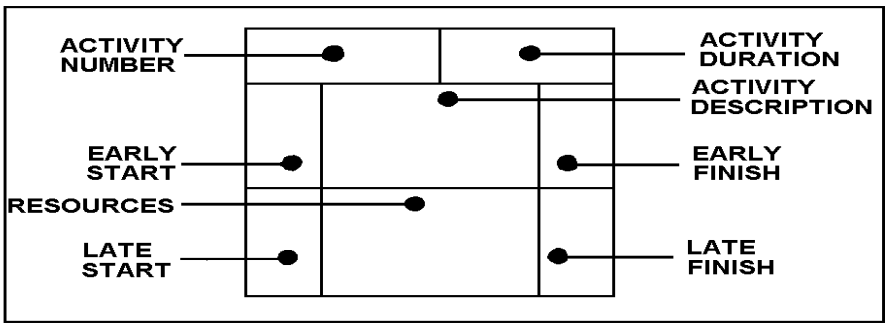


Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

* g. Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

i. Describe the following forms:

1) Master Activity Summary Sheet
2) Construction Activity Summary Sheet
3) Quality Control Plan
4) Safety Plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

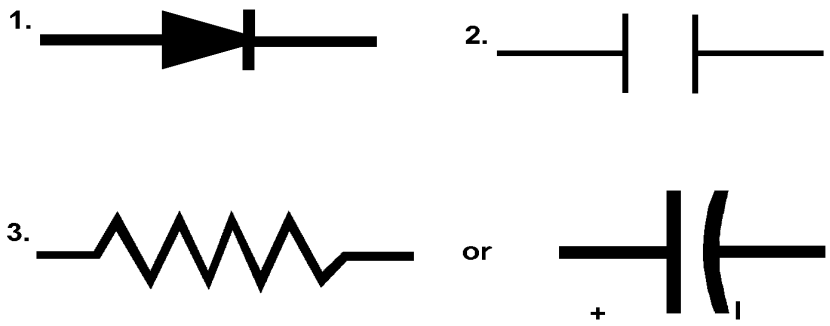
k. Develop an equipment and tool estimate from a set of drawings and specifications.

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

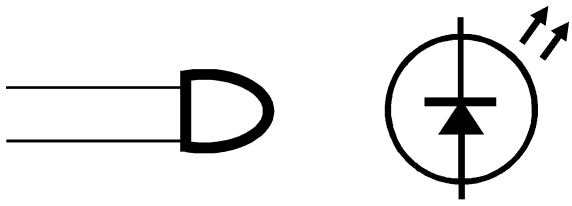
a. Explain the purpose of a construction specification.

b. Explain the different types of wiring diagrams that can be found on a blueprint.

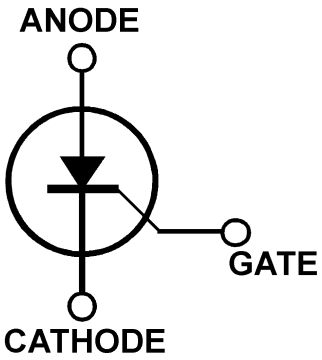
c. Describe the electrical symbols as shown below:



4. Physical Appearance and Schematic Symbol.



5.



Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview and/or grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

212.2 Advanced Base Power Plant Maintenance

1. Skill Definition.

Individual must be able to correctly install generator sets; Individual must perform all prestart checks on the prime movers; start and warm up prime mover and adjust for proper meter readings; pick up load and parallel with other generator(s); adjust for proper load sharing; perform emergency shut down procedures; remove generator from line or load; secure power plant; make post operation checks; set up and maintain a generator/power plant watch bill; stand watch and make proper log entries; notify proper authority in the event of an emergency; have a thorough understanding of solid state components as reflected in skill level 251.1; utilize tools, test equipment and schematics (AC and DC) to perform intermediate levels of maintenance and repair of (MEP) generators, light plants, field saws and welders; determine phase rotation of new or replacement generator.

2. Specific Skill Questions.

* a. What is the maximum allowable ohmic value for ground to earth on a(MEP) generator?

* b. Why do you ensure that the D.C. circuit breaker is open during prestarts?

c. How many methods of paralleling are there for generators? Explain them.

d. Why should there be a space for oil pressure in a generator log?

e. What purpose does a rectifier serve?

f. What fault indicator would illuminate if a paralleled generator over powered yours?

g. What is the minimum distance a generator may be placed next to a load?

h. What is the proper level of radiator coolant?

I. What is the purpose of a diode?

j. Explain electrical safety as it applies to power generation.

Skills marked with an * asterisk denote critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award skill is 8 of 10 specific questions.

216.2 Electric Motors and Controls II

1. Skill Definition.

   Individual must install motor foundations and supports; install and connect motors and control equipment including overload heaters, contactors, start-stop stations, forward-reverse stations, timers, coils and other sensing or limiting devices used to control the operation of single phase, split phase and three phase motors; connect motor to workload by using belts, pulleys and direct shaft coupling; make repairs to wire, motor, and controllers interpreting wire schematics for autotransformer, resistive, wye/delta and part winding starting controllers; and establish a preventative maintenance program.

2. Specific Skill Questions.

   a. Fuses should be installed at what percentage of the load in a motor control station.

   b. Wire is installed at what percentage of the load in a motor control station.

   c. What device removes the capacitor from the starting circuit of a capacitor start motor when it reaches 75% of rated speed.

   d. Do heaters protect against short circuits, high voltage or current overloads?

   e. Describe what the schematic diagrams for three phase wye and delta look like.

   f. Describe or perform trouble shooting technique on motor control stations.

   g. Why are capacitor start motors used?

   h. hat is housed in the end bells?

   I. Where must disconnects, used as controllers, be located?

* j. What action may be taken to reverse any three phase motor?

   k. Explain how motor controllers improve safety.

216.2 Electric Motors and Controls II

l. How does a part winding motor reduce starting current?

_____

Skills marked with an * asterisk denote critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award skill is 8 of 12 specific questions.

220.2 Electric Power Distribution Systems II

1. Skill Definition.

   Individual must use and care for tools and equipment including those from kit 80007 (linemen tool kit), kit 80078 (hot line tools); load and transport utility poles on pole/reel trailer; set, face, and tamp in place wood and concrete utility poles; climb and work aloft; work as a " groundsman"; use and interpret framing schedules and/or construction standards to frame, attach cross arms, install insulators and transformers, including transformer banks, cluster mount, 'H' frame and pad mounted; install single and multiple guys; install primary and secondary overhead conductors and self-supported service drops; bond and ground conductors and auxiliary equipment on utility poles; install sectionalizing switches; install and maintain street and/or airfield wiring and fixtures; install constant current transformers; maintain distribution lines, poles, switches, cutouts, lightning arresters, pins, insulators, cross arms, and other equipment; place and interconnect ABFC power distribution panels, power cords and connect electrical loads; and perform pole top rescue.

2. Specific Skill Questions.

   a. Describe or perform the common tasks involved in setting a wooden utility pole by hand. Stress safety in all tasks.

   * b. Explain what a lineman looks for when checking the following climbing equipment.

      1) body belt
      2) safety strap
      3) climbers
      4) gloves

   c. Explain or perform the procedures in setting an expanding type guy anchor and guy wire.

   d. Explain what constitutes framing of a pole, and the purpose of framing on the ground before the pole is raised.

   e. Explain or perform the procedures of stringing conductors.

   * f. What is the maximum resistance of any power distribution ground?

   g. Explain how the completely self-protected (CSP) transformer is designed.

   h. Explain how to correct low power factor.

   I. Explain or draw the wye-wye transformer connection, and tell why it is used.

j. Explain the maintenance required for transformers and regulators of the liquid-cooled type.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview and/or grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

231.2 Telephone Exchange and Distribution Systems II

1. Skill Definition.

   Individual must be able to install all types of hardware associated with telephone cables and messengers; He or she must be able to install underground cable directly or in a duct, test and locate faults within the cable; install connect and perform maintenance on local battery and common battery telephone exchange components, including multiple boards, drop and trunk lines, batteries and charging equipment, systems protective equipment, ringing equipment, central office test equipment and main distribution frame; locate and correct circuit faults; Work as an operator handling regular traffic and conference calls; Install and maintain solid state key system with an intercom.

2. Specific Skill Questions.

   a. Why must field wire lines be confined to short lengths?

   b. What constitutes a telephone cable?

   c. Why should a storage battery be kept in a clean condition in a well ventilated spot?

   d. What is banking?

   e. Where does the advantage lie in an underground or direct burial system?

   f. What is the simplest telephone circuit?

   g. What converts sound waves to electrical waves?

* h. What is the voltage for transmitter and dial?

* I. What is the frequency and voltage for the ringer?

   j. What are two types of battery systems used telephones?

Skills marked with an * asterisk denote a critical skill These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

240.2 Interior Wiring II

1. Skill Definition.

   Individual must use and interpret construction drawings, diagrams, and specifications; record changes on "as built" drawings; demonstrate a good working knowledge of the National Electrical Code; use and maintain tools and equipment from the following kits:

   kit 80006 (electricians tools)
   kit 80140 (conduit installation .5 to 2 inch)
   kit 80141 (conduit bending .5 to 2 inch)
   kit 80142 (conduit cutting and threading 2.5 to 6 inch)
   kit 80143 (conduit bending 1.25 to 4 inch)
   kit 80144 (conduit bending 2.5 to 5 inch)
   kit 80145 (PVC conduit installation .5 to 6 inch)
   kit 80146 (knockouts for conduits .5 to 5 inch)
   kit 80147 (vacuum fish tape system .5 to 6 inch)
   kit 80148 (wire puller light duty)
   kit 80149 (wire/cable puller heavy duty)
   kit 80067 (hydraulic crimping)

   Install service entrances, electrical panels, safety switches, disconnects, and conduits .5 to 6 inches, in rigid frame, CMU, and wood structures; pull and splice conductors; install fixtures, switches, receptacles, and other common wiring devices; test completed electrical installations, troubleshoot and correct circuit faults, install low voltage control circuits, and install and maintain ground fault systems from the NMCB TOA.

2. Specific Skill Questions.

   a. Explain what information is provided by the National Electrical Code.

   * b. Explain or perform lockout/tagout procedures.

   c. Explain or perform the installation and purpose of a four wire/three phase wiring system. Explain the phase arrangement.

   d. Explain or perform how the service entrance panel is grounded to a low-resistance ground and state the maximum resistance to ground as per NEC.

   e. Explain the differences between a grounded conductor and a grounding conductor and the color codes of each.

   f. Explain how to balance the load in a panelboard.

* g. Explain or perform the procedures of bending and installing a rigid metal conduit circuit. In addition, explain what the maximum number of bends or degrees in a conduit can be run.

h. Explain or correct the following trouble shooting faults.

1) open circuit
2) short circuit
3) grounded circuit

* I. Explain how to properly and safely use the following test equipment.

1) ohmmeter
2) ammeter
3) voltmeter

j. Draw and identify six different electrical symbols

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview /grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

251.1 Solid State Fundamentals

1. Skill Definition.

Individual must identify solid state components and the schematic symbols used to represent each, including but not limited to: diodes, transistors and silicon controlled rectifiers (SCR), use and care of kit 80008 (electronic maintenance tools) to remove solid state components from circuits without damaging the circuit or component, test solid state components for application and functional ability in the repairs of printed circuit boards; troubleshoot solid state devices to the component level.

2. Specific Skill Questions.

* a. Why is it important to de-energize electronic circuits before doing any repairs?

b. What is the purpose of a resister?

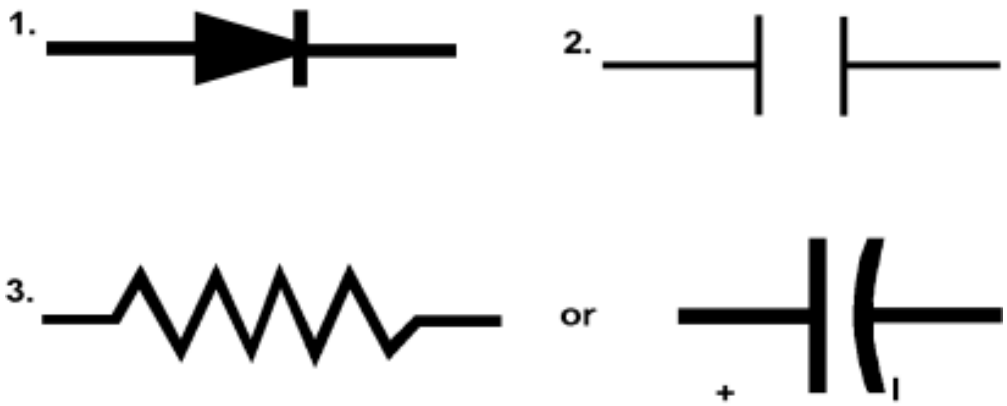
c. What is the purpose of a diode?

d. What is the purpose of a transistor?

e. Why do you use a heat sink when soldering solid state components?

f. Identify the solid state components below from their schematic drawings in figures 1 and 2.

Figure 1



3. Physical Appearance and Schematic Symbol

4.

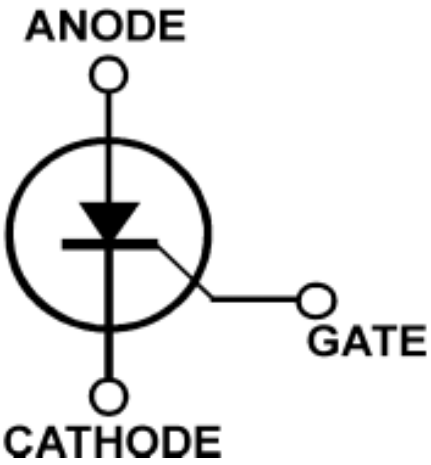
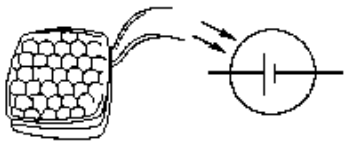


Figure 2

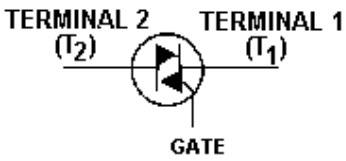
5. Physical Appearance and Schematic symbol

6. Physical Appearance and Schematic Symbol



7. Physical Appearance and Schematic Symbol

8.



251.1 Solid State Fundamentals

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview /grant the skill.

Minimum correct responses required to award this skill is 4 of 6 specific questions.

252.1 Bucket Truck/Auger Truck Operation

1. Skill Definition.

   Individual must perform and explain pre-operational checks and operator's maintenance, positioning the equipment at the work site, operating the bucket, setting and removing utility poles, installing power screw anchors, use of auxiliary hydraulic/pneumatic equipment and all applicable safety precautions for the Bucket/Auger Truck. Must have a valid 15 ton license

2. Specific Skill Questions.

   a. Describe the pre-operational checks required for the Bucket/Auger Truck .

   b. List the four common items of auxiliary equipment and explain how they are used.

* c. Describe the proper method to set up and stabilize the vehicle at the work site.

   d. Describe the location, purpose and use of the control stations for the hydraulic derrick.

* e. Explain the steps necessary to set and pull a utility pole with the vehicle.

* f. Describe the installation of power screw anchors.

* g. Explain personal safety equipment used during Bucket operations.

   h. List the three elements of the hydraulic system and explain their use.

* I. Describe the steps necessary to install and remove Auger bits.

   j. Explain how to remove loosened soil from the hole during excavation with the Auger.

Skills marked with an * denote critical skill. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

311.1 Technical Librarian
313.1 Preventive Maintenance Clerk
315.1 Equipment Inspector
317.1 Direct Turnover Clerk
325.2 Engine Overhaul II
332.2 Engine Tune Up (Gasoline) II
334.2 Engine Tune Up (Diesel) II
334.3 Engine Tune Up (Diesel) III
345.2 Equipment Electrical II
345.3 Equipment Electrical III
355.2 Equipment Power Train II
365.2 Equipment Chassis II
365.3 Equipment Chassis III
375.1 Cost Control Clerk
385.1 Repair Parts Storeman
396.1 Radiator Repair
397.1 Equipment Hydraulic Repair

311.1 Technical Librarian

1. Skill Definition.

   Individual must be able to determine the necessary reference materials for identifying the correct repair parts and must be able to identify and correctly utilize the necessary requisition forms used by Naval Construction Force (NCF) units in order to requisition repair parts. Individual should have a thorough understanding of the composition of the MODIFIERS 98 & 97, and the MINI-MODIFIER 96, and should be able to readily cross-reference part numbers to NSN's, and vise versa, and should be able to identify the correct procedures for inventorying tech library. And the individual should be able to clearly determine the procedures for checking in/out technical manuals.

2. Specific Skill Questions.

   a. Which instruction is used to determine the check in and check out procedures for technical manuals:

      1) COMSECONDNCB/COMTHIRDNCB 5600 series instruction, Publications.

* b. Determine which technical manuals contain instructions for filling out NAVSUP Forms 1250-1 & 1250-2 for NCF units:

      1) COMSECONDNCB/COMTHIRDNCB Instruction 4400.3A, Seabee Supply Manual.
      2) COMSECONDNCB/COMTHIRDNCB Instruction 11200.1, Equipment Management Manual.
      3) NAVFAC P-404, Naval Construction Force Equipment Management Manual.

* c. Explain the differences between NAVSUP Forms 1250-1 and 1250-2:

      1) A 1250-1 is used in order to request items according to NSN, while a 1250-2 is used in order to request items according to part number.

      2) Sections AA through NN on a 1250-2 require specific information as to source of supply, description of item, manufacturer's code (CAGE), etc., which isn't necessary for NSN numbered items of stock.

* d. Describe the elements of the MODIFIER 98 (COSAL):

      1) Equipment Indices.
      2) Allowance Parts Lists.
      3) National Stock Number (NSN)/Part Number Cross Reference List & the Stock Number Sequence List (SNSL).

* e. What NAVSUP form is used to request corrections to a MODIFIER 98:

1) NAVSUP Form 1220-1.

* f. Which element of the MODIFIER 98 would you use in order to cross an NSN to a part number:

1) NSN/Part Number Cross Reference Lists.

* g. Which element of the MODIFIER 98 would you use in order to correctly inventory tech library:

1) Stock Number Sequence List (SNSL).

h. What log is used in tech library in order to check in/out technical manuals:

1) Technical Manual Check In/Check Out Log.

Skills marked with an * denote critical skills. These **must** be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 8 specific questions.

313.1 Preventive Maintenance Clerk

1. Skill Definition.
   Individual must identify the elements of the Preventive Maintenance Program, the procedures for compiling all Civil Engineer Support Equipment (CESE) into PM Groups and preparing a PM Schedule, the procedures for properly updating the PM Record Cards, and the procedures for properly maintaining the Equipment History Jackets, the Equipment Status Board, and the Equipment Repair Order Log. The individual must also be familiar with the reference manuals as they apply to initiating, updating and completing Equipment Repair Orders (EROs).

