U.S. Department of
Homeland Security

United States
Coast Guard

# STUDENT ENGINEER PERSONNEL QUALIFICATION STANDARD

**COMDTINST M3502.11B**
**March 2008**

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U.S. Department of Homeland Security
United States Coast Guard

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COMDTINST M3502.11B
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COMMANDANT INSTRUCTION M3502.11B

Subj: STUDENT ENGINEER PERSONNEL QUALIFICATION STANDARD

1. PURPOSE. This manual provides guidance for officers assigned to the student engineer program.

2. ACTION. Area, district, and sector commanders, commanders of maintenance and logistics commands, commander deployable operations group, commanding officers of headquarters units, assistant commandants for directorates, Judge Advocate General and special staff offices at Headquarters shall ensure that the provisions of this manual are followed. Internet release is authorized.

3. DIRECTIVES AFFECTED.

   a. The Engineer Officer in Training (EOIT) Personnel Qualification Standard, COMDTINST M3502.11A is cancelled.

4. DESCRIPTION. The primary goal of the student engineer program is to train officers for duty as naval engineers. The program is generic to all cutter classes and shall be administered in conjunction with a unit's Engineer Officer of the Watch (EOW) qualification process. The unit's Engineer Officer (EO) is responsible to ensure the student engineer is well versed in all aspects of the curriculum during the member's first afloat tour. During the second duty tour, the student engineer's supervisor is responsible for ensuring the student engineer continues the program to completion. Completion of this program provides an officer with an excellent foundation for future assignments in technical, logistical, and operational specialties. The student engineer program is separated into six chapters.

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5. PROCEDURES.

a. Chapters 1 - 4 shall be completed during the student engineer's first afloat tour. Chapters 5 and 6 are typically completed during the student engineer's second assignment tour.

b. Chapters 1 through 4 must be completed prior to assignment as EO afloat. Currently, this requirement does not apply to warrant officers assigned as EO or warrant officers selected to lieutenant and assigned as EO.

(1) The student engineer shall:

(a) Actively pursue and complete the course of study outlined herein, and continuously seek feedback from the EO regarding progress.

(b) Establish and maintain a student engineer notebook that documents the completion of chapters 1-6.

(c) Successfully pass the chapter 1 written test of basic shipboard engineering knowledge within one year of reporting aboard.

(d) Qualify as an EOW. Until qualified, the student engineer shall stand underway and inport watches with a qualified EOW as directed by the EO and the unit's break-in watch rotation standards. Watchstanding (learn by experience) is the backbone of the student engineer program. As general guidance, a student engineer should stand break-in watches at least 2 days per week inport and optimize the time available to stand watches while underway.

(e) As directed by the EO, work as a member of the main propulsion, auxiliary, electrical, and damage control divisions.

(f) As directed by the EO, participate in engineering plant light-off, securing, and special evolution's until qualified as an EOW.

(g) Pursue completion of chapters 5 and 6 during subsequent duty assignments and seek designation from CG-4 as a Coast Guard Naval Engineer upon program completion.

(2) The EO shall:

(a) Brief the engineering department on their role in the student engineer program. Solicit input from chief/senior petty officers regarding the student engineer's technical aptitude and interpersonal skills demonstrated while working closely with enlisted personnel.

(b) Actively supervise, instruct, and provide frequent feedback to the student engineer.

(c) Conduct counseling sessions at least once per month to review the student engineer's notebook and evaluate his/her progress.

(d) Upon completion of chapters 1 - 4, the EO shall adequately document completion in the officer's OER stating his/her overall capabilities, interest, and engineering aptitude. A specific comment regarding suitability for assignment as Engineer Officer afloat shall be included in the OER. Completion should be documented on Form CG-4082, Officer Educational Record and appropriate competencies entered into the Direct Access system.

(e) Keep the command informed of the student engineer's status throughout the program.

(3) The second duty tour supervisor shall:

(a) Actively supervise, instruct, and provide frequent feedback to the student engineer.

(b) Provide opportunities to the student engineer to gain experience required by the student engineer PQS manual.

(c) Document the student engineer's completion of chapters 5 and 6 in the officer's OER and include comments on the officer's capabilities, interest, and engineering aptitude upon completion of the student engineer program. Additionally, an entry on Form CG-4082, Officer Educational Record and appropriate competencies should be entered into the Direct Access system.

(d) Submit program completion memo to CG-4 for the officer as indicated in the sample memo in Appendix A of this manual.

(e) Keep the command informed of the student engineer's status throughout the program.

6. CHANGES. Recommendations for improvements to this manual should be submitted via the chain of command to the Commandant (CG-45), Office of Naval Engineering.

7. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental considerations were examined in the development of this manual and have been determined not to be applicable.