2. Specific Skill Questions.

* a. State the three levels of maintenance:

   1) O, Organizational, Operator & Preventive Maintenance.
   2) G & H, Intermediate.
   3) D, Depot.

* b. State the differences between "A", "B" and "C" PMS/Inspections:

   1) Inspection Depth.
   2) Inspection rate: Type A is conducted at the end of every complete PM Interval, type B PMs are completed at intervals of 2,000 miles, 120 hours, or after two consecutive type A PMs. Type C PMs are completed on demand on 50% of the CESE on site.

* c. State the two conditions for establishing PM Groups:

   1) Place marriageable equipment into the same PM Groups.
   2) Distributive like equipment evenly over the PM Groups.

d. State the order in which the PM Record Cards are filed in the tickler file:

   1) PMG, USN.

e. State the order in which the Equipment History Jacket are filed:

   1) ECC, USN.

f. State the elements of the ERO log:

1) ERO Number.
2) ECC.
3) USN Number.
4) Type of Repair.
5) Date In.
6) Date Out.
7) PMG.
8) Hard Card #.

g. Which copy of an ERO has a listing of the function codes:

1) White.

* h. State the routing procedures for an ERO:

1) Green copy: Mechanics copy.
2) Blue copy: History Jacket.
3) Pink copy: Maintenance Supervisor.
4) White copy: CESO.
5) Yellow copy: DTO.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 to 8 specific questions.

315.1 Equipment Inspector

1. Skill Definition.

   Individual must identify the essential elements of the Preventive Maintenance program, the procedures for completing type A, B, C and Deadline inspections, the procedures for completing the applicable elements of an Equipment Repair Order (ERO), and the individual must be able to explain the differences between an initial and final inspection. The individual must be able to identify the reference manuals that he/she needs to complete an inspection. The individual must be a senior, knowledgeable mechanic with the ability to clearly and concisely describe the needed repairs found during an inspection.

2. Specific Skill Questions.

   a. State the three levels of maintenance:

      1) Organizational

         (a) Operator.
         (b) Preventive Maintenance.

      2) Intermediate

         (a) G, maintenance designed for major detachments from the Main Body.
         (b) H, maintenance designed for NMCB Main Bodies.

      3) Depot

         a) Depot maintenance is that maintenance performed on equipment which requires major overhaul or comprehensive restoration to a degree necessary to restore the unit, as a whole, to a like new condition.

* b. Describe the necessary elements of a Deadline Inspection:

   The deadline inspection consists of the performance of an 01 or type "A" inspection on every scheduled PM due date. The inspector must ensure that:

      1) All openings are covered and weather-tight.

      2) All machine surface are preserved.

      3) All disassembled components are tagged, covered and stored.

4) No cannibalization has taken place since the last inspection.

5) Parts that are removed from the deadlined piece of equipment are replaced with the non-serviceable item, and the Maintenance Supervisor ensures that the replacement parts are ordered using an applicable priority.

6) All replacement parts, cost, and labor hours related to the interchange are charged against the piece of equipment on which the part failed. When the replacement parts are received and installed, only the labor involved is to be charged to the piece of equipment from which the interchange part was taken.

* c. State the two conditions necessary for an inspector to initiate an 04 PM on a piece of equipment:

1) The repairs cannot be completed within an hour.
2) The repairs require repair parts.

* d. Describe the elements of the Equipment Repair Order (ERO) that the initial inspector has to complete:

1) Block 7, Hour Meter.
2) Block 8, Odometer Meter.
3) Block 29, Inspection Start Time.
4) Block 30, Inspection Start Date (Julian).
5) Block 63, Work Description.
6) Block 64, Primary or Secondary.

e. Describe the elements of the Equipment Repair Order (ERO) that the final inspector has to ensure is completed:

1) Block 77, Dispatcher's Signature.
2) Block 79, Date of signature.
3) Block 75, Final Inspector's Signature.
4) Block 15, Total Time of final inspection.

* f. State which manuals contain the equipment inspection guides:

1) COMSECONDNCB/COMTHIRDNCB 11200.1 Instruction. (Red Book)
2) NAVFAC P-404, Equipment Management Manual.

g. Describe the two type of inspection guides:

1) Automotive.
2) Construction.

* h. Describe an ERO package:

1) Hard Card, NAVFAC Form 9-11240/13, Automotive, & NAVFAC Form 11260/4, Construction.
2) ERO and Continuation Sheet, NAVFAC Forms 11200/41 & 11200/41A.
3) ERO Worksheet, NAVFAC Form 11200/41B.
4) DTO Information Sheet.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 8 specific questions.

317.1 Direct Turnover Clerk

1. Skill Definition.

   The individual must identify the accountability records for all NIS/NC repair parts requisitions. The individual must also identify the procedures for initiating a local requisition number, the temporal intervals required for awaiting official requisition numbers for priority A, B, and C requisitions, and the temporal intervals required for following up requisition status for priority A, B and C requisition. The individual must also be able to identify the composition of the DTO Equipment File, and the individual must be able to identify the composition of the DTO storeroom.

2. Specific Skill Questions.

* a. Identify the two accountability records used in DTO:

   1) DTO Log.
   2) DTO Summary Sheet.

* b. Describe the elements of the local requisition number:

   1) Date (Julian Date)
   2) Department Number("A" designating Alfa Co., followed by a three digit number indicating the sequence in which the requisition was entered into the log).

* c. State the intervals required for awaiting official requisition numbers for priority A, B, and C requisitions:

   1) Priority A, 24 hours.
   2) Priority B, 48 hours.
   3) Priority C, 5 working days.

* d. State the intervals required for updating requisitions:

   1) Priority A, every seven days.
   2) Priority B, bi-weekly.
   3) Priority C, monthly.

   e. Explain the differences between NORS/ANORS requisitions:

   1) NORS, Not Operationally Ready for Supply; Priority "A."
   2) ANORS, Anticipated Not Operationally Ready for Supply, Priority "B."

f. Describe the ERO routing procedures as they apply to the DTO Clerk:

1) The preparation of a DTO Information Sheet.

* g. Describe the composition of the DTO Equipment File:

1) DTO Summary Sheet.
2) Yellow Copies of the pertinent EROs.
3) Yellow or Pink copies of the 1250-1/-2, depending upon the stage of the requisition (yellow, held initially until the part is received along with the pink copy of the 1250, which is then retained in the equipment file).

h. Describe the composition of the DTO Storeroom:

1) 40 individually marked 12" X 12" storage bins.

* I. State which copy of the 1250 is returned with the official requisition number:

1) Yellow.

Skill marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 9 specific questions.

325.2 Engine Overhaul II

1. Skill Definition.

   Individual must perform engine repairs to the extent of remove or replace cylinder heads, intake and exhaust manifolds, water pumps, blowers, turbo chargers, and oil coolers. Disassemble, inspect and measure all wear and friction surfaces using measuring instruments. Hone engine cylinders, recondition valves, valve seats and guides using reconditioning equipment. Fit pistons, piston rings, and bearings, replace all defective or worn parts and assemblies, assemble engine insuring correct tolerances and adjustments.

2. Specific Skill Questions:

   a. Describe or perform the task involved to install a vacuum gage, explain vacuum gage readings as they apply common engine malfunctions.

   b. Describe or perform wet/dry cylinder compression test, discuss indications that could be observed and probable causes for low readings.

   c. Remove, or describe the sequence of steps involved to remove and replace engine intake and exhaust manifolds, list significant tools/equipment required.

   d. Remove, or describe the sequence of steps involved to remove and replace a turbocharger or blower.

* e. Remove, or describe the sequence of steps involved to remove and replace engine cylinder heads, list significant tools/equipment used.

   f. Remove, or describe the sequence of steps involved to remove and replace a water pump and fan, emphasize safety as it applies.

   g. Remove, or explain the steps involved to remove and replace an engine flywheel, discuss areas to inspect.

   h. Perform, or describe sequence of steps involved to recondition a cylinder head, include all safety precautions, inspection procedures and special tools required.

   I. Explain the difference between a mechanical and hydraulic valve train.

* j. Describe the sequence of steps and areas to be observed to recondition valves, valve seats and valve guides including the proper use of valve reconditioning tools.

   k. Explain the difference between wet and dry cylinder liners.

l. Demonstrate the ability to use, read and maintain a micrometer, telescoping gage, calipers and a dial indicator.

m. Perform, or describe sequence of steps involved to recondition an engine cylinder, include ridge cutting, checking for out of round and cylinder Honing.

n. Describe sequence of steps involved to inspect, measure, recondition and fit a piston and piston rings.

o. Describe or perform the tasks involved in camshaft timing on a gasoline engine. Explain the steps and sequence, reason for each, and results if not performed properly.

p. Describe or perform the tasks involved to inspect and measure critical machined surfaces. List tools and equipment used. Discuss all safety precautions to be observed.

Skills marked with an * denotes skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill 12 of 16 specific responses.

332.2 Engine Tune Up (Gasoline) II

1. Skill Definition.

   Using appropriate tools and observing all appropriate safety practices, individual must perform or describe the proper procedures to disassemble, clean, inspect, repair, reassemble and adjust engine fuel, ignition and emission system components. Record, evaluate, and interpret cylinder compression readings, fuel pump and vacuum gauge readings. Use engine analyzer to test electronic ignition and fuel injection systems.

2. Specific Skill Questions.

* a. Explain or perform the proper procedures to perform a wet and dry compression test using proper tools. Record and interpret readings.

b. Describe or perform the steps required to remove and replace fuel tanks, pumps, lines. Emphasize safety where it applies.

* c. Discuss two types of fuel pumps and explain their operation.

d. Explain the function of the carburetor, define vaporization, atomization, and the venturi effect.

e. Describe or perform the steps required to inspect, test, and repair a carburetor or fuel injector.

f. Discuss the component parts of a conventional ignition system and explain their function.

* g. Explain the common tasks to be performed to inspect an ignition system. Include the procedures to test ignition wires, spark plugs and distributor cap. Emphasize safety as it applies.

h. Perform or describe the sequence of steps to test and diagnose an electronic fuel injection (EFI) fuel pressure regulator, EFI throttle position sensor and an EFI nozzle.

I. Explain the proper procedures to set-up for and test ignition timing for electronic ignition systems.

* j. Discuss or perform the proper procedures to test a distributor vacuum/centrifugal advance units.

k. Explain the function of electronic spark control.

l. Discuss the characteristics of a GM distributorless ignition system. Include safety precautions as they apply to this system.

m. Explain proper set-up and test procedures for an air injection system.

n. Describe or demonstrate two methods to test a P.C.V. system.

o. Explain the purpose operation and proper test procedures of the E.G.R. system.

p. Perform or explain set-up of a diagnostic engine analyzer to test and diagnose an ignition coil, secondary wires and a ballast resistor.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 12 of 16 specific questions.

334.2 Engine Tune Up (Diesel) II

1. Skill Definition.

   Individual must perform the following skills using the appropriate tools and test equipment. Take and record cylinder compression readings, adjust valve tappet clearance, remove and replace fuel system component assemblies. Troubleshoot and isolate diesel fuel system malfunctions, test, adjust, time and repair fuel injection system components per manufacture's specifications.

2. Specific Skill Questions.

* a. Explain the purpose and describe the procedures to perform wet and dry cylinder compression tests.

* b. Explain the purpose and describe the procedures to perform valve adjustments on any two diesel engines, list significant tools and equipment used and safety precautions to be observed.

c. Describe the different types of material used for low pressure fuel lines and problems associated with there use.

d. Explain the purpose of the restricted fitting in the Detroit Diesel fuel system. Include location of fitting and results if substituted with a standard brass fitting.

e. Describe the causes of a low pressure reading at the transfer pump pressure port on a Stanadyne injection pump. Include suspected parts and corrective action to repair the condition.

* f. Describe or perform the sequence of steps to perform an injection nozzle opening test with the nozzles installed in the engine, list significant tools and equipment used and discuss safety precautions to be observed.

g. Describe or perform the sequence of steps to time a Caterpillar sleeve metering pump to the engine, list significant tools and equipment used and results if performed incorrectly. Discuss safety precautions.

h. Explain the purpose of the continuity light used to check the load stop adjustment on the Caterpillar sleeve metering pump.

* I. Describe the differences between the detroit diesel "N" Needle valve and "HV" Crown valve injectors. Include spray tip construction and fuel flow.

* j. Describe or perform the sequence of steps to time and equalize Detroit Diesel unit injectors. List significant tools and equipment used, safety precautions to be observed.

* k. Describe the procedure to remove and install fuel injectors and nozzles. List significant tools and equipment used, safety precautions to be observed.

* l. Describe or perform the procedure to static time a distributor type fuel injection pump. List significant tools and equipment used, safety precautions to be observed.

m. Describe or perform the sequence of steps to adjust the idle on a Cummins PT fuel pump. List significant tools and equipment used and safety precautions to be observed.

* n. Describe or perform the sequence of steps for the torque method adjustment of the Cummins PT injector. List significant tools and equipment used and discuss results if not performed properly. Emphasize safety precautions to be observed.

o. List the main fuel filter locations in the Cummins PT fuel system. Include description of each and indications if contaminates are found on filer.

Skills marked with an * denote critical skills. These must be described/performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 11 of 15 specific questions.

334.3 Engine Tune Up (Diesel) III

1. Skill Definition.

   PRCP skill level 334.2, plus inspect, repair, test and adjust diesel fuel system components. Test, repair, and adjust mechanical and hydraulic governors in accordance with manufactures specifications, using the correct tools and test equipment.

2. Specific Skill Questions.

   a. Describe or perform the sequence of steps to disassemble and assemble a Detroit Diesel fuel transfer pump. List significant tools and equipment to be used, describe the difference between the standard and high capacity fuel transfer pumps and state the indications that would be observed.

* b. Describe or perform the sequence of steps to remove and install a Detroit Diesel "V" series governor. List significate tools and equipment used, discuss the purpose for the buffer screw on the Detroit diesel mechanical governor. Safety must be emphasized.

* c. Describe or perform the sequence of steps to conduct a unit injector spray tip leakage test. List significate tools to be used, discuss the parameters of the procedure and the indications to be observed. Explain safety precautions as they apply.

* d. Describe or perform the sequence of steps for a Detroit Diesel engine tune-up. List significate tools to be used, explain the results if not performed correctly and explain safety as it applies.

   e. Describe the procedure to remove the linkage hook from a Stanadyne fuel injection pump.

   f. Describe or perform the sequence of steps to remove a distributor rotor from the hydraulic head of a stanadyne pump. List significate tools and equipment.

* g. Describe or perform the sequence of steps to lapp the injector body and nozzle body sealing surfaces of a Robert Bosch injection nozzle.

   h. Describe or perform the sequence of steps to adjust the injection pressure of a Robert Bosch injection nozzle. List significant tools and equipment.

   I. Describe or perform the sequence of steps to calibrate a Caterpillar sleeve metering pump. Include tools and equipment, explain the results if not performed correct.

* j. Explain the function of the sleeve control shaft and describe how it changes the sleeve position.

* k. Describe the procedure to install a Caterpillar capsule type nozzle onto the injection nozzle body, pay particular attention to the tightening sequence. Include significant tools and equipment.

l. Describe the shape of the proper spray pattern from a Caterpillar capsule nozzle during a spray pattern test.

m. Describe or perform the sequence of steps to install and protrusion test the Cummins PTG weight assist plunger. List significant tools and equipment.

* n. Describe the sequence of steps or perform the Cummins injector plunger leakage test. Include all tools and equipment, indications that should be observed, and safety as it applies.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 10 of 14 specific questions.

345.2 Equipment Electrical II

1. Skill Definition.

   Individual must troubleshoot and repair starting and charging systems. Read electrical schematics, troubleshoot and repair malfunctions in electrical circuits on all types of automotive, material handling and construction equipment.

2. Specific Skill Questions.

   a. Read an electrical schematic adequately enough to isolate an electrical circuit, draw and identify six electrical symbols commonly used on equipment wiring schematics.

* b. Define voltage, amperage and resistance as they pertain to a direct current electrical circuit. Explain their relationship in accordance with ohms law as it applies to both series and parallel circuits.

   c. Describe or perform the procedures required to properly test diodes, zener diodes, transistors, resistors and thermistors using a digital multi meter. Ensure that all steps include proper procedure, purpose of each step and the correct conclusion of the test results.

   d. Describe or perform the steps required to properly charge a dry charged battery and prepare it for use, list all tools and equipment required. Include all safety procedures as they apply.

   e. Describe or perform the steps required to measure individual battery cell voltages, test specific gravity of electrolyte and properly load test a battery according to it's cold cranking amp or amp hour rating, include all safety procedures as they apply.

   f. Perform or discuss the steps required to perform a parasitic draw test, include troubleshooting procedures to locate the source of the draw.

* g. Demonstrate the ability to properly care for and use a multi meter to measure amperage, voltage and resistance. Log or read test results paying particular attention to decimal placement (i.e., milli, micro, mega). Describe the difference between analog and digital multi meters, explain the advantages and disadvantages of each.

   h. Describe or perform the steps necessary to troubleshoot an AC charging circuit, use all applicable tools and manuals. Explain results if performed properly.

* I. Explain or perform the proper procedures to test an alternator and regulator while on the vehicle, include tools, sequence, and possible test results if procedures are followed.

* j. Explain the operation of positive and negative diodes discuss how they work together to rectify AC current to DC current in an alternator.

k. Discuss or perform the steps required to determine the type of charging system circuit and how to polarize both the "A" and "B" type charging system circuits.

l. Perform or discuss the steps required to perform a starter amperage draw test, include all tools required and the proper use and set up of the tools. Explain the probable causes of higher than normal readings.

m. Perform or discuss the steps required to replace and properly align high and low beam headlights.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 13 specific questions.

345.3 Equipment Electrical III

1. Skill Definition.

   Using appropriate tools and observing all safety practices, individual must disassemble, inspect, bench test, and recondition cranking and charging system components. Inspect and repair wiring harnesses, solenoids and relays.

2. Specific Skill Questions.

* a. Describe or perform the tasks involved to perform current draw and voltage drop test on a cranking motor. Steps to include sequence, reasons for each and results if not performed properly.

* b. Describe or perform the steps required to inspect, test and repair an armature, include methods to test for opens, grounds, shorts and check for thrown windings and worn commutator. List significant tools needed and safety practices as they apply.

c. Explain the operation and describe or perform the tasks involved to inspect and repair the overrunning clutch, bendix and dyer drive types of starter drives.

d. Explain the operating principles of a diode (both negative and positive) and explain test procedures. Include all tools required and normal test results.