8. FORMS/REPORTS. The forms called for in this manual are available in USCG Electronic Forms on the Standard Workstation or on the Internet: http://www.uscg.mil/forms/, CG Central at http://cgcentral.uscg.mil/, and Intranet at http://cgweb2.comdt.uscg.mil/CGFORMS/Welcome.htm.

D. G. GABEL /s/
Assistant Commandant for Engineering and Logistics

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# Chapter 1
## Basic Shipboard Engineering

Basic Shipboard Engineering should normally be completed within 1 year of reporting aboard. Assignment as student engineer is an officer's primary duty. Due to the demanding nature of this program, non-engineering collateral duty assignments shall be minimized until completion of chapter 1. The student engineer shall successfully pass the chapter 1 written basic shipboard engineering knowledge test within 1 year of reporting aboard. A Performance Qualification Guide developed by TRACEN Yorktown is available at the CG-45, CG Central site to facilitate completion of chapter 1 knowledge requirements and written test. Upon completion of chapter 1, the EO shall evaluate the student engineer's technical aptitude for further training. If an officer does not wish to remain in the program, or if the EO recommends that the officer should not be permitted to continue in the program, the Commanding Officer shall initiate a letter to Commander, Coast Guard Personnel Center (CGPC-OPM) so indicating. Commander, Coast Guard Personnel Center (CGPC-OPM) may reassign the officer, as the needs of the service require.

**SECTION 1101 – MECHANICAL FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Principles of Naval Engineering, NAVEDTRA 10788
   3. Applicable Naval Ships Technical Manual chapters; refer to chapter 001, Publications Index
   4. Manufacturers' Technical Publications
   5. Coatings and Color Manual, COMDTINST M10360.3 (series)
   6. Student Engineer Performance Qualification Guide

B. Describe the operation of the following
   1. Globe valve
   2. Gate valve
   3. Check (Lift, Ball, Swing) valve
   4. Ball valve
   5. Plug
   6. Directional control valve
   7. Needle valve
   8. Pressure reducing/regulating valve
   9. Butterfly valve
   10. Thermostatically controlled valve
   11. Orifice valve
   12. Relief valve
   13. Pilot Controlled valve
   14. Safety Valve
   15. Fuel cut-out (isolation) valves
   16. Backflow preventing valve
   17. Pressure gauges
   18. Tank level indicators
   19. Vacuum gauges
   20. Fluid flow meters
   21. Compound gauges
   22. Revolution counters (shaft counter, RPM gage)
   23. Thermometers
   24. Pyrometers
   25. Manometer
   26. Governor function
   27. Ultrasonic thickness (UT) tester
   28. Dry Film thickness (DFT) tester
   29. Differential gauge

C. Identify the respective blue print symbology for each valve listed in 1101 B.

D. State the function of the following safety devices:
   1. Overspeed trip
   2. Emergency hand trip
   3. Low oil pressure trip
   4. Interlocks
   5. Thermal Overload Relay
   6. Automatic shutdown device
   7. Float switch
   8. Flow switch
   9. Temperature switch

E. State how the following pumps move fluids; are they positive or non-positive displacement type?
   1. Reciprocating
   2. Rotary
   3. Centrifugal
   4. Gear
   5. Vane
   6. Axial Piston
   7. Jet
   8. Propeller
   9. Screw
   10. Air-Operated Diaphragm

F. Define the following as applied to pumps.
   1. Capacity
   2. Aeration
   3. Packing
   4. Cavitation
   5. Mechanical Seal
   6. Suction/Discharge Head
   7. Power End / Fluid End
   8. Lantern Ring
   9. Pressure Compensated

G. Define the following engineering terms.
   1. Light offs
   2. Cross-connect
   3. Standby
   4. Cut in
   5. Press Up
   6. Cut out
   7. Absolute Pressure (psia)
   8. Settle out
   9. Gauge pressure (psig)
   10. Viscosity
   11. Bypass
   12. On the line (OTL)
   13. Cold iron
   14. Kinetic energy
   15. Potential energy
   16. Secure
   17. Dew point
   18. Circulation/recirc
   19. Line up
   20. Warm up
   21. Auxiliary
   22. Blowdown
   23. Brake Horse Power
   24. Torque
   25. Priming
   26. Shaft Horse Power
   27. OOC
   28. Overtorque

H. Identify the basic application and types of heat exchangers.

I. Describe the function of gears in terms of changing speed, direction, and torque of shafts.

J. State the purpose of the shaft turning gear.

K. How do the following factors contribute to or reduce the efficient and economical operation of the engineering plant?
   1. Clean heat exchanger surfaces.
   2. Overloaded and underloaded engine.
   3. Excessive exhaust temperature.
   4. Load balance (plant) and liquid load.
   5. Ventilation