* e. Describe or perform the steps required to test a Rectifier bridge.

f. Describe the "Y" and "delta" types of alternator windings and discuss the advantages and applications of each.

g. Describe or perform the steps required to disassemble, inspect, bench test, and recondition a generator.

h. Describe both the "A" and "B" type of D.C. field circuits and explain the differences between the two. State the purpose of polarizing and describe the procedures to polarize both circuits.

I. Explain the function of a voltage relay in a DC charging system.

j. Describe or perform the steps required to conduct circuit resistance, current and voltage tests on a standard automotive, electrical system. Include all tools and their uses. Observe all safety practices as they apply.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

355.2 Equipment Power Train II

1. Skill Definition.

   Disassemble, clean, repair, adjust, and assemble all items listed in Skill level 1 except automatic and power shift transmissions and torque converters.

2. Specific Skill Questions.

   a. Describe symptoms of a slipping clutch, dragging clutch, clutch chatter and misadjusted clutch.

   b. Describe throw out bearing noise and when it is most evident.

* c. State the major differences between a constant mesh, and a synchromesh transmission.

   d. Describe the parts most likely to wear or break in a synchromesh transmission.

   e. Explain the effects of improper (low or high) oil levels in transmissions or transfer cases.

   f. Explain how to use a dial indicator to check "backlash" in a differential, transfer case, and transmission.

* g. Define the terms PINION DEPTH, and BEARING PRE-LOAD as they relate to differential adjustments.

   h. Explain why a bearing should not be allowed to spin if it is being dried with compressed air.

* I. Describe how neutral, reverse, direct drive, over drive, and under drive are obtained using a planetary gear set.

   j. Describe two methods of adjusting the drive tracks of crawler tractors.

   k. What is the best source for specifications and procedures when rebuilding or adjusting power train components?

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 11 specific questions.

365.2 Equipment Chassis II

1. Skill Definition.

   Individual will perform or describe the following tasks. Troubleshoot and replace defective brake system components and assemblies of disc, drum, hydraulic, air-hydraulic, vacuum, air brakes and antilock brakes. Replace defective suspension and steering components and assemblies.

2. Specific Skill Questions:

* a. Describe the basic hydraulic brake system, name all components and state their purpose and operating principles.

   b. Explain proper procedure to remove install a disc brake caliper, include proper disassembly, inspection, assembly and brake bleeding procedures. List all tools required and all safety procedures as they apply.

* c. Describe or perform the tasks involved to remove and install a wheel cylinder, include proper disassembly, inspection, assembly and brake bleeding procedures. List all tools and safety procedures as they apply.

   d. Describe symptoms of a malfunctioning vacuum booster, include the probable cause(s) of excessive effort at the brake pedal, engine stalling when brakes are applied and brakes that "Grab."

   e. Describe the air/hydraulic brake system. Explain the theory of operation noting similarities and differences to the hydraulic brake system.

   f. Describe the steps required to bleed an air/hydraulic brake system include proper brake bleeding sequence, tools required and all safety procedures as they apply.

   g. Explain critical safety precautions required to remove an air-hydraulic brake cylinder.

   h. Describe the basic air brake system, name all major components and critical valves, state their purpose and operating principles.

* I. Explain the safety precautions required to rebuild a dual diaphragm brake chamber.

* j. Explain or perform the steps required to perform major and minor brakes adjustments on a typical tractor trailer air brake system.

* k. Explain the proper procedures required to troubleshoot, remove, repair and re-install air brake system components including relay, quick release, unloader, emergency relay and directional control valves.

* l. Explain the proper procedures required to adjust an unloader valve.

m. Describe the components that compose an antilock brake system. Discuss their individual function(s) and the interaction of components within the system, explain how they effect the base brake hardware during anti-lock and normal braking.

n. Describe or perform the steps required to retrieve and analyze information stored in the E.C.U of an anti-lock brake system.

o. Explain or perform the steps required to remove, inspect and replace a MacPherson strut, include tools required and list all safety procedures as they apply.

p. Inspect or describe tire wear pattern inspection procedures, explain the causes of improper wear patterns to include saw toothing, inside/outside shoulder wear, feathering and cupping.

q. Explain or perform the procedures required to properly remove, inspect, pack and replace front wheel bearings. Describe all safety requirements and the necessary tools.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 12 of 17 specific questions.

365.3 Equipment Chassis III

1. Skill Definition.

   Individual must perform the following skills using the appropriate tools and equipment. Disassemble, repair, adjust and assemble brake system components including anti-lock brake systems. Recondition brake drums and rotors. Perform front-end alignment, static and dynamic wheel balancing and diagnose steering system malfunctions.

2. Specific Skill Questions

   a. Perform or describe the sequence of steps required to remove, disassemble, inspect, reassemble, bleed and test a brake master cylinder. Include proper tools and safety as it applies.

   b. Perform or describe a logical sequence of steps to diagnose a malfunctioning hydraulic brake system that requires excessive pedal pressure.

   c. Explain or perform the steps required to remove, inspect and resurface brake drums and rotors, include tools required, explain their proper use and list all safety procedures as they apply.

   d. Explain or perform steps required to measure a brake rotor and a brake drum. Using manufactures specifications and proper measuring instruments, determine the amount of existing wear and the maximum material to be removed. Describe all necessary tools to be used and discuss safety requirements.

   e. Explain how the Rear Wheel Anti-Lock brake system controls hydraulic pressures during an anti-lock operation. Describe or perform the steps required to retrieve and analyze information stored in the E.C.U of an anti-lock brake system.

   f. Describe steering geometry angles to include camber, caster, kingpin inclination, Toe.

   g. Perform or describe a logical sequence of steps to diagnose and correct a vehicle steering system that has tires wearing on the inside, explain probable causes and the steps required to confirm and correct the diagnosis.

   h. Perform or describe a logical sequence of steps to diagnose a vehicle that wanders, explain probable causes and the steps required to confirm and correct the diagnosis.

   I. Describe procedures and list significant tools needed to remove, disassemble, inspect, assemble, adjust and install a steering gear box.

j. Describe or perform the procedures to adjust a steering gear box of a typical light duty truck, include all tools required and safety precautions as they apply.

k. Perform or explain the proper procedure to static and dynamic balance a tire, explain the different results of each. Include tools and equipment required for each and explain their proper use.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

375.1 Cost Control Clerk

1. Skill Definition.

   Individual must have developed a working knowledge, through formal or on the job training, of the terms, forms, and procedures required in the operation of the following Maintenance Control Office functions: preventive maintenance scheduling, deadline status reporting, DTO parts control, ERO routing, and report submission control.

2. Specific Skill Questions.

* a. Explain the standard interval between PM service inspections.

   b. Explain why the PM interval for a piece of equipment may need to be reduced; two different ways to reduce the PM interval, and who is responsible for that decision.

   c. Describe how a deployment schedule of PM due dates is arranged, and what factors should be taken into account when arranging it.

* d. Describe how to compute daily and monthly equipment availability figures.

* e. Explain how dead-lined equipment is reported to COMSECONDNCB/ COMTHIRDNCB, and what information must be reported.

   f. Describe the information contained in the DTO log.

   g. Describe the flow of a 1250-1 or 1250-2 from the time it is marked NIS/NC at Repair Parts Storage until the DTO clerk receives the part.

   h. State how an equipment status board is arranged.

   I. Describe the information found on a 1342, and where the 1342 is stored.

* j. Explain the difference between a PM and an Interim repair.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 10 specific questions.

385.1 Repair Parts Storeman

1. Skill Definition.

   Individual must utilize CESE COSALS, NAVSUP 1114 Stock Record Cards, and FEDLOG and Snap II computer programs to identify required items by name and part/stock number. Individual will be able to prepare Navy Milstrip Requisitioning forms for submission to supply.

2. Specific Skill Questions.

   a. Describe the purpose of the CESE COSAL.

* b. Name the three parts of the COSAL and describe the information contained in each of them.

   c. Describe how to locate a repair part in the COSAL.

* d. State the major differences between the MOD 96 and MOD 97.

   e. Explain what the NAVSUP 1114 Stock Record Card is used for.

* f. Explain how to make a parts allowance change, and the form that is utilized.

   g. State the two documents utilized to order repair parts for NSN and NON-NSN parts.

   h. Name the 6 types of searches available on FEDLOG.

   I. Explain where you can find instructions on how to use FEDLOG.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 9 specific responses.

396.1 Radiator Repair

1. Skill Definition.

   Individual must use and maintain tools and equipment included in kit 80023 (Radiator Repair). Have through technical knowledge and skills necessary to repair cooling systems in construction equipment and automotive vehicles. To include testing for obstructions, using a flow meter, or leaks using compressed air, flushing radiator with cleaning compounds to remove obstructions, removing core or tanks, boil out and/or rod out to clean tubes, solder leaks in core, install new core or tubes using a soldering iron or gas torch.

2. Specific Skill Questions.

   a. Explain the periodic inspection procedures of the cooling system, list specific areas to be inspected, reason for each and possible results if neglected.

   b. Describe or perform the tasks required to prepare a radiator for repair, include proper cleaning procedures, explain all steps, the reason for each step, and results if not performed properly.

* c. Demonstrate the proper care and operating practices required to properly operate a soldering iron and a gas torch for soldering purposes. Pay particular attention to safety as it is paramount to the awarding of this skill level.

   d. Describe or perform the tasks involved to repair a radiator tank. Include all steps for removing, repairing and installing the tank. Explain each step, and the consequences if not performed properly. Emphasize safety as it applies.

* e. Describe or perform the steps required to test a radiator for obstructions and leaks. Include procedures to connect a flow meter, determining percentage of clogging and air testing for leaks. Explain the correct sequence, reason for each test and results if not performed properly. Emphasize safety as it applies.

   f. Describe or perform the procedures to air test a radiator for leaks.

* g. Describe or perform the procedures for flushing and back flushing a radiator.

   h. Explain the purpose of rod cleaning (rodding out) the radiator tubes.

   I. Describe or perform the steps required to repair a radiator core. Explain fin replacement procedures, also tube removal, repair, splice and replacement. Explain the reason for each step and results if not performed properly. Emphasize safety as it applies.

j. Describe or perform the tasks required to flush, back flush, vat clean and rod clean a radiator. Include all steps and procedures including the care and use of tools required. Explain the safety precautions and personal protective equipment required while working in or around a hot vat.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 7 of 10 specific questions.

397.1 Equipment Hydraulic Repair

1. Skill Definition.

   Individual must possess a working knowledge of hydraulic theory and be able to troubleshoot and repair malfunctions found in hydraulic systems of any weight/material handling or construction equipment. Read and identify hydraulic symbols, and components of a hydraulic circuit using proper terminology. Use and maintain the in-line hydraulic tester or similar type found in the equipment shop maintenance kit 80414.

2. Specific Skill Questions.

   a. Define force, pressure and area as associated with a hydrostatic hydraulic circuit. Explain their relationship per Pascals law.

   b. Explain or perform the proper procedures to test a hydraulic pump while on the vehicle, include tools, sequence, and possible test results if procedures are followed.

   c. Describe or perform the procedures required to properly test and diagnose hydraulic system pressure relief valves using an in-line hydraulic flow meter. Ensure that all steps include proper procedure, purpose of each step and the correct conclusion of the test results.

   d. Describe or perform the tasks required to complete leakage, pressure and flow tests using the in-line tester on hydraulic system control valves. Explain the steps and reason for each test including the proper diagnosis of test results.

   e. Describe or perform the tasks involved to rebuild a hydraulic cylinder. Include removal, and disassembly of the cylinder, repair, inspection, reassembly, installation and testing of cylinder.

   f. Describe or perform the tasks involved to rebuild flow, pressure and directional control valves. Include the correct sequence of steps for removal, disassembly, inspect, repair, installation and testing. Emphasize safety precautions as they apply.

   g. Describe or perform the tasks involved to replace hydraulic hose and fittings. Include the correct sequence of steps and the reason for each. Emphasize safety to include removal of hoses and lines from the equipment. Crimp type fittings, Reusable type (non skive) fittings, steel lines and fittings.

   h. Read a hydraulic schematic sufficiently to isolate an individual hydraulic circuit. Explain the path of fluid flow and each component function. Draw and identify six hydraulic symbols commonly used in schematics.

I. List the minimum quality requirements and functions of hydraulic fluid including corrosion resistance, anti-foaming, lubricity, viscosity and the effect of heat on viscosity.

j. Identify the measurements of hydraulic hose. Point out the dash size, hose size, inside diameter, type of hose, working pressure and explain its importance.

* k. Explain the operation of open center and closed center hydraulic control valves. Discuss their operational differences and system requirements in addition to the valves.

l. Describe two types of hydraulic oil coolers. Explain their operational characteristics and service requirements.

m. Explain the operating principles of two different vane, three different gear and two different piston type hydraulic pumps. Elaborate on flow rate by volume and velocity. Explain the differences in fixed displacement, variable displacement, positive and non-positive displacement pumps.

n. List three types of accumulators, explain how and why they are used in a hydraulic system. Stress safety and define inert gas.

o. Perform or describe the sequence of steps to properly service filters and Strainers. Explain the operational principles of the by-pass valve and define micron.

p. Describe or perform the steps required to measure individual circuit operating pressures according to the vehicles service manual. Include all safety procedures as they apply.

q. Perform or discuss the steps required to perform a hydraulic pump output pressure test, include all tools required and the proper use and set up of the tools. Explain the probable causes of higher/lower than normal readings.

Skills marked with an * denotes skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill 13 of 17 specific questions.

403.1 Planning and Estimating
410.2 Surveying II
420.2 Drafting II (Architectural)
441.1 Soils and Pavement Analysis II (Soils)
442.1 Soils and Pavement Analysis II (Bitumens)
443.1 Soils and Pavement Analysis II (Concrete)

403.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package; Identify and explain the activity/work element estimates; levels I, II, and III; Interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams. Demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook. Describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, and manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Explain why an estimator compares the material take off sheet against the project bill of material.

* d. Explain what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

   e. Describe the terms in figure 1.

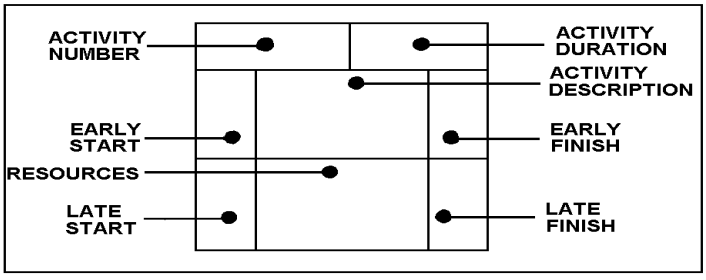


Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

* g. Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

i. Describe the following forms:

1) master activity summary sheet
2) construction activity summary sheet
3) quality control plan
4) safety plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

k. Develop an equipment and tool estimate from a set of drawings and specifications. (Interviewer provides drawings and specifications)

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

a. Describe or explain a scheduling bar chart.

b. Explain the formula for computing direct labor estimates.

c. Describe or explain what can be found in a project quality control plan and safety plan.

d. Describe or explain some of the information that can be found in the title block of a construction blueprint.

e. Describe the following terms:

1) Work Elements (WE)
2) Availability Factor (AF)
3) Man day Equivalent (ME)
4) Delay Factor (DF)
5) Production Efficiency Factor (PEF)

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 11 specific questions.

410.2 Surveying II

1. Skill Definition.

   Individual will: explain office/field safety and reporting of accidents; explain elements of construction surveying; explain the orders of precision and correction; perform and explain horizontal and vertical control with the use of a transit and level; describe the procedures for conducting a topographic survey; explain trial and error method for placing slope stakes; identify and solve for points on horizontal and vertical curves; explain cut and fill for mass diagraming; perform minor adjustment to the transit and level; explain the procedures for utility layouts; explain the procedures for a building layout.

2. Specific Skill Questions.

   a. Name the Method used for Prevention of Safety Mishaps and explain office and field safety precautions.

   b. Name and describe the types of corrections which can be applied to reduce or eliminate errors in Precision surveying and explain the orders of precision.

* c. With a Transit, and other necessary equipment, and figure 1, describe or perform the Survey of the Closed Traverse in Fig 1 from Magnetic North, starting at point A.

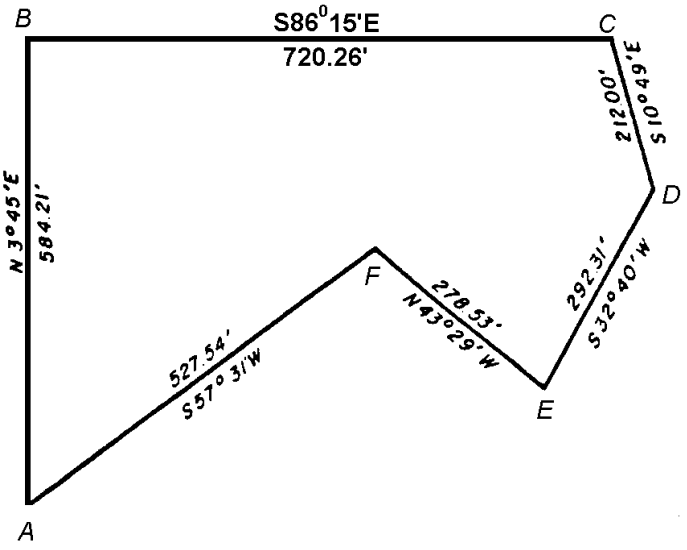


Figure 1

d. Describe the procedures for a Trial and Error Method of placing slope stakes for Cut and Fill Section shown in figure 2.