L. List the color codes and describe the purpose of colors used to identify the following systems:
   1. Seawater

2. JP-5
3. Firemain
4. Lube Oil
5. Potable water
6. Low Pressure Air
7. Fuel Oil
8. Steam
9. Sewage
10. Waste oil
11. Hydraulic
12. AFFF
13. Countermeasure Washdown

M. Become familiar with the piping system designation and marking criteria outlined in NSTM 505.

**SECTION 1102 – ELECTRICAL FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapters 300, 310, 313, 320
   3. Electrician's Mate, NAVEDTRA 14344
   4. Blueprint Reading and Sketching, NAVEDTRA 14040
   5. Manufacturer's Technical Publications
   6. Student Engineer Performance Qualification Guide

B. Identify the function and application of each of the following.
   1. Voltage tester
   2. Ammeter (clamp on./inline)
   3. Voltmeter (manual/auto)
   4. Tachometer
   5. Frequency meter
   6. Transformer
   7. Voltage regulator
   8. Reverse power relay
   9. Controllers (LVR/LVP/LVRE)
   10. Fuses
   11. Distribution panels
   12. Circuit breakers
   13. Switchboard
   14. Synchronizing monitor
   15. Thermocouple
   16. Bus transfer switches (ABT/MBT)
   17. Voltage-adjusting
   18. Rheostat
   19. Kilowatt meter
   20. Meter selector switches
   21. Power available lights
   22. Breaker position lights
   23. Power factor capacitor
   24. Droop switch
   25. Ground detector indicator
   26. Phase-sequence meter
   27. Megohmeter (Megger)
   28. Multi-meter
   29. Conductor
   30. Signal Generator
   31. Voltage
   32. Current
   33. Ampere
   34. Power factor (p.f.) generator operation
   35. Watt
   36. Resistance/ohm
   37. Generator
   38. Armature/stator
   39. Slip rings
   40. Commutator
   41. Brushes
   42. Brushless
   43. Hertz
   44. Direct Current (DC)
   45. Short circuit
   46. Prime mover
   47. Field excitation
   48. Parallel/split plant
   49. Isochronous
   50. Droop
   51. Selective tripping
   52. Field/Rotor
   53. Alternating Current (AC)
   54. Motor
   55. Thyristor
   56. Programmable Logic Controller (PLC)
   57. Type I Power
   58. 400 Hz Power Supply
   59. Variable Frequency Drives

C. Define the difference in principle of operation between a generator & motor.

D. State the basic unit of measure and list the symbols used for identifying the following:
   1. Voltage
   2. Current
   3. Resistance
   4. Frequency
   5. Power

E. State the basic principle of electrical power generation.

F. State the relationship between current, voltage, and resistance.

G. Explain the importance of an ungrounded system on board a ship.
H. Explain the difference between medium and high voltage installations.

I. Explain the procedures for hooking up shore power.

J. Explain the procedures for hooking up and removing casualty power.

K. Explain how to detect, isolate, and clear an electrical ground.

L. Demonstrate the proper operation of two electrical meters:
    1. Multi-meter
    2. Mega-ohm meter

**SECTION 1103 – SAFETY FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Asbestos Exposure Control Manual, COMDTINST 6260.16 (series)
   3. Safety and Environmental Health Manual, COMDTINST 5100.47 (series)
   4. Hazard Communication for Workplace Materials, COMDTINST M6260.2 (series)
   5. Technical Guide: Practices for Respiratory Protection, COMDTINST M6260.2 (series)
   6. Cutter Heat Stress Program, COMDTINST M6260.17 (series)
   7. Water Supply & Wastewater Disposal manual, COMDTINST M6240.5 (series)
   8. Equipment Tag-Out Procedure, COMDTINST 9077.1 (series)
   9. Eyewash Stations, 29 CFR 1910.151, ANSI Z358.1
   10. Student Engineer Performance Qualification Guide

B. Demonstrate basic first-aid procedures.

C. Explain the purpose and methods of use for the GAR model.

D. State where safety precautions are to be posted IAW Ref 1.

E. State which shipboard spaces are required to have Eye Wash Stations.

F. State the requirements for single and double hearing protection and safety placard location.

G. State the requirements of the heat stress program. What is a Physiological Heat Exposure Limit (PHEL) Chart?

H. Demonstrate proper tag-out procedures (including color-coding of tags).

I. State the requirements of the Respiratory Protection Program (i.e. color coding of respirators, shelf life, in-line respirators, etc).