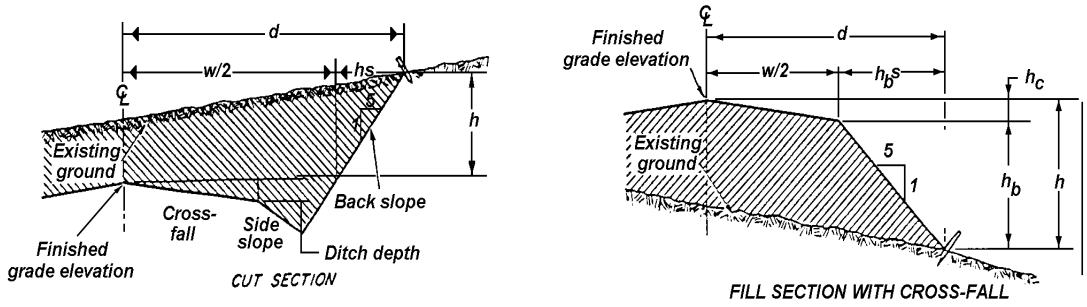


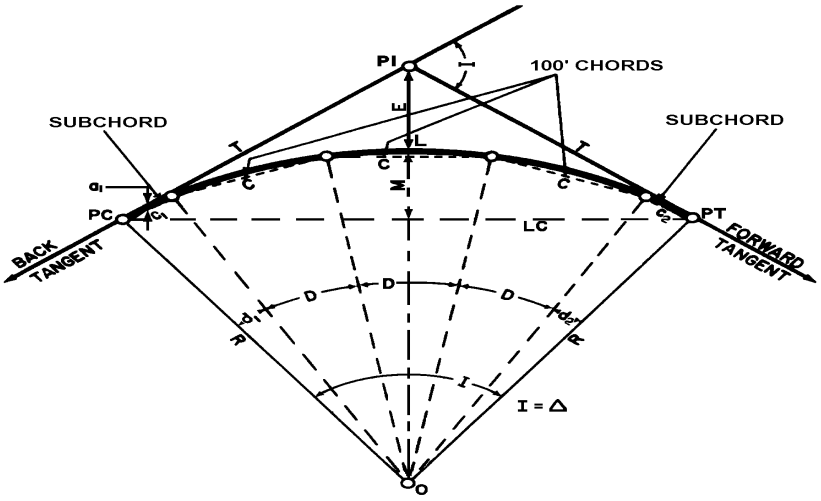
Figure 2

* e. Describe the procedures for performing a Topographic Survey. Describe the following:

1) Survey party responsibilities
2) Stadia
3) Developing a Topographic Map from survey notes
4) Contour line
5) Name the four general systems used in establishing control for a topographic survey

* f. Given figure 3 Define the point of a Horizontal curve by Arc and chord definition given the following:

1) PI = 18 + 00
2) I = 75 degrees
3) D = 15 degrees
4) Solve for R, T, PC, PT, L, E, M, Lc, C, d1, d2.



FORMULAS

$$R = \frac{50}{\sin \frac{d}{2}} \quad \text{(chord definition)}$$

$$R = \frac{100 \times 360}{2\ D} = \frac{5729.58}{D} \quad \text{(arc definition)}$$

$$T = R \tan \frac{I}{2}$$

$$E = T \tan \frac{I}{4}$$

$$T = \frac{E}{\tan \frac{I}{4}}$$

$$E = \frac{R}{\cos \frac{I}{2}} - R$$

$$E = R \ \text{Exsec} \ \frac{I}{2}$$

$$M = R - \left(R \cos \frac{I}{2}\right)$$

$$M = R \ \text{vers} \ \frac{I}{2}$$

$$L_c = 2R \sin \frac{I}{2} \ := 2T \cos \frac{I}{2}$$

$$L \ \text{(in feet)} = 100 \frac{I}{D}$$

$$d_1 = \frac{C_1}{100} \ (D)$$

$$d_2 = \frac{C_2}{100} \ (D)$$

$$a_1 = \frac{C_1}{C} \times \frac{D}{2}$$

$$\therefore \ d_1 = * \ 0.3 \ C_1 \ D$$

$$C_1 = 2 \frac{(360)}{d_1} \left(\frac{a_1}{2}\right) \sin \frac{d_1}{2}$$

* Constant value

Figure 3

g. Given a transit, level, and the EA 3 & 2 Vol 3, perform or describe minor adjustments made on bubbles, line of sight, axis, and vertical circle.

* h. Explain the procedures for staking out a gravity flow Sewer line.

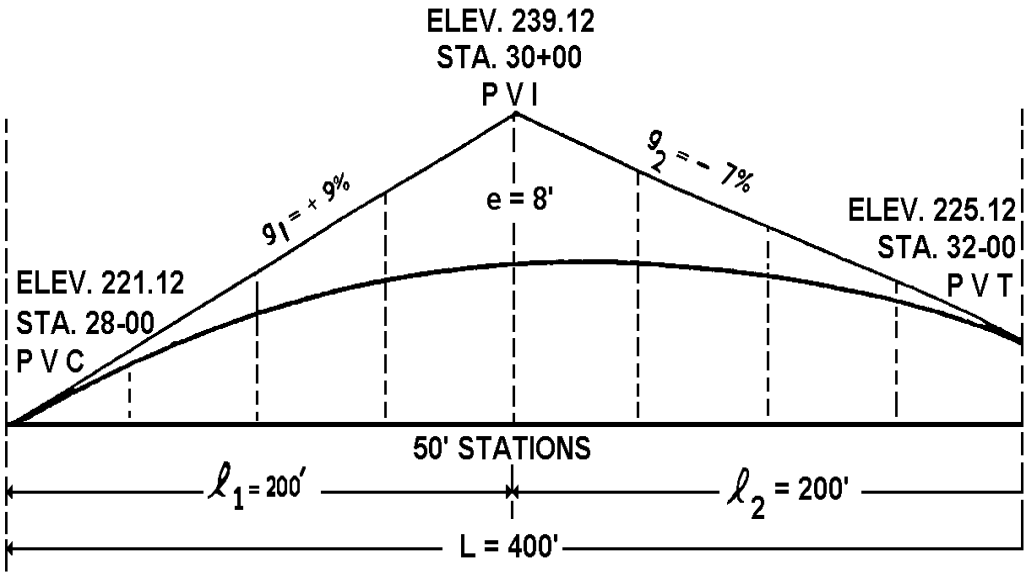


Figure 4

I. Given figure 4, describe the points for a vertical Curve.

j. Describe the procedure for plotting the mass diagram.

1) Name at least 4 methods of computing average end areas
2) Describe the procedure for determining volume between stations
3) What is Economic Haul Limit

* k. Explain the procedures for laying out a base line for building layout.

Skills marked with an * denotes critical skills. These must be explained or described correctly in order to continue and/or award the skill.

Minimum correct responses required to award skill is 8 of 11 questions.

420.2 Drafting II (Architectural)

1. Skill Definition.

   Individual will: Explain office safety and reporting of accidents; discuss footings and foundations; name framing components; explain roof pitch design; name materials and explain design factors for interior and exterior finishes; explain design methods for insulation, vapor barriers, and ventilation systems; explain and describe the process and information presented on a set of drawings; describe/explain the information and design methods contained on a floor plan, foundation plan, elevation views, sections and details, plumbing plan, and electrical plan.

2. Specific Skill Questions.

   a. Name the method used for prevention of safety mishaps and explain office safety procedures.

* b. Name and describe the purposes of framing components in platform or western framing from foundation to the roof.

   c. Describe the type of concrete foundation used to support heavy loads.

* d. Explain order/layout of sheets for a set of drawings and general information found on each.

   e. Given figure 1, explain roof pitch design.

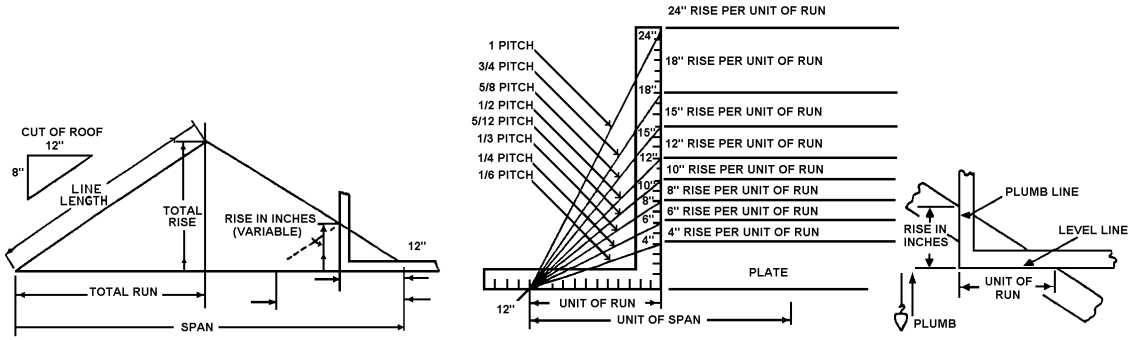


Figure 1

* f. Describe types of materials used for vapor barriers, ventilation systems, and insulation in interior and exterior construction.

g. Explain how information contained on the floor plan relates to other drawings.

h. Explain the process of checking and approving for a set of drawings.

I. Explain the importance of these details and sections.

1) Wall.
2) Door and Window.
3) Eave.

* j. Describe the layout/design of an isometric plumbing plan shown in figure 2.

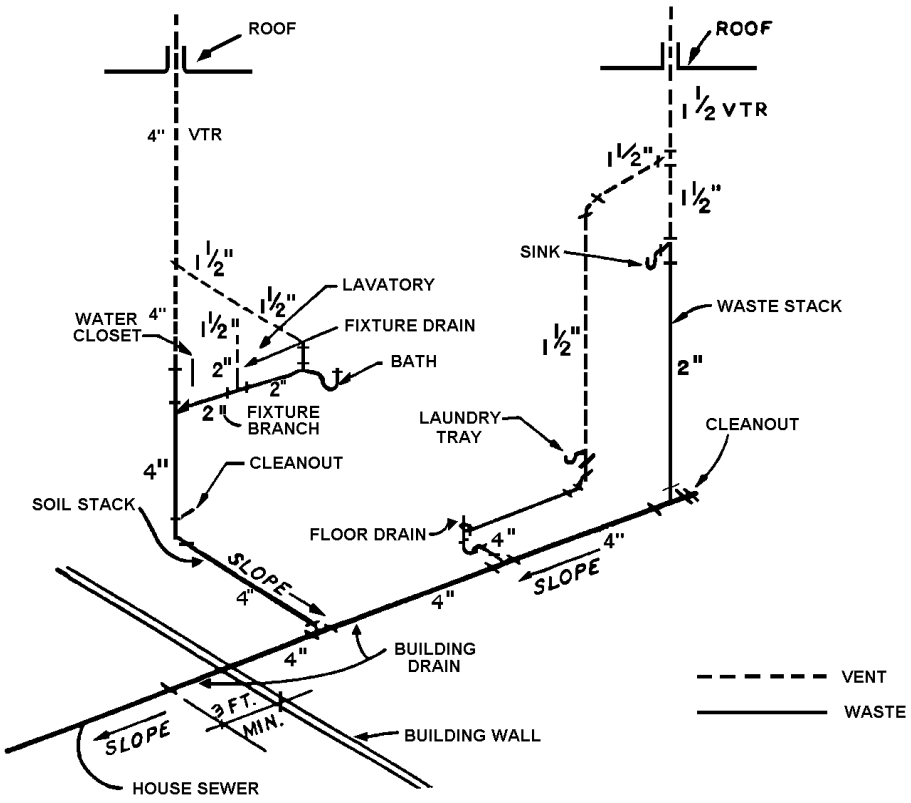


Figure 2

k. Describe the layout and design of the interior electrical plan shown in figure 3.

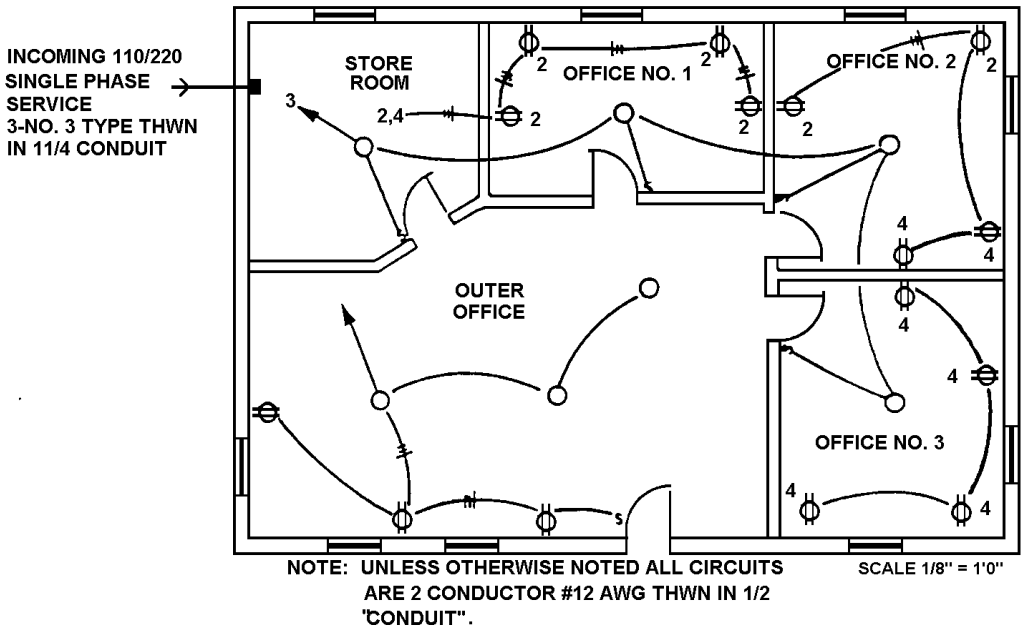


Figure 3

Skills marked with an * denotes critical skills. These must be explained or described correctly in order to continue and/or award the skill.

Minimum correct responses required to award skill is 8 of 11 questions.

441.1 Soils and Pavement Analysis II (Soils)

1. Skill Definition.

   Individual will: Explain soils lab safety and reporting of accidents; define and identify properties of soil; identify and explain elements of soil exploration; define and identify categories of the soil classification system; name and describe equipment, tests, and symbols for field identification of soils; name and describe tests performed in the lab for classification of soils; name equipment and explain the procedure for the lab and field, california bearing ratio test; describe the information contained on a soils stabilization report; name uses, objectives, and factors of soil stabilization; describe the properties and tests for soils stabilization.

2. Specific Skill Questions.

   a. Name the method used for prevention of safety mishaps, describe lab safety procedures and explain MSDS.

   b. Describe the information contained on the field notes and logs for soil exploration and investigation.

   c. Describe the physical characteristics of soils.

* d. Name the information that is recorded for a bore test exploration.

* e. Describe the procedure and results for the roll and thread test and wet shaking test.

* f. Describe the procedure for three of the five common field tests.

* g. Identify the letters and symbols used to classify soils. G, S, M, O, C, W, P, L, H, and pt.

   h. Describe the procedure for the liquid limit and plastic limit test.

* I. Describe the procedures for the soil compaction test and name the properties obtained.

   j. Describe the procedures for the California bearing ratio test, and state its purpose.

   k. Describe how properties of soils are altered for soil stabilization.

441.1 Soils and Pavement Analysis II (Soils)

1. Describe the procedure for breaking soil cement specimens.

_____

Skills marked with an * denote critical skills. These must be explained or described correctly in order to continue the interview or grant and/or award the skill.

Minimum correct responses required to award skill is 9 of 12 questions.

442.1 Soils and Pavement Analysis II (Bitumens)

1. Skill Definition.

   Individual will: Explain soils lab safety and reporting of accidents; define and identify properties of bituminous materials; define and identify field procedures for the identification of the different bituminous materials; describe the equipment used in the laboratory identification of bituminous.

2. Specific Skill Questions.

   a. Name the three types of asphalt products used in road surfacing.

   b. How is asphalt cement graded?

   c. What is the classification of asphalt cutback based on, and what are the three classifications?

* d. What is the classification of asphalt emulsion based on, and what are the three classifications?

* e. What road surface is the product of distilled coal?

* f. How are road tars graded?

* g. Name at least three of the five field tests for the identification of bitumen's.

   h. Describe the two apparatus in figure 1. below and their use.

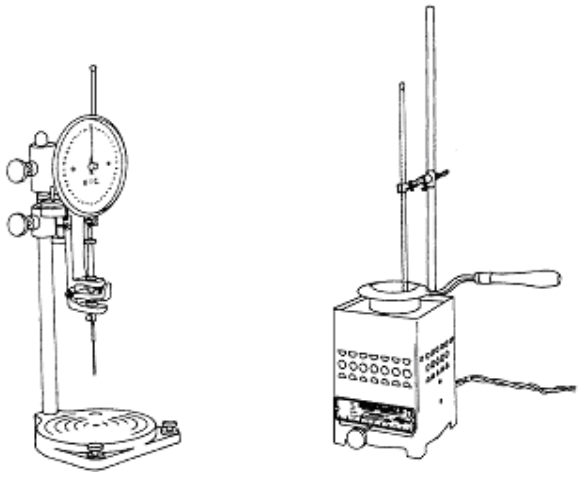


Figure 1

Skills marked with an * denote critical skills. These must be explained or described correctly in order to continue the interview or grant and/or award the skill.

Minimum correct responses required to award skill is 6 of 8 questions.

443.1 Soils and Pavement Analysis II (Concrete)

1. Skill Definition.

   Individual will: Explain soils lab safety and reporting of accidents; identify tools and equipment; name and explain procedures for testing aggregates for concrete; name the properties of concrete; describe the procedures for concrete mix design; identify equipment and materials needed for tests on concrete; describe the procedures for sampling and testing concrete cylinders and concrete beams.

2. Specific Skill Questions

   a. Name the method used for prevention of safety mishaps and explain lab safety procedures.

* b. Explain why the water/cement ratio is the deciding factor for all properties of concrete.

   c. Explain the importance of hard and dry aggregate.

   d. Describe the tests for impurities and soundness of aggregates.

   e. Name the five types of portland cement and the uses for Type 1 or type 1a.

   f. Explain the differences between accelerators and Retarders, and name one agent of each.

* g. Describe the procedure for Making and Curing Concrete Cylinders and Concrete Beams.

* h. Describe the procedure for Taking a Slump Test.

* i. Determine: (1) Compressive Strength PSI; and (2) Flexural Strength PSI, given the following information:

   1. $f'c = \frac{4P}{(3.14)(D)(D)}$ P = 142,000lbs, D = 6"

   2. $R = \frac{PL}{(b)(d)(d)}$ P = 6,000lbs, b = 6" d = 6", L = 18"

*j. What part of a concrete mix has the greatest effect on the strength and exposure characteristics?

*k. How is workability or consistency of a concrete mix measured?

*l. What are the two methods for determining a concrete batch design?

Skills marked with an * denotes critical skills. These must be explained or described correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award skill is 6 of 9 questions.

503.1 Planning and Estimating
515.2 Truck, Tractor, and Trailer Operations
519.1 Wrecker Operations (Tactical)
522.3 Asphalt Paving Operations III
523.1 Crushing and Screening Operations
523.2 Crushing and Screening Operations II
526.1 Soil Stabilization I
526.2 Soil Stabilization II
530.1 Water Well Drilling
536.1 Rock Drilling Operation
542.1 Scraper Operation
544.2 Grader Operation II
546.2 Crawler Tractor and Attachments II
548.1 Ditcher Operation
549.2 Front End Loader and Attachments II
590.1 Driver's License Examining and Mishap Reporting
592.1 Equipment Yard Supervisor
594.1 Dispatcher
596.1 Collateral Equipment Custodian
597.1 Tire Shop Custodian

503.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package; identify and explain the activity/work element estimates; levels I, II, and III; interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams; demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook; and describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Describe what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

* d. Describe the three sections of a division in job specifications.

   e. Describe the terms in figure 1.

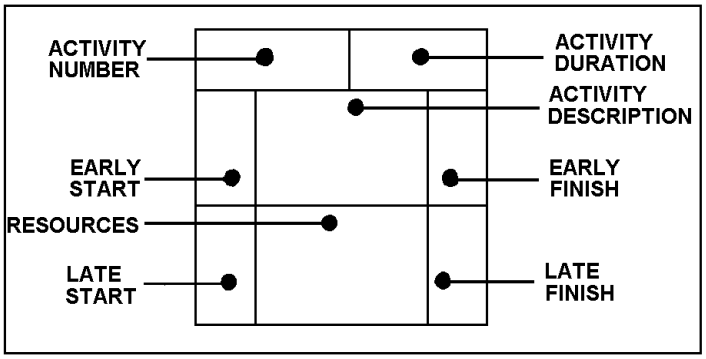


Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

g.* Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

I. Describe the following forms:

1) Master Activity Summary Sheet
2) Construction Activity Summary Sheet
3) Quality Control Plan
4) Safety Plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

k. Develop an equipment and tool estimate from a set of drawings and specifications.

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

a. Describe or explain the various parts of an engineers level.

b. Describe the purpose of construction stakes.

c. Describe or explain the features that can be located on a topographic map.

d. Describe or explain the purpose of a bench mark.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview and/or grant the skill.

Minimum correct responses required to award skill is 9 of 11 specific questions.

515.2 Truck, Tractor and Trailer Operations

1. Skill Definition.

The individual must perform operator's maintenance, prestart checks, lubrication, and operate dump trucks (commercial and tactical) for hauling loose material, cargo, stake truck, and tractors and trailers (commercial and tactical) for hauling pelletized materials using direct balance, secured brace and tie down methods to include spreading the loose material, chock, brace and tie down of construction equipment, apply vehicle recovery procedures and perform minor expedient road repairs.

2. Specific Skill Questions.

* a. Perform or describe operator pre start check on a commercial or tactical dump truck to include hydraulic tanks, rams and hoses, oil reservoir, proper light selection, headlights, turn signals, etc.

* b. Perform or describe operator pre start check on commercial or tactical cargo, stake trucks and tractor trailers.

* c. Perform or describe starting procedures for commercial or tactical cargo, stake, dump trucks and tractor trailers.

* d. Operate or describe commercial or tactical cargo, stake, and dump trucks to include shifting gears, double clutching from a higher gear into a lower gear, turning and backing.

* e. Perform or describe the coupling of the tractor to the trailer.

f. Identify or describe the major components of a commercial or tactical tractor trailer to include kingpin, base plate, landing gear, brake system, (including the glad hands, air hoses and trailer brakes), electrical system (including the running lights, connectors, and receptacles), and any accessories such as chocks crank, chains, binders, etc.

* g. Operate or describe a commercial or tactical tractor trailer to include shifting gears, double clutching from a higher gear into a lower gear, turning, backing and applying the trailer brakes in conjunction with the service brakes.

h. Perform or describe the distribution and securing of cargo using chains and binders to include bulk cargo and construction equipment.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 6 of 8 specific questions.

519.1 Wrecker Operation (Tactical)

1. Skill Definition.

   Individual must be able to perform pre-operational checks, operator's maintenance, and operate the wrecker for vehicle and equipment recovery utilizing ground anchors, field chocks, and winches with multiple part lines; operate the boom-type crane and place outriggers and boom jacks for heavy lifts; attach the anti-sway bar to vehicle by means of cable, or other grappling devices; calculate effort and tackle for heavy winch operation and prepare accident reports and liability release forms.

2. Specific Skill Questions.

* a. Perform or describe pre-operational checks, and daily operator maintenance requirements on the wrecker and tools required.

* b. Describe procedure or start unit and maintain equipment, winch, and crane.

* c. Identify or describe items to be observed during operation and take appropriate action as necessary.

* d. Perform or describe the steps necessary for the operation of the wrecker.

e. Identify potential safety hazards and take necessary action to eliminate or isolate safety hazards.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 3 of 5 specific questions.

522.3 Asphalt Paving Operations III

1. Skill Definition.

Individual must perform comprehensive pre, during and post operational maintenance checks on paving machines, asphalt distributor trucks, asphalt pavers, asphalt rollers, operate controls and system accessories for all phases of asphalt application; load the distributor truck; determine the mechanical operating condition of the distributor; replace worn or broken accessories; align accessories; preheat; apply prime, tack-coats, fog/seal-coats, road applications and hand spray; secure distributor system; clear and clean accessories including spray bars and pipelines; and maintain operational records and reports. Individual must perform as a member of an asphalt paving crew; work the three positions of the paving machine (Tractor Operator, Screed Operator and (Hopper Guide); operate asphalt rollers, observing proper rolling techniques for rolling hot laid asphalt, properly use and maintain asphalt related hand tools, observing all safety precautions pertaining to asphalt lay down operations. Individual must be able to coordinate activities of paving operations in the placement, rolling/tamping and hauling of asphalt or similar materials; measure slope and thickness of paving to verify compliance with specifications; provide an in-place density and assist in determining probable cause; estimate materials required, calculate number of trucks required to haul material from the plant to work site.

2. Specific Skill Questions.

* a. Identify or describe different types of asphalt.

b. Identify or describe aggregate characteristics and gradation appropriate for asphalt cements.

c. Perform or describe the operation for clearing and cleaning the spray bar and pipelines, also perform various application procedures (i.e., prime coat, tact coat).

* d. Perform as a screed operator or describe the factors that affect the process.

e. Perform or describe screed preheating operations.

* f. Perform or describe the three rolling operations typically used in asphalt lay down operations (i.e. breakdown, intermediate, finish).

* g. Perform or describe appropriate operations specific to asphalt lay down hand work requirements.

h. Describe the uses of the hand tools specific to asphalt operations.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview and/or grant the skill.

Minimum correct responses required to award the skill is 5 of 8 specific questions.

523.1 Crushing and Screening Operations

1. Skill Definition.

   Individual must be able perform pre-operational checks, maintain and lubricate plant. Observe flow of material through crusher and wash plant to prevent block up and stop machinery when clogged with material. Must be respirator qualified.

2. Specific Skill Questions.

* a. Perform or describe pre-operational checks on crushing, screening and wash plant.

   b. Identify results of neglect or improperly performed pre-operation checks and take or describe measures to rectify them.

* c. Perform or describe operation and maintenance procedures on crushing, screening and wash plant.

   d. Perform or describe control/coordination procedures required to operate crushing, screening and wash plant.

   e. Select and properly utilize or describe tools and equipment required to operate and maintain crushing, screening and wash plant.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 4 of 5 specific questions.

523.2 Crushing and Screening Operations II

1. Skill Definition.

   Individual must be able to explain, perform, maintain and select cone setting and screens to produce aggregate to specification; maintain, production/distribution records; schedule/ coordinate support equipment and direct and instruct crews in operation, maintenance, lubrication, and operational repairs of plants.

2. Specific Skill Questions.

* a. Describe or perform proper adjustments to Jaws, Cone, Screen assembly's, and conveyer belts.

* b. Perform or describe proper procedures in feeding and regulating flow of materials to jaws and cone assembly.

* c. Perform or describe proper shut down procedures and maintenance for the crusher, screen, wash plants, and conveyers.

* d. Perform or describe proper entries that is required to start-up and maintain Production, Machinery, and Aggregate Distribution records.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 4 of 4 specific questions.

526.1 Soil Stabilization I

1. Skill Definition.

   Individual must be able to perform pre-start check; report or repair discrepancies; perform operators lubrication on soil stabilizer and associated equipment; aerate wet and mix dry and wet materials; maintain specified mixing ratio; utilize system accessories; secure and maintain operational records and reports; must be respirator qualified.

2. Specific Skill Questions.

* a. Perform or describe the sequence of steps for pre-operational service on the soil stabilizer and associated equipment.

* b. Identify items that would be observed during the pre-operational check.

c. Select required tools, equipment and machinery during pre-operational and operational procedures or simulation.

* d. Identify safety precautions to be observed.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 3 of 4 specific questions.

526.2 Soil Stabilization II

1. Skill Definition.

   Individual must possess skill 526.1, plus direct personnel and control equipment engaged in grading, tamping, rolling and smoothing areas to specification i.e. airfields, streets, roads, etc; determine adequate mixing or pulverizing of materials; use leveling instruments to set and verify grade stakes and alignment of graded surfaces; interpret and use the principles and methods of soil stabilization operations to include grader mix and soil stabilizer operations.

2. Specific Skill Questions.

   a. Perform or describe procedures for setting and verifying grade stakes and their markings.

* b. Select and demonstrate or explain how to use the tools and equipment used to perform this procedure.

   c. Discuss appropriate principles and methods needed during various soil stabilization operations.

* d. Perform or describe the sequence of steps necessary for soil stabilization operations.

   e. Select and be able to use the proper agents used for soil stabilization.

   f. Demonstrate or explain proper safety precautions that must be observed.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 5 of 6 specific questions.

530.1 Water Well Drilling

1. Skill Definition.

   The individual must be respirator qualified, and be able to pre-start, setup, operate, add or remove all components of a drill string and perform preventive maintenance on a water well rig. Additionally, the individual must be able to construct and maintain a mud pit system, identify required tools and supplies, arrange and operate all support equipment, and perform in any assigned crew position.

2. Specific Skill Questions.

* a. Perform or explain the pre-starting and maintenance operations for the water well rig.

* b. Identify the different types of drill bits and their purposes.

c. Identify or describe all the water well support equipment, to include the doghouse, steel trailer, water truck, satellite station, 1200 gallon fuel truck, maintenance truck, tractor with trailer and a front end loader including all attachments.

d. Perform or describe all positions as a crew member of a water well team, to include: the tool pusher, driller, derrick hand, and floor hand (worm).

* e. Perform or describe the procedures involved in adding and removing drill steel.

f. Perform or describe in detail the procedures in completing a well, to include casing, gravel packing (if applicable), developing and all procedures involved in placing a sanitary seal.

g. Perform or describe various mud property tests, to include the marsh funnel, filter press, sand content, and the mud weight test.

h. Perform or describe geological and hydrological considerations that must be considered when selecting a water well site.

* I. Perform or describe the procedures involved in site preparations, to include: leveling the area, construction and purpose of mud pits, water well rig setup, and placement of all support equipment.

* j. Demonstrate or describe the safety procedures used when drilling, to include but not limited to proper use of personnel protective equipment.

k. Demonstrate or explain the use of the driller's log.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

536.1 Rock Drilling Operation

1. Skill Definition.

   The individual must be respirator qualified and perform operators service, prestart checks, lubrication and adjustments on the air trac or self contained rock drill. The individual also must be able to maneuver, set up, drill and secure the drill in accordance with the manufacturers operator's manual.

2. Specific Skill Questions.

* a. Identify the parts and functions of a rock drill (air trac or self contained) to include: drifter, boom, mast, chain feed, various drill bits, etc.

* b. Perform or describe procedures for drilling a hole to include preparing the drill string, collaring the hole, feed pressure, etc.

* c. Identify any problems that might arise when drilling and any possible corrective actions that can be taken to avoid such problems.

d. Perform or describe the securing procedures for a rock drill.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 3 of 4 specific questions.

542.1 Scraper Operation

1. Skill Definition.

   Individual must perform a prestart check; lube and service; correct and report deficiencies; remove, replace, install and tighten cutting edges and wear plates; adjust parking brakes and drive belts; service breathers, cleaners and fuel filters; start engine, check instruments; operate scrapers common to the NCF; operate the scraper utilizing steering assist, brake and differential lock; load the scraper with and without pusher tractor in sand, gravel, common earth, sticky material, stumps and boulders; haul and dump load in a 6 inch lift; put in rough-grade as indicated by grade stakes to within .10 of a foot; secure scraper and maintain records and reports.

2. Specific Skill Questions.

* a. Perform or describe sequence of steps necessary for the prestart of scrapers.

* b. Identify items to be observed during the pre-operational and operational service of the scraper.

c. Identify safety hazards and precautions to be observed.

d. Demonstrate the procedures for proper recording and reporting as it pertains to scraper operations.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 3 of 4 specific questions.

544.2 Grader Operation II

1. Skill Definition.

   The individual must perform operators maintenance, prestart checks, lubrication, and operate the grader to cut rough grade with a grader to within 0.2 feet of a proposed grade, replace tires, cutting edges, scarifier teeth, dress slopes, cut flat bottom and "V" ditches, make scarifier and blade adjustments and travel at high speeds shifting through all gears.

2. Specific Skill Questions.

* a. Perform or describe operator pre start check on a grader to include inspecting the blade, air cleaner, hydraulic lines and hoses, belts, etc.

* b. Identify the major components of a grader to include the engine, transmission, blade, circle assembly, scarifier, front leaning wheels, moldboard, etc.

* c. Identify the control levers of a grader to include starter switch, left and right moldboard lever, scarifier control lever, circle reverse lever, circle sideshift lever, leaning front wheel lever, transmission forward/reverse lever, transmission high/low range control, etc.

* d. Perform or describe shut down procedures for a grader.

* e. Position or describe the positioning of the blade for the different cutting methods of a grader to include ditch cut, high bank cut, reverse blading, mixing and rolling, spreading, shoulder pick up, leveling pass, marking cut, etc.

f. Perform or describe the positioning of a moldboard for transporting a grader on a tractor trailer or aircraft.

g. Perform or describe the methods of scarifying materials.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 5 of 7 specific questions.

546.2 Crawler Tractor and Attachments II

1. Skill Definition.

The individual must perform operators maintenance, prestart checks, lubrication, and operate the crawler tractor, replace and align cutting edges, end bits, track pads, etc. Perform the following operating techniques: push-cat operations, slot doze, side hill doze, clear and grub, use ripper teeth to cut out rocks, stumps, etc, side by side doze, do rough leveling, cross over ditches pivoting on the balance point to provide a smooth crossing, load and off load the tractor to include the proper securing methods using chains and binders.

2. Specific Skill Questions.

* a. Perform or describe operator pre start check on a crawler tractor to include inspecting the blade, cutting edges, ripper teeth, air cleaner, hydraulic lines and hoses, belts, etc.

* b. Identify the major components of a crawler tractor to include: the engine system, lubrication system, fuel and air induction system, cooling system, electrical system, hydraulic system, transmission system, trunnion braces, etc.

c. Perform or describe the operations of the winch, ripper and scraper attachments.

* d. Perform or describe the operations of the crawler tractor controls to include: transmission selector lock lever, transmission gear selection lever, decelerator pedal, throttle lever, steering levers, etc.

e. Identify the following blade types and their uses straight, angled, U-shaped, and rock rake.

* f. Perform or describe the loading and unloading of a crawler tractor to include proper tie down and safety procedures.

* g. Perform or describe the construction of a slot trench to include making a marking cut, maintaining a level work area, gradually increasing the depth of the ditch by maintaining the cut for the entire length of the ditch, maintaining a 4:1 ratio on entrance and exit ramps, backfilling and correcting any errors, etc.

Skills marked with an * denotes critical skills. These MUST be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 5 of 7 specific questions.

548.1 Ditcher Operation

1. Skill Definition.

   Individual must perform prestart check; correct or report discrepancies; remove and replace tires, buckets, bucket teeth, extensions, drive chain and links as appropriate; perform daily operator's lubrication and service; start unit and check instruments; walk the ditcher on and off either low-bed or tilt top trailer and lash down for transporting; adjust the tracks and bucket line chains; operate the ditcher and perform ditching operations maintaining vertical and horizontal alignment; maintain operational and trouble reports.

2. Specific Skill Questions.

* a. Perform or describe pre-operational check of the ditcher.

   b. Identify items that would be observed during the pre-operational, operational and maintenance service of the ditcher and take or describe appropriate steps to correct any discrepancies.

* c. Perform or describe proper safety procedures and take appropriate action to isolate potential safety hazards.

* d. Perform or describe proper ditcher operations vertical and horizontal control/coordination.

   e. Discuss the control/coordination required to perform ditcher operations.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 4 of 5 specific questions.

549.2 Front End Loader and Attachments II

1. Skill Definition.

   Individual must perform operators maintenance, pre-start checks, lubrication, and operate the front end loader with the four-in-one bucket, forklift, and backhoe attachments includes: remove and replace tires, teeth, cutting edges, backhoe and forklift attachments, load earth, sand, gravel, trash, etc into hauling equipment, use as a dozer to backfill trenches and pits and as a forklift to haul cargo.

2. Specific Skill Questions.

* a. Perform or describe operator pre-start check on a front end loader to include tires, hydraulic rams, lines, and hoses, fuel tank, belts, radiator level, etc.

* b. Identify the location of all levers, gauges, controls, and indicators, personal safety equipment, describe safety devices/warnings, overhead clearance, tipover hazards, etc.

c. Identify the functional controls of the front end loader to include steering, transmission, bucket control, emergency stop control, engine off control, service brakes, etc.

* d. Perform or describe the basic maneuvering operations of a front end loader to include: placing the front end loader in motion, raising, tilting, lowering the bucket, shifting the gears, driving forward and reverse, stopping, etc.

* e. Perform or describe various operations of the front end loader to include dozing, scraping, bucket loading, clamshell loading, placing a hauling unit to be loaded and loading it with material, etc.

f. Identify the different type of attachments and their uses.

* g. Perform or explain the changing of attachments of a front end loader to include four in one bucket, backhoe, forklift, including the safe guarding of the hydraulic system.

* h. Perform or describe the various operations of excavating pits and trenches with the backhoe attachment.

549.2 Front End Loader and Attachments II

I. Describe the special characteristics of the front end loader to include track mounted unit vs. rubber tired unit, capabilities, indicators, functional controls such as steering, decelerator pedal and transmission declutch, lift arm safety bar, etc.

Skills marked with an * denotes critical skills. These MUST be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 6 of 9 specific questions.

590.1 Driver's License Examining and Mishap Reporting

1. Skill Definition.

   The individual must have the ability to set up a license examiner and mishap investigation office, maintaining automotive and operator license files, records and reports. Conduct and score examinations and skill tests required for Automotive and Construction Equipment Operator licenses. Conduct investigations and prepare necessary forms and reports involving automotive and construction equipment mishaps in accordance with prescribed Navy Regulations.

2. Specific Skill Questions.

* a. Perform or describe the requirements for establishing a License Examiner's and Mishap Investigation Office.

* b. Perform or explain the steps necessary for conducting examinations and skill tests required for automotive licenses.

* c. Perform or explain the steps necessary for conducting examinations and skill tests required for construction equipment operator licenses.

d. Perform or describe the procedures for the issue and renewal of automotive and construction equipment operator licenses.

* e. Perform or describe the procedures for maintaining automotive and construction equipment operator license files and records.

* f. Perform or explain the procedures for conducting investigations and preparing necessary forms involving automotive and construction equipment mishaps.

Skills marked with an * denotes critical skills. These must be described or performed correctly in order to continue the interview or grant the skill.

Minimum correct responses required to award the skill is 5 of 6 specific questions.

592.1 Equipment Yard Supervisor

1. Skill Definition.

   Individual must identify the general responsibilities and requirements of a yard supervisor; be familiar with policy set by the Equipment Officer for management of the equipment yard; know equipment capabilities and capacities to safely accomplish tasks; and know the flow procedures as equipment is sent to the shop for repairs or preventive maintenance.

2. Specific Skill Questions.

   a. Describe the management of the equipment yard:

      1) Equipment wash rack and refueling station.
      2) Determining operator liability for new dents and damage.

* b. Explain the procedure for sending equipment to the shop:

      1) Initiating Operator's Inspection Guide and Trouble Report (Hard Card) and turning it into Dispatcher.

* c. Describe the procedures for cycling equipment:

      1) Unused equipment should be cycled (generally every week).
      2) Cycle equipment for one hour minimum and exercise attachments as applicable.

   d. Describe traffic control procedures in the equipment yard:

      1) Stop signs, one-way traffic, and speed limit.
      2) Parking lines, and areas such as ready-line and equipment awaiting shop.

   e. Describe who is responsible for completing the Operator's Inspection Guide and Trouble Report (Hard Card):

      1) The operator, with supervision of the Yard Boss or a member of his crew.

Skills marked with an * demote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 3 of 5 specific questions.

594.1 Dispatcher

1. Skill Definition.

   Individual must identify the general requirements, qualification and responsibilities of a dispatcher; be familiar with vehicle assignment policy; know the difference between A, B, and C assigned vehicles; know the different forms used and the duration which the forms are kept on file; and know how to maintain the equipment status boards, key security and key locker procedures.

2. Specific Skill Questions.

   a. Describe the requirements and qualifications of a dispatcher:

      1) Normally an EO1, controls the day-to-day equipment assignment and CESE usage
      2) Have good administrative, clerical, and record-keeping skills
      3) Should have knowledge of equipment sizes, types, uses, and limitations

   b. Describe the primary duties of a dispatcher:

      1) Efficiently manage equipment resources according to the equipment Officer's policies.
      2) Receive and evaluate requests for vehicles.
      3) Dispatch suitable equipment from authorized resources.

* c. Describe the three types of automotive vehicle assignments:

      1) Class"A" is the full time assignment; only authorized by CNO.
      2) Class"B" is a recurring assignment, usually on a weekly basis.
      3) Class"C" is all others assigned as "Pool" vehicles.

   d. What is the maximum percentage of vehicles that can be "B" assigned:

      1) 5 percent of the active fleet of CESE.

* e. Explain the procedures for keeping records of completed trip tickets and hard cards:

      1) File completed forms weekly with Dispatch Log.
      2) Forms are normally kept for 90 days unless otherwise directed.

f. Describe the elements of an equipment status board:

1) Lists all CESE by Equipment Cost Code.
2) Color coded to identify current equipment status, general assignment, and location of each vehicle.

g. Describe key control and key locker procedures:

1) Dispatcher controls keys to all vehicle locking devices and ignition switches

2) Dispatch office without a 24-hour watch must use locked key cases or cabinets to secure keys.
3) Spare keys will be maintained in the equipment history jackets.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue interview/grant the skill.

Minimum correct responses required to award skill is 5 of 7 specific questions.

596.1 Collateral Equipment Custodian

1. Skill Definition.

   Individual must know the different types of collateral equipage; be familiar with the various NAVSUP and DD forms used for the control, inventory, and ordering of collateral equipage; know the sequence of steps taken for the preventive maintenance of collateral equipage; and identify how to properly store and preserve the various attachments in collateral.

2. Specific Skill Questions.

   a. Name the two basic types of collateral equipage:

* b. Describe which form is used to record the inventory and location control of collateral equipage:

   c. Describe which form is initiated to replace damaged or lost collateral equipage:

* d. Explain the collateral custodians role during preventive maintenance of CESE:

   e. Describe the proper means of stowing and preserve attachments:

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 3 of 5 specific questions.

597.1 Tire Shop Custodian

1. Skill Definition.

Individual must have developed a working knowledge, through formal or on the job training, all safety precautions and procedures required in the operation and identification of the following tire shop custodian functions: identify causes of wear, identify rims utilized by the NCF, tire mounting, distinguishing difference's between bias and radial ply tires, and safety of the tire shop and tire shop operations.

2. Specific Skill Questions.

a. State the effects on a tire that has been under-inflated .

b. State the rims most commonly used by the military.

c. State the cause of the following tire conditions, excessive center tread wear, severe impact injury, excessive tire bounce.

d. State the method in which directional tires are mounted on earth moving equipment, on live axles and dead axles.

* e. State the difference between a Radial ply and a Bias ply tire.

* f. Explain why tire mismatching should NEVER be used.

* g. State the safe procedure for installing tires on rims with locking rings.

h. Why is it important to follow specific instructions in repairing tubeless tires.

* I. State the purpose of an approved safety cage and how to safely use it.

j. State why Bias ply and Radial ply tires should never be used together.

Skills Marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 10 specific questions.

603.1 Planning and Estimating
610.2 Arc Welding (Structural) II
612.1 Arc Welding (Pipe)
615.2 Gas Cutting and Welding II
615.3 Gas Cutting and Welding III
618.1 Shielded Inert Gas Welding
619.1 Maintenance Welder
620.2 Sheet Metal Work II
630.2 Steel Reinforcing II
634.2 Rigging II

603.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package; identify and explain the activity/work element estimates; levels I, II, and III; interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams; demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook; and describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, and manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Describe what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

* d. Describe the three sections of a division in job specifications.

   e. Describe the terms in figure 1.

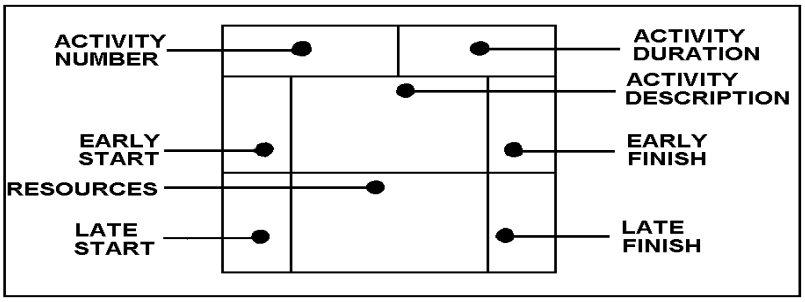


Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

* g. Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

i. Describe the following forms:

1) Master Activity Summary Sheet
2) Construction Activity Summary Sheet
3) Quality Control Plan
4) Safety Plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

k. Develop an equipment and tool estimate from a set of drawings and specifications.

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

a. Describe or explain the type of information found by reading notes and references on drawings.

b. Describe some of the types of aids used when planning and estimating a project.

c. Describe or explain the purpose of a bench mark.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 8 of 11 specific questions.

610.2 Arc Welding (Structural) II

1. Skill Definition.

   Individual must identify, set up, use and care for typical arc welding tools similar to those found in kit 80024. Have a thorough technical understanding of arc welding fundamentals, welding safety, arc welding machines, electrode classification and selection. Read and interpret construction drawings, including welding symbols. Specify welding procedures for shielded metal arc welding, including hard facing. Have the manual skills necessary to produce quality multiple pass fillet and groove welds, in all positions, on mild steel plate of unlimited thickness, using the shielded metal arc welding process.

2. Specific Skill Questions.

* a. Demonstrate or describe the common tasks involved in the set up and adjustment of an arc welder (generator motor or engine and transformer rectifier). Steps to include sequence, reasons for each and the results if not performed properly. Emphasize safety as it applies.

   (1) Connect welding leads
   (2) Energize or start (prestart if required)
   (3) Adjust controls (polarity and amperage)

   b. Identify shielded metal arc welding electrodes using the American Welding Society's method for classification to include:

   (1) First two or three numbers
   (2) The next number
   (3) The last number

   c. Identify welding symbol elements.

* d. Observe or explain safety precautions when using the shielded metal arc welding process to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

* e. Perform or describe material preparation and assembly of structural steel for welding. Steps to include:

   (1) Preparation of bevel angle and root face
   (2) Adjust polarity and amperage
   (3) Joint alignment with consistent root opening
   (4) Placement of tack welds and proper size

* f. Produce or describe a quality single vee groove weld, butt joint, on structural steel in the flat (1G), horizontal (2G), vertical (3G) and overhead position (4G), using the shielded metal arc welding process.

NOTE: Explain the differences in manual welding techniques for each weld pass(es) to include: Correct travel speed, arc length, electrode angles (work and travel) and electrode manipulation.

g. Perform or explain the sequence of steps for hard facing and explain the reasons for each. Identify electrodes, significant tools/equipment and principal materials used.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 4 of 7 specific questions.

612.1 Arc Welding (Pipe)

1. Skill Definition.

   Individuals must have a thorough technical understanding of welding safety, weld quality and uphill pipe welding procedures. Be able to properly prepare, assemble and tack weld pipe nipples as a necessary element for producing a quality weld. Have the manual skills necessary to produce quality groove welds on open root mild steel pipe in the vertical (2g) and horizontal (5G) fixed position, using the shielded metal arc welding process.

2. Specific Skill Questions.

   a. Explain safety precautions when using the shielded metal arc welding process to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

* b. Perform or describe material preparation and assembly of a pipe joint. Steps to include:

   (1) Preparation of bevel angle and root face
   (2) Machine setting, polarity and amperage
   (3) Joint alignment with consistent root opening
   (4) Placement of tack welds, proper size and number

* c. Produce or describe a quality single vee groove weld, butt joint, on steel pipe in the vertical fixed position (2G) and horizontal fixed position (5G) using the shielded metal arc welding process.

   NOTE: Explain the differences in pipe welding techniques for each weld pass(es) to include: Correct travel speed, arc length, electrode angles (work and travel) and electrode manipulation.

   d. Identify or describe the five essential welding variables controlled by the welder and the effects they have on weld quality if not properly maintained. Essentials to include: Electrode size, current, arc length, travel speed and electrode angle.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 2 of 4 specific questions.

615.2 Gas Cutting and Welding II

1. Skill Definition.

   Individual must identify, set up, use, care, maintain and order (using SKO Manual) typical gas cutting and welding tools similar to those found in kit 80004. Have a through technical understanding of oxyfuel gas cutting, welding and torch brazing fundamentals and welding safety. Read and interpret construction drawings, welding symbols, welding procedure specifications and welder performance qualification. Identify oxyfuel gas welding rods, brazing rods and heat treatment compounds. Have the manual skills necessary to flame cut mild steel, produce quality square groove welds in all positions on mild steel using the oxyfuel gas welding process, torch braze mild steel, stainless steel, brass and copper fillet welds in the horizontal (2F) position and cast iron groove welds in the flat (1G) position.

2. Specific Skill Questions.

   a. Describe the importance of a tool kit inventory.

   b. Identify welding symbol elements.

   c. Explain the purpose and list the welding variables found on the following welding documents:

      (1) Welding Procedure Specification
      (2) Welding Procedure Qualification Record
      (3) Welder Performance Qualification Test Record

   d. Identify or describe the primary and secondary use, including characteristics, of the following filler metals and heat treatment compounds:

      (1) Oxyfuel gas welding rods for mild steel and cast iron
      (2) General and high strength torch brazing rods
      (3) Silver brazing kits
      (4) Case hardening compound
      (5) Holding and heat-resisting compound
      (6) Molecular metal

* e. Observe or explain safety precautions when using the oxyfuel gas cutting, welding and torch brazing process to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

* f. Perform or describe oxyfuel gas cutting procedures for mild steel. Steps to include: Setting up the equipment, selecting the proper cutting tip, lighting torch, adjusting flame, position torch and cut material.

* g. Produce or describe a quality square groove weld, butt joint, on mild steel pipe in the 45° fixed (6G) position, using the oxyfuel gas welding process.

* h. Produce or describe quality fillet weld lap joints on mild steel, stainless steel, brass and copper in the horizontal (2F) position, using the torch brazing process.

I. Produce or describe a quality multiple pass groove weld on cast iron in the flat 1(G) position, using the torch braze welding process.

NOTE: Explain the differences in proper welding procedures for each process to include: Preparation of material, fluxing, positioning, flame adjustment, preheating, welding technique, post heat treatment, and post cleaning.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 9 specific questions.

615.3 Gas Cutting and Welding III

1. Skill Definition.

   Individual must possess skill level 2 plus have the knowledge and manual skills necessary to layout, calculate and flame cut pipe transitions using the field method (carpenters square) and special tools (contour marker, centering head, magnetic pipe level and prefabricated pipe wrap around) on mild steel pipe. Pipe layout to include miter turns, segmented turns, branch connections, Y connection and methods for blanking off pipe (orange peel or bull plug).

2. Specific Skill Questions

* a. Perform or describe procedures for dividing the outside circumference of a pipe into four equal parts.

* b. Perform or describe procedures for pipe layout on mild steel pipe using a carpenters square and bevel protractor (field method). Steps to include:

   (1) Establish a base line on the pipe
   (2) Determine proper amount of cut back
   (3) Mark off cut back measurements and label reference points
   (5) Use wrap-around to connect reference points and mark proper angle of cut.

   c. Demonstrate or describe procedures for pipe layout using the following special tools.

   (1) Centering head
   (2) Magnetic pipe level
   (3) Contour marker
   (4) Manufactured wraparounds

* d. Observe or explain safety precautions when using the oxyfuel gas cutting process to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

* e. Perform or describe oxyfuel gas cutting procedures using the radial and miter method on mild steel pipe. Steps to include: Setting up the equipment, selecting the proper cutting tip, lighting torch, adjusting flame, positioning torch and cutting material.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 4 of 5 specific questions.

618.1 Shielded Inert-Gas Welding

1. Skill Definition.

   Individual must identify, set up, use and care for typical arc welding tools similar to those found in kit 80096 (Gas Tungsten Arc Welding), kit 80009 (Gas Metal Arc Welding) and kit 82067 (welding arc 300 amp rectifier type). Have a thorough technical understanding of gas tungsten arc and gas metal arc welding fundamentals, shielding gases, arc characteristics and welding safety. Have the manual skills necessary to produce quality multiple pass fillet and groove welds on aluminum and mild steel plate, in all positions, using the gas metal arc welding (GMAW) process. Manual skills necessary to produce quality fillet welds on mild steel, stainless steel and aluminum, in the horizontal (2F) and vertical (3F) position, using the gas tungsten arc welding (GTAW) process.

2. Specific Skill Questions.

* a. Observe or explain safety precautions when using the gas metal arc and gas tungsten arc welding processes to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

b. Select or describe the proper shielding gas (inert or reactive) for welding mild steel, stainless steel and aluminum, when using the gas metal arc or gas tungsten arc welding processes.

* c. Demonstrate or describe the tasks involved in the set up and adjustment of an arc welder with gas metal arc welding equipment. Steps to include: sequence, reasons for each and the results if not performed properly. Emphasize safety as it applies.

   (1) Weld control unit set-up and connection to power source
   (2) Assemble spoolmatic gun (contact tube, gas nozzle and electrode wire)
   (3) Gas connection from cylinder to GMAW unit
   (4) Pre-weld adjustments: Select welding current (AC or DC with proper polarity) and amperage range, set shielding gas flow, select wire feed speed and adjust electrode wire stickout.

* d. Produce or describe a quality single vee groove weld, butt joint, on 3/8" mild steel plate, in the vertical (3G) and overhead (4G) position, using the gas metal arc welding process.

* e. Produce or describe a quality multiple pass fillet weld, tee joint, on 3/8" aluminum plate, in the vertical (3F) and overhead (4F) position, using the gas metal arc welding process.

NOTE: Explain the proper welding procedure and manual welding technique, for each base metal, when using the gas metal arc welding process to include: Preparation of material, joint assembly, pre-weld adjustments, fore hand/back hand welding method, correct travel speed, arc length, gun angles (work & travel) and gun manipulation.

f. Select or describe the proper gas tungsten arc welding electrode for welding mild steel, stainless steel and aluminum using the color code identification system.

* g. Demonstrate or describe the tasks involved in the set up and adjustment of an arc welder with gas tungsten arc welding equipment. Steps to include: sequence, reasons for each and the results if not performed properly. Emphasize safety as it applies.

(1) Rheostat control unit connection to power source
(2) Assemble GTAW torch (collet, collet body, nozzle, electrode and torch cap) and connect to power source
(3) Gas connection from cylinder to power source
(4) Pre-weld adjustments: Select welding current (AC or DC with proper polarity) and amperage range, set shielding gas flow rate, select high frequency setting, prepare tungsten electrode tip configuration and adjust electrode extension.

* h. Produce or describe quality fillet weld lap joints, tee joints and square groove butt joints on 14 gage mild steel, 16 gage stainless steel and 11 gage aluminum in the horizontal (2F) and vertical (3F) position, using the gas tungsten arc welding process.

NOTE: Explain the proper welding procedure and manual welding technique, for each base metal, when using the gas tungsten arc welding process to include: Preparation of material, joint assembly, pre-weld adjustments, correct travel speed, arc length, torch angles (work & travel), torch manipulation and filler metal manipulation.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 8 specific questions.

619.1 Maintenance Welder

1. Skill Definition.

   Individual must have a thorough technical understanding of welding theory & application, weld joint geometry and welding terminology, properties of metals, basic welding metallurgy, weld and base metal discontinuities, reinforcement for construction equipment, welding safety and oxyfuel gas welding (OFW), torch brazing (TB), shielded metal arc welding (SMAW) and gas tungsten arc welding (GTAW) process fundamentals. Use the NCF Welding Materials Handbook (P-433) to select filler metals, electrodes and heat treatment compounds. Have the manual skills necessary to cut and gouge metals, using the air carbon arc and shielded metal arc cutting processes. Produce successful welding repairs on ferrous and non-ferrous metals, under adverse conditions, using the oxyfuel gas welding, torch brazing, shielded metal arc and gas tungsten arc welding processes.

2. Specific Skill Questions

   a. Identify weld joint nomenclature, types of joints and types of welds.

   b. Describe the procedures or identify various metals (ferrous and nonferrous) using the following metal identification methods: Appearance, magnetic test, spark test, chip test, fracture test and flame test.

   c. Use or describe thermal, mechanical and heat treatment methods to reduce or eliminate residual welding stresses in weldments. Methods to include: Preheat, postheat, peening, annealing, normalizing, quenching and tempering.

   d. Identify or describe weld and base metal discontinuities to include: Incomplete fusion, porosity, incomplete joint penetration, undercut, spatter, slag inclusions, overlap, underfill, cracks, distortion, excess convexity, excess concavity and excess weld reinforcement.

   e. Use or describe the following basic types of reinforcement for construction equipment.

(1)	Plate stiffener	(6)	Standard beam
(2)	Corner reinforcement	(7)	Gusset reinforcement
(3)	Mounting plate	(8)	Step plate reinforcement
(4)	Hole reinforcement	(9)	Radius wrapper
(5)	Tapered reinforcement	(10)	Angle wrapper

f. Describe the NCF Welding Materials Handbook (P-433) to identify the characteristics and uses of shielded metal arc welding electrodes, oxyfuel gas welding and torch brazing filler metals, air carbon arc and shielded metal arc cutting electrodes and heat treatment compounds.

* g. Observe or explain safety precautions when using the oxyfuel gas welding, torch brazing, shielded metal arc and gas tungsten arc welding processes to include: Personal safety, slipping/tripping hazards, eye hazards, compressed air hazards and fire hazards.

* h. Perform or describe the procedures for preparing, assembling and welding aluminum, stainless steel and mild steel to cast iron, using the shielded metal arc welding process. Steps to include:

(1) Preparation of material, bevel angle and root face (if necessary)
(2) Machine setting, polarity and amperage
(3) Proper electrode selection (using P-433)
(4) Joint alignment with consistent root opening (if necessary)
(5) Placement of tack welds and proper size
(5) Preheating and post heat treatment (if necessary)

* I. Perform or describe the procedures for preparing, assembling and welding mild steel to cast iron using the arc braze welding process. Steps to include:

(1) Preparation of bevel angle, root face and weld area
(2) Machine setting, polarity and amperage
(3) Proper electrode selection (using P-433)
(4) Joint alignment with consistent root opening
(5) Placement of tack welds and proper size
(6) Preheat and post heat treatment

NOTE: Explain the differences in manual welding techniques for shielded metal arc welding to include: correct travel speed, arc length, electrode angles (work and travel) and electrode manipulation.

j. Cut/Gouge or describe the procedures for cutting/gouging ferrous and non-ferrous metals using the air carbon arc and shielded metal arc cutting processes. Steps to include: Machine setting, polarity and amperage, set air pressure (if required), electrode selection and use proper cutting/gouging techniques.

* k. Produce or describe quality fillet weld lap joints on stainless steel, brass and copper in the horizontal (2F) position, using the torch silver brazing process.

* l. Produce or describe a quality multiple pass groove weld on cast iron in the flat 1(G) position, using the torch braze welding process.

NOTE: Explain the differences in proper welding procedures for each process to include: Preparation of material, fluxing, positioning, flame adjustment, preheating, welding technique, post heat treatment, and post cleaning.

m. Select or describe the proper shielding gas and gas tungsten arc welding electrodes (using the color code identification system) for welding stainless steel and aluminum with the gas tungsten arc welding process.

* n. Perform or describe the tasks involved in the set up and adjustment of an arc welder with gas tungsten arc welding equipment. Steps to include: sequence, reasons for each and the results if not performed properly. Emphasize safety as it applies.

(1) Rheostat control unit connection to power source
(2) Assemble GTAW torch (collet, collet body, nozzle, electrode and torch cap) and connect to power source
(3) Gas connection from cylinder to power source
(4) Pre-weld adjustments: Select welding current (AC or DC with proper polarity) and amperage range, set shielding gas flow rate, select high frequency setting, prepare tungsten electrode tip configuration and adjust electrode extension.

* o. Produce or describe quality fillet weld, tee joints and square groove weld, butt joints on 16 gage stainless steel and 11 gage aluminum in the flat (1G) and horizontal (2F) position, using the gas tungsten arc welding process.

NOTE: Explain the proper welding procedure and manual welding technique, for each base metal, when using the gas tungsten arc welding process to include: Preparation of material, joint assembly, pre-weld adjustments, correct travel speed, arc length, torch angles (work & travel), torch manipulation and filler metal manipulation.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 11 of 15 specific questions.

620.2 Sheet Metal Work II

1. Skill Definition.

   Individual must identify, use and care for typical sheet metal tools similar to those found in kit 80021. Have a thorough technical understanding of sheet metal layout, fabrication, installation and safety practice fundamentals. Read and interpret construction drawings and specifications, include heating and ventilation duct system elements and sheet metal symbols. Have the manual skills necessary to layout, fabricate and install quality sheet metal shapes using hand tools and sheet metal equipment.

2. Specific Skill Questions.

   a. Describe the proper use of tools and equipment for sheet metal layout, fabrication and installation. Tools to include: T square, triangles, protractor, architect scale, compass, french curves, sheet metal brakes, slip roll forming machine, squaring shear, beading machine, crimping machine, ring and circle shears, bar folder and spot welding machine.

   b. Identify makeup of blueprints and construction drawings.

      (1) Blue prints to include basic lines, views (orthographic projection), notes and specifications, title block, bill of material, dimensioning, scale, tolerance and drawing sets (master print, assemble print, sub-assemble and detail).

      (2) Constructions drawings to include types of construction drawings (plans, elevations, details, schedules and framing), contents and order (title sheet, plot plan, architectural, structural, mechanical, plumbing and electrical).

   c. Identify or describe elements of heating and ventilation duct systems to include plant, bonnet/plenum, ducts, registers/grills and fan/blower.

   d. Identify or describe contents and order of construction specifications to include general, site work, concrete, masonry, metals, carpentry, moisture protection, doors, windows and glass, finishes, specialties, equipment, furnishings, special construction, conveying systems, mechanical and electrical.

* e. Observe or explain safety practices that apply to the layout, fabrication and installation of sheet metal shapes to include: General shop safety, hand tool safety, metal cutting and bench tools, soldering equipment, cutting machines, forming machines, portable machine tools and mishap reporting methods.

* f. Layout simple and complex sheet metal shapes using parallel, radial and triangulation line development. Shapes to include:

(1) Drip pan
(2) Tool box
(3) Two piece 90° elbow
(4) T-joint
(5) Cone frustrum
(6) Galley hood
(7) Square to round transition
(8) Transition elbow

* g. Fabricate or describe the procedures for fabricating simple and complex sheet metal shapes using hand tools and shop equipment.

* h. Install or describe the procedures for installing sheet metal duct work with different fastening methods to include: "S" cleats and drive cleats, rivets, soldering and spot welding.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 5 of 8 specific questions.

630.2 Steel Reinforcing II

1. Skill Definition.

   Individual must use and care for basic hand tools required to cut, place and tie reinforcing steel. Have a thorough technical understanding of reinforcing steel types, characteristics, concrete strength factors, placement procedures, bending schedules, safety practices and have the manual skills necessary to cut, place and tie reinforcing steel according to construction drawings, bending schedules and placing plans.

2. Specific Skill Questions

   a. Explain the strength factors that effect concrete to include tensile strength, compression strength and shear strength.

   b. Identify or describe reinforcing steel and welded wire fabric using steel mill indication to include bar sizes and grades.

   c. Identify or describe the types and typical bends of reinforcing steel to include: Plain and deformed bars; truss bar, stirrup, tie, radius bend, spiral, offset column bars and hooks.

* d. Develop or describe bending schedules for steel reinforcement from construction drawings.

* e. Observe or explain safety while cutting, bending and tying steel reinforcement.

* f. Cut and bend or describe the procedures for cutting and bending steel reinforcement utilizing bending tables, jigs, templates, power shears and power benders, according to bending schedules.

* g. Place or describe the procedures for placement of steel reinforcement, allowing for proper concrete coverage, according to construction drawings and placement plans.

* h. Tie or describe the procedures for tying steel reinforcement utilizing standard tying methods. Ties to include: Snap, double strand snap, wall tie, saddle tie, saddle tie with a twist and cross tie or figure eight.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 5 of 8 specific questions.

634.2 Rigging II

1. Skill Definition.

   Individual must identify, set up, use and care for typical rigging tools similar to those found in kit 80022. Have a thorough technical understanding of rigging and hoisting fundamentals, safe working load formulas, fiber line and wire rope construction, care and maintenance. Have the manual skills necessary to cut, splice and tie fiber line, calculate safe working loads and mechanical advantages, reeve simple block and tackle combinations and lay out, rig and erect various hoisting devices with manmade hold fasts.

2. Specific Skill Questions

   a. Identify or describe the types, sizes and construction of fiber line to include: manila fibers, sisal fibers and hemp fibers, construction of line (fibers, yarns and strands) and lays (hawser, shroud and cable laid).

   b. Observe or describe proper procedures for the care, inspection and handling of fiber line to include: Procedures for cleaning, stowing methods, inspecting methods (external and inner fibers, strands and yarns), handling methods, coiling and uncoiling, faking and flemishing.

* c. Tie basic knots, bends and hitches that are used in rigging and hoisting operations to include: Square knot, single and double becket bend, single and double bowline, running bowline, bowline on a bight, spanish bowline, half hitch, clove hitch, stopper hitch, sheep shank, barrel hitch and scaffold hitch.

* d. Splice fiber line. Splices to include: Eye splice, back splice, short splice and long splice.

   e. Identify or describe the construction of wire rope to include: Wires, strand combinations, core and lays (right and left regular, right and left lang, reverse lay).

   f. Observe or describe proper procedure for the care, lubrication, inspection and handling of wire rope to include: Unreeling wire, avoiding kinks, coiling procedures, handling procedures, storage procedures, methods for lubricating and proper inspection procedures.

* g. Compute safe working loads and determine mechanical advantages of rigging gear to include: Fiber line, wire rope, hooks, shackles, chains, wire rope clips, size line needed for known load, size line needed with tackle combinations for known load, safe working load of a tackle system, length of line needed for reeving blocks and force needed to lift known load.

* h. Reeve or describe the procedures for reeving simple block and tackle combinations to include: Single whip, gun tackle, inverted gun, single luff, twofold purchase, double luff tackle and threefold purchase.

* I. Rig and erect or describe the procedures for rigging and erecting hoisting devices to include: Gin pole, shear legs ("A" frame) and tripod.

* j. Construct or describe the procedures for constructing hold fasts to anchor hoisting devices. Hold fasts to include: Single picket, combination picket, combination log picket and log deadman

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Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 6 of 10 specific questions.

SECTION VII

703.1 Planning and Estimating
710.2 Plumbing and Pipefitting II
720.2 Shore-Based Boilers II
730.2 Pumps and Compressors
750.1 Sewage Disposal and Field Sanitation
760.1 Air Conditioning and Refrigeration

SECTION VII

703.1 Planning and Estimating

1. Skill Definition.

   Individual must interpret construction drawings and specifications; prepare material, equipment, and manpower/labor estimates; describe the contents of an NCF construction project package ; Identify and explain the activity/work element estimates; levels I, II, and III; Interpret and prepare critical path method (CPM) schedules, activity blocks of a precedence diagrams. Demonstrate use of Federal Supply Catalogs/Manuals and NAVFAC P-405, Seabee Planners and Estimators Handbook. Describe some of the various forms used in construction project estimating.

2. Specific Skill Questions.

   a. Describe the types of estimates (work, material, equipment, and manpower/labor); sources of conflicts between drawings, blueprints, project specifications and explain the differences.

   b. Describe the NAVFAC P-405 as it pertains to rate specific manpower/labor estimates.

* c. Explain why an estimator compares the material take off sheet against the project bill of material.

* d. Explain what information can be obtained from:

   1) foundation plan
   2) floor plan
   3) elevations
   4) sections and details

   e. Describe the terms in figure 1.

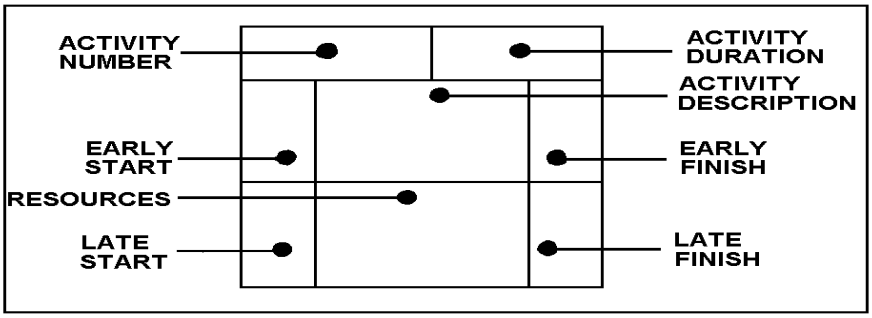

Figure 1

f. Describe a precedence diagram and define the following terms.

1) activities
2) events
3) connectors
4) durations
5) forward pass
6) backward pass
7) critical path
8) ES, EF, LS, LF

* g. Describe the contents of an NCF project construction package.

h. Explain what type of activities or information are included on a level I, II, and III.

i. Describe the following forms:

1) master activity summary sheet
2) construction activity summary sheet
3) quality control plan
4) safety plan
5) NAVSUP 1348 and 1250

j. Briefly describe resource leveling.

k. Develop an equipment and tool estimate from a set of drawings and specifications.

3. The following rate specific planning and estimating questions will be asked of each interviewee in order to award the skill.

a. Describe or explain an isometric drawing of a plumbing system.

b. Describe or explain 10 mechanical symbols for standard plumbing, piping and valves.

Skills marked with an *denotes critical skills. These must be described or performed correctly in order to continue the interview/grant the skill.

Minimum correct responses required to award skill is 9 of 11 specific questions.

710.2 Plumbing & Pipefitting II

1. Skill Definition.

   Individual must be able to use blueprints and specifications to determine grade, bedding, materials, and backfilling requirements for sewer and water distribution projects. Establish rough-in measurements, locate risers, and position of sleeves in footings, floors, and walls for rough-in plumbing. Read and interpret grade stakes used in laying out trenches; use batter boards and grade lines; specify the size and location of thrust blocks; perform hydrostatic and gravity tests on newly installed piping systems. Install corporation stops and saddle tees with water distribution systems under pressure. Maintain and troubleshoot faults associated with faucets, valves, pressure regulators, fire hydrants, and galley equipment.

2. Specific Skill Questions.

* a. Draw an isometric drawing of a plumbing system using mechanical blueprints with a plumbing floor plan, specifications and drafting materials.

* b. Size a sanitary system (drains, waste and vent-DWV) when given an isometric drawing and drainage fixture tables.

* c. Size the hot and cold water supply of a single story residential dwelling when given an isometric drawing and fixture demand tables.

d. Perform or describe the installation and testing procedures of a water distribution system when given tools, materials, and safety equipment.

e. Describe maintenance and troubleshooting procedures for residential plumbing, valves, pressure regulators, fire hydrants, and galley equipment.

f. Explain site requirements, set-up procedures, and operations for performing pressured taps to water mains, while observing safety precautions.

Note: Interviewer must provide equipment

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 5 of 6 specific questions.

720.2 Shore-Based Boilers II

1. Skill Definition.

   Individual must be able to operate packaged firetube boilers (up to 100 hp) and auxiliary equipment such as feedwater pumps, condensate return pumps, and heat exchangers. Operation includes pre-start checks, firing off burner, operational safety checks, combustion efficiency checks, securing, and logging all operating conditions. Maintain packaged firetube boilers and auxiliary equipment, using test equipment, hand and power tools, and manufacturer's maintenance manuals. Adjust and maintain steam operating limits, high limit controls, low oil pressure controls, draft failure switches, water level controls, and modulating damper motors. Perform operational tests on flame failure controls. Perform fireside and water side maintenance on packaged firetube boilers, to include replacing refractory, fire tubes, gaskets, and safety valves. Perform auxiliary equipment repairs to feedwater pumps, steam traps, strainers, pressure reducing valves, temperature regulating valves, main steam stops, root valves, and heat exchangers.

2. Specific Skill Questions.

   a. List the steps of a boiler steam cycle.

* b. List the components of a packaged firetube boiler.

* c. Identify the location and functions of boiler fittings. (Refer to figure 1)

* d. Identify the functions, location, design and installation requirements of boiler auxiliary equipment. (Refer to figure 2)

   e. Identify the characteristics, location, and functions of boiler controls and controlled devices.

   f. Perform or describe the steps to operate a packaged firetube boiler.

   NOTE: Ensure interviewee adhere to the following safety precautions:

   (1) Pre-watch assumption checks.

   (2) Pre-operational checks.

(3) Procedures for lining up system.

(a) water
(b) oil
(c) steam
(d) electrical

(4) Operational procedures required to light off boiler and place in service.

(5) Operational safety checks.

(6) Combustion efficiency tests.

(7) Securing procedures.

g. Test or describe boiler efficiency by obtaining flue gas analysis, net stack temperature, draft reading and smoke particle test when given a boiler in operation, boiler efficiency test kits, tools and safety equipment.

h. Perform or describe maintenance and system adjustment on a gun-type burner assembly.

* I. List the steps for maintenance and system adjustment to the following controls and controlled devices:

(1) Pressure controls:

(a) operating limit
(b) high limit
(c) low oil pressure cut out

(2) Water level controls (feedwater/low water):

(a) Combination float mercury type
(b) Three electrode type
(c) Two electrode type

(3) Flame failure controls:

NOTE: No adjustments or repairs can be made to flame failure controls, except by the manufacturer.

(4) Draft failure controls:

NOTE: No adjustments or repairs can be made to draft failure controls, except by the manufacturer.

(5) Solenoid valves

(6) Programmer

NOTE: No adjustments or repairs can be made to a programmer, except by the manufacturer.

j. List the steps and procedures of performing fireside maintenance on a packaged firetube boiler.

k. List the steps and procedures of replacing damaged or defective fire tubes.

l. Describe the process of damaged or defective refractory.

m. List the effects of inadequate boiler waterside treatment.

* n. Identify the maintenance requirements, and system adjustments of the following boiler auxiliary equipment components:

(1) Steam stop
(2) guard and root valves
(3) Pressure reducing valve
(4) Temperature regulating valve
(5) Heat exchanger
(6) Strainer
(7) Steam trap
(8) Condensate make-up tank
(9) Feed pump
(10) Relief valve
(11) Chemical feeder
(12) Feed stop valve
(13) Feed check valve

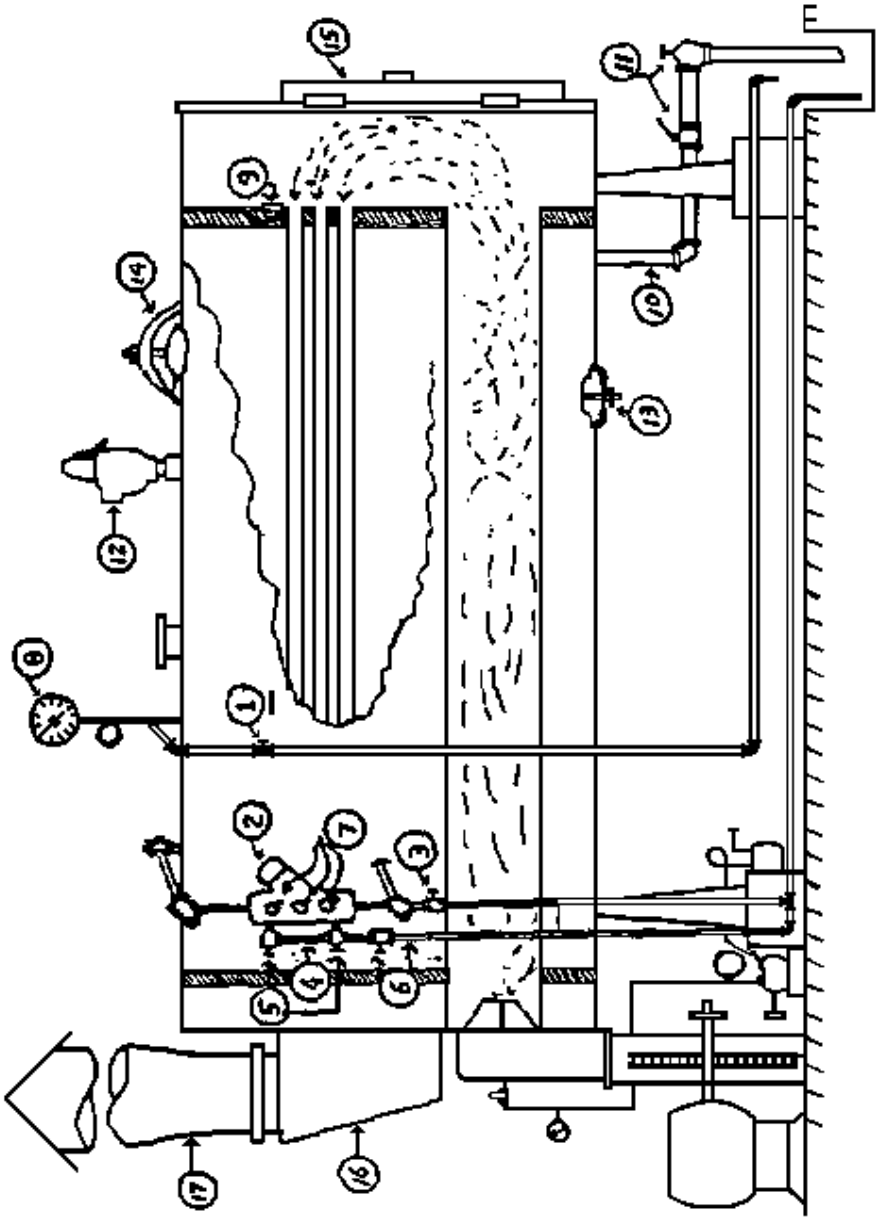

Figure 1

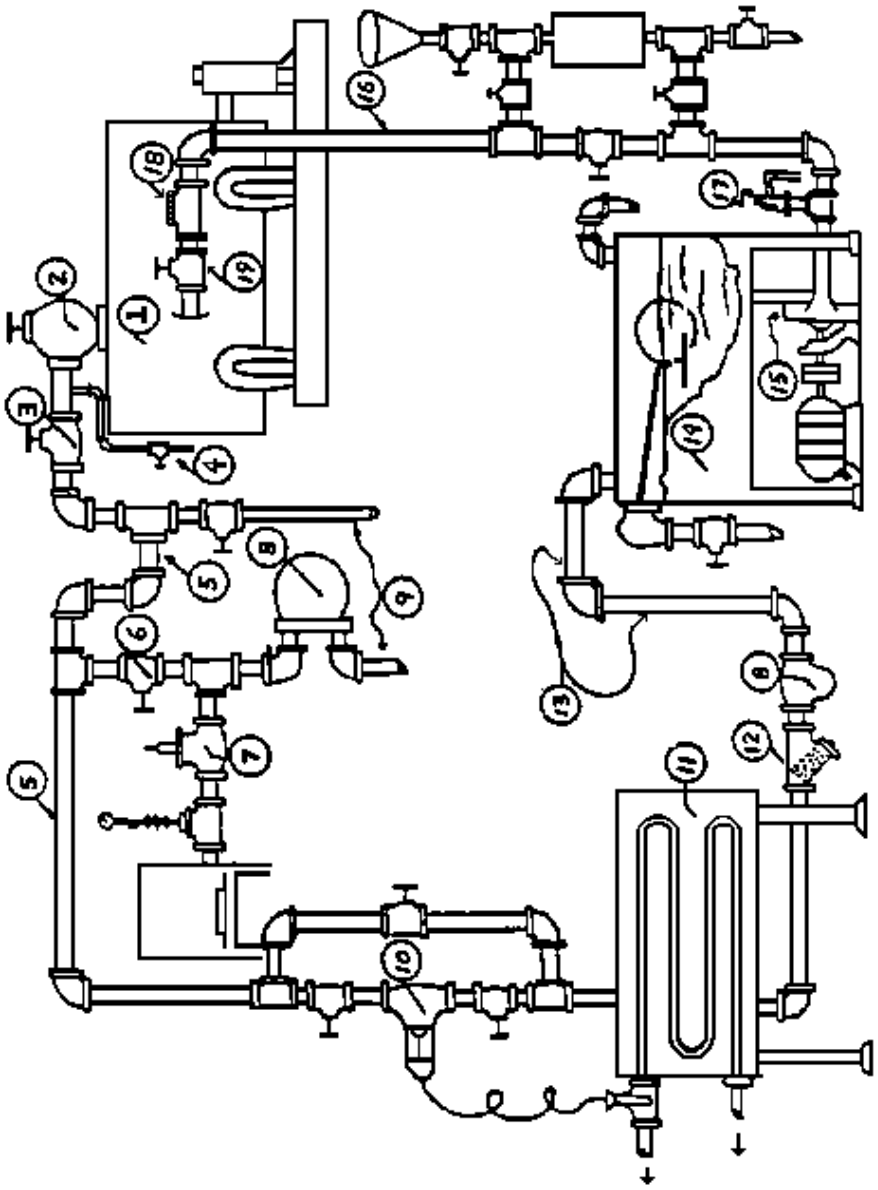

Figure 2

720.2 Shore-Based Boilers II

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 11 of 14 specific questions.

730.2 Pumps and Compressors

1. Skill Definition.

Individual must select, use, and care for tools, equipment, and materials required to install pumps and compressors, including the prime mover. Operate and perform operator's maintenance on internal combustion engines, and on pumps and compressors. Maintain logs of operating conditions. Perform preventive maintenance on low capacity electrical stationary compressors. Diagnose faulty operation of pumps and compressors. Repair and adjust pumps and compressors to obtain optimum operational capabilities.

2. Specific Skill Questions.

* a. List five different types of pumps, and identify their uses.

(1) suction lift

(2) centrifugal

(a) closed vane
(b) semi-closed vane
(c) open vane

(3) rotary

(4) air lift

(5) reciprocating

(a) diaphragm
(b) well pump

* b. List four types of prime movers, and identify their applications.

(1) electric motor
(2) pneumatic
(3) internal combustion engine
(4) steam turbine

c. List common pump inspection items, and maintenance procedures.

d. Identify the various tools, and their uses, for pump installation, and repair.

e. Perform or describe the installation a centrifugal pump, and prime mover (electric motor). Perform pump alignment with a dial indicator.

f. Perform or describe the procedures to repair a leaking stuffing box gland on a centrifugal pump.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 4 of 6 specific questions.

750.1 Sewage Disposal and Field Sanitation

1. Skill Definition.

   Individual must be able to install and properly size advanced base sewage leaching fields, cesspools, and septic tanks. Apply operating principles of advanced base sewage disposal systems. Test for soil leaching capacity. Install typical advanced base field latrines.

2. Specific Skill Questions.

   a. List the effects of improper sewage disposal.

   b. List the steps, and define the installation procedures of sewage disposal and field sanitation systems.

* c. State the steps of conducting a soil percolation test. List the desirable qualities of soil for leaching. List the desirable qualities of topographical locations for sewage disposal and field sanitation systems.

* d. State the characteristics of a cesspool. List the procedures for cesspool installation.

* e. State the characteristics of a septic tank. List the procedures for septic tank installation.

* f. State the characteristics of a leach field. List the procedures for leach field installation.

* g. State the characteristics of advanced base field latrines. List the procedures for field latrine installation.

   h. Describe the principles of sewage disposal and list the effects.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 6 of 8 specific questions.

760.1 Air Conditioning and Refrigeration

1. Skill Definition.

Individual must identify the four major components of an Air Conditioning and Refrigeration system. Describe the characteristics and function of each major component of an AC&R system. Identify proper High and Low side pressures using a temperature pressure chart. Understand the use of the service gauge manifold. Identify four AC&R accessories and function of each accessory. Perform the setting of High and Low pressure controls for cut in and cut out pressures in relation to Box Temperature. Describe basic electrical trouble shooting. Explain line up and operational procedure of a package refrigeration unit. Discuss the EPA requirements of a type one and two refrigeration certification.

2. Specific Skill Questions.

* a. Describe the four major components of an AC&R system.

b. Identify the state of refrigerant as it passes from the low to the high side of the compressor.

c. Explain the state of refrigerant in the tail coil of the evaporator.

d. Explain the state of refrigerant as it passes through the condenser.

* e. Identify four types of metering devices and proper methods of adjustment of superheat.

* f. Calculate the high side operating pressure with an ambient temperature of 80 degrees using R-12 and the pressure temperature chart. (figure 1)

* g. Calculate the low side operating pressure with a box temperature of 38 degrees using R-12 and the pressure temperature chart. (figure 1)

* h. Perform or describe the tasks involved setting up a service gauge manifold to an AC&R system.

I. Calculate the setting of a low pressure motor control to maintain a box temperature of 20° to 30° (assume an evaporator temperature difference (TD) of 10° using R-12. (figures 1 and 2)

j. Demonstrate the electrical trouble shooting technique, (Hopscotch). utilizing figure 3.

* k. Identify the effects of HFC refrigerants on the ozone and what chemical is responsible for ozone depletion.

Skills marked with an * denote critical skills. These must be described or performed correctly in order to continue the interview.

Minimum correct responses required to award skill is 8 of 11 specific questions.

Figure 1, Pressure Temperature Chart.

VAPOR PRESSURES

TEMP ^{0}F	113	141b	123	11	114	134a	12	500	22	502	13	503
- 150							29.6	29.5	29.4	29.1	20.9	16.9
- 140						29.6	29.4	29.2	29.1	28.5	18.8	11.1
- 130						29.4	29.1	28.5	28.5	27.8	11.5	3.5
- 120						29.1	28.6	28.3	27.7	26.7	4.5	3.1
- 110					29.7	28.7	27.3	27.5	26.8	25.3	2.1	9.3
- 100					29.5	28.0	27.0	26.9	25.1	23.3	7.6	16.0
- 90				29.7	29.3	27.1	25.8	24.9	23.0	20.6	14.3	26.3
- 80			29.7	29.6	29.0	25.7	24.1	22.9	20.2	17.2	22.5	37.7
- 70		29.7	29.5	29.4	28.0	24.0	21.9	20.3	15.6	12.7	32.3	51.3
- 60		29.5	29.4	29.2	28.0	21.6	19.0	17.0	13.8	7.2	43.9	67.3
- 50	29.6	29.3	29.2	28.9	27.1	18.5	15.4	12.8	6.1	0.0	57.6	89.1
- 40	29.5	29.0	28.9	28.4	26.1	14.7	11.0	7.9	0.5	4.1	73.3	107.8
- 35	29.4	28.8	28.1	28.1	25.4	12.3	8.4	4.8	2.5	6.7	82.2	119.8
- 30	29.3	28.6	27.8	27.8	24.7	9.7	5.5	1.4	4.8	9.4	91.6	132.8
- 25	29.2	28.3	27.4	27.4	23.8	6.9	2.3	1.1	7.3	12.3	101.7	146.7
- 20	29.0	28.1	27.0	27.0	22.9	3.7	0.6	3.1	10.1	15.5	112.5	161.4
- 15	28.8	27.7	26.5	26.5	21.5	0.0	2.4	19.0	13.1	19.0	123.8	177.1
- 10	28.7	27.3	26.0	26.0	20.6	1.9	4.5	22.8	16.4	22.8	135.1	193.0
- 5	28.4	26.5	25.4	25.4	18.3	4.1	6.7	26.9	20.0	26.9	143.1	211.0
0	28.2	26.4	24.7	24.7	17.8	6.5	9.2	31.2	23.9	31.2	162.9	230.5
5	27.8	25.8	24.0	24.0	16.2	9.1	11.8	36.0	28.1	36.0	177.4	250.5
10	27.6	25.2	23.1	23.1	14.4	12.0	14.6	41.1	32.7	41.1	192.4	271.7
15	27.2	24.5	22.1	22.1	12.4	15.0	17.7	46.6	37.7	46.6	209.1	294.1
20	26.7	23.7	21.1	21.1	10.2	18.4	21.0	52.4	43.0	52.4	225.3	317.0
25	26.3	22.0	19.9	19.9	7.3	22.1	24.6	58.7	48.7	58.7	244.4	342.5
30	25.7	21.5	18.6	18.6	5.1	26.1	28.5	65.4	54.8	65.4	263.3	389.3
35	25.3	20.7	17.2	17.2	2.2	30.4	32.6	72.6	61.4	72.6	283.5	397.2
40	24.4	19.5	15.6	15.6	0.4	35.0	37.0	80.2	68.5	80.2	304.3	428.5
45	23.7	18.3	13.9	13.9	2.1	40.0	41.7	87.7	76.0	87.7	327.1	457.5
50	22.8	16.7	12.0	12.0	3.9	45.3	46.7	96.9	84.0	96.9	350.4	490.2
55	21.9	15.1	10.0	10.0	5.9	51.1	52.0	109.7	92.5	109.7	375.0	524.5
60	20.8	13.4	7.7	7.7	8.0	57.3	57.7	115.6	101.6	115.6	400.5	560.7
65	19.9	11.5	5.3	5.3	10.3	63.9	68.8	125.8	111.2	125.8	423.1	593.7
70	18.6	9.4	2.6	2.6	12.7	70.9	70.2	136.6	121.4	136.6	450.1	
75	17.3	7.2	0.1	0.1	15.3	78.4	77.0	147.9	132.2	147.9	467.2	
80	15.8	4.8	1.6	1.6	18.2	86.4	84.2	159.9	143.6	159.9	513.4	
85	14.2	2.3	3.2	3.2	21.2	94.9	91.8	172.5	155.6	172.5		
90	12.5	0.2	5.0	5.0	24.4	103.9	99.8	185.8	168.4	185.8		
95	10.6	1.7	6.8	6.8	27.3	113.5	108.3	199.7	181.8	199.7		
100	8.6	3.2	8.9	8.9	31.4	123.6	117.2	214.4	195.9	214.4		
105	6.4	4.8	11.1	11.1	35.3	134.3	126.6	229.7	210.7	229.7		
110	4.0	6.8	13.4	13.4	39.4	145.6	136.4	245.8	226.3	245.8		
115	1.4	8.4	12.0	15.9	43.8	157.6	146.8	266.1	242.7	266.1		
120	0.7	10.4	15.9	18.5	48.4	170.3	157.7	280.3	..259.9	280.3		

Figure 2, Condition Chart.

1. Using the condition chart below, calculate the settings of an LPMC to maintain a box temperature of 15°F to 25°F. Assume an evaporator TD of 10°F unless otherwise stated. Use R-12.

	BOX TEMP	EVAP TEMP	SUCTION PRESS
CUT-IN	**25°F**	**25°F**	**24.6°F**
CUT-OUT	**15°F**	**5°F**	**11.7°F**

2. Place the required cut-in and cut-out temperatures in their respective places. In this case, the cut-out is 15 and the cut-in is 25.

   NOTE: At cut-in, the evaporator temperature and box temperature will be the same (the evaporator fan continues to operate and the compressor is off).

3. Place 25° under the evaporator temperature.

   NOTE: At cut-out, the evaporator temperature is 10° less than the box temperature. This is due to the fact that we are using a 10° TD evaporator.

4. Place 5° under evaporator temperature.

5. Use your pressure-temperature relationship chart and look up the refrigerant (R-12) pressures for 25° and 5°. In this case, it is 24.6 and 11.7, respectively.

6. Place 24.6 and 11.7 in the condition chart.

7. Subtract 11.7 from 24.6, this gives you the pressure differential, it is 12.9.

8. Set differential at 12.9 to maintain a box temperature between 25 and 15 degrees.

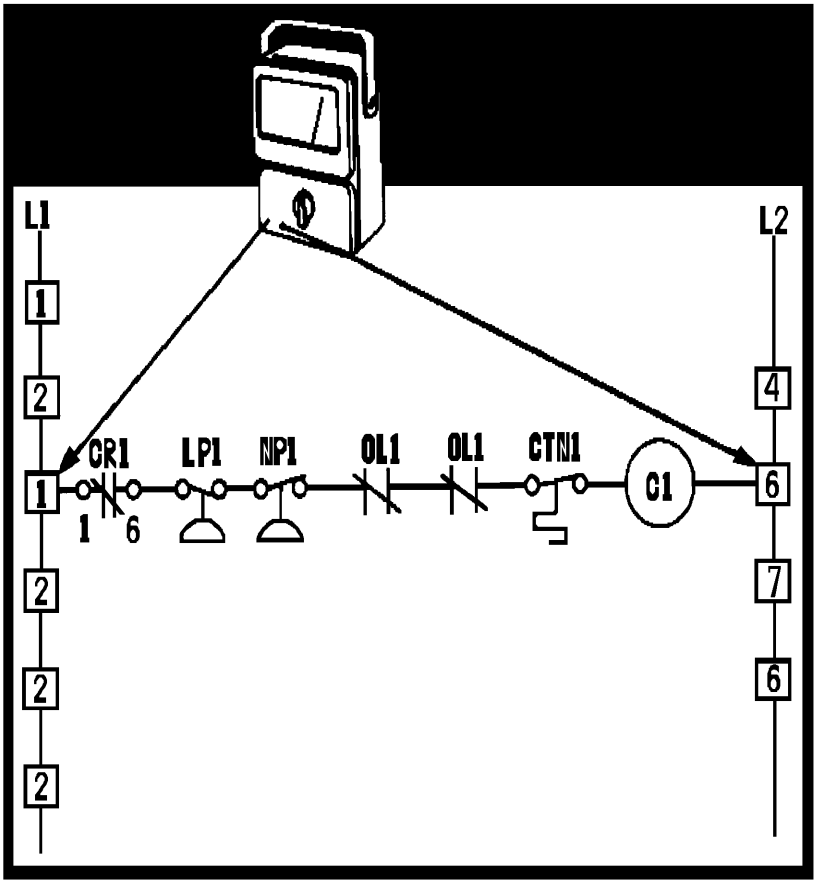

Figure 3, Electrical Troubleshooting.