J. Explain the requirements for conducting portable electric tool handling and safety inspections.

K. Explain the intended use and placement of battle lanterns and emergency lighting.

L. State the benefits of a well-administered electrical safety program.

M. State the use and protective function of the following:
   1. Lagging
   2. Piping flange shields
   3. Machinery guards/shields
   4. Red Gear Cover Locks
   5. Ground Indicators
   6. Breakers/Fuses
   7. Fuel oil/lube oil handling program
   8. Remote Operated Valve (Emergency Cut Out)
   9. Grounding Wand
   10. Electrical Matting
   11. Pull Away Cane (Dead Man Stick)
   12. Caution Lines
   13. Reach Rods
   14. Quick-closing Valves
   15. Automatic Cutouts
   16. Coupling Cover
   17. Diaphragm Control Valve
   18. Strainer Shields

N. Explain the procedure for replacing fuses and using fuse pullers.

O. State the effect and/or hazard caused by the following equipment:
   1. Improper valve alignment
   2. Packing gland too tight
   3. Bowed shafting

4. Improper thread packing procedure
5. Lack of Lube oil purification
6. Lube Oil Contamination
7. Lube Oil Thickening or Thinning
8. Improper Fasteners
9. Improper use of tools
10. Misaligned machinery

P. Identify the general safety precautions to be observed when operating high speed, rotating machinery.

Q. Explain the importance of staying clear of the shaft turning gear when starting the main engines.

R. Identify the importance of secured deckplates, gratings, handrails, and safety chains.

S. State the reasons for good housekeeping practices in engineering spaces.

T. Identify the hazards of fuel oil, lube oil or flammable liquids in bilges.

U. Identify the safety precautions to be employed when handling and storing HAZMAT.

V. Identify the safety precautions used when handling and storing acids and alkalis.

W. State the special hazards involved and the procedures to follow when working on a system with single-valve protection.

X. Describe the potential hazards that exist to personnel entering an unventilated space where $CO_2$ and/or Halon have been discharged.

Y. State the precautions to be followed before entering a sealed void or compartment. Define an Immediately Dangerous to Life and Health (IDLH) atmosphere and how it is determined.

Z. Identify the hazards to personnel working in a space where steam is being released through steam hoses or steam smothering systems.

AA. State the safety precautions to operate an electrical submersible pump.

BB. State the possible results of an open/unlocked and unattended sounding tube on potable water, feedwater, fuel oil, and lube oil tanks.

CC. Explain how to properly handle potable water safely aboard vessels to prevent waterborne diseases.

DD. Explain the safety requirements and procedures for using portable electric lighting (type, construction, and usage).

EE. Explain the reason for capping sound-powered telephone outlets when not in use.

FF. Explain the procedures for removing a victim from an energized circuit.

GG. Identify the safety precautions for portable electrical equipment.

HH. Explain the proper procedures to be followed prior to working on electrical machinery/equipment and energized circuits.

II. Identify the safety hazards for asbestos, fiberglass insulation materials, refrigerants, mercury, lead-based materials, Polychlorinated Biphenyls (PCBs), and fluorescent lamps.

JJ. State the requirements for the handling and storage of gasoline and gasoline equipment.

KK. State the requirements/restrictions of the following in engineering spaces:

1. Long-sleeved shirts
2. Hats
3. Goggles/face mask
4. Gloves
5. Safety Boots
6. Respirators
7. Earplugs/protectors
8. Electrical Safety Matting
9. Jewelry
10. Polyester Clothing
11. Undershirt

LL. State the importance of eye safety (i.e. especially hazards associated with wearing contact lenses).

MM. State the purpose and use of the information contained on a Material Safety Data System (MSDS). How is an MSDS obtained?

NN. State the purpose and importance of enforcing a unit TAG-OUT program.

OO. Familiarize yourself with the access and escape routes (egress) of each Engineering Space.

PP. State the procedures and safety precautions required for personnel working aloft, over the side, or during diving operations.

**SECTION 1104 – HYDRAULIC FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 556
   3. Manufacturers' Technical Publications
   4. Student Engineer Performance Qualification Guide

B. Define the following terms, as applied to hydraulics:
   1. Force
   2. Area
   3. Displacement
   4. Volume
   5. Pressure
   6. Reservoir
   7. Regulator
   8. Accumulator
   9. Actuator
   10. Linear Actuator
   11. Rotary Actuator
   12. Sequential Speed
   13. Reciprocating
   14. Orifice
   15. Solenoid
   16. Viscosity
   17. Test Ports
   18. Pressure Switch
   19. Pressure Gauge
   20. Hydraulic Pump
       a. Vane
       b. Gear
       c. Piston
       d. Screw
   21. Strainer
       a. Simplex
       b. Duplex
   22. Hydraulic Fluid
   23. Filter
   24. Accumulator
       a. Piston
       b. Spring
       c. Bladder
   25. Sequencing Valve
   26. Direction Control Valve
       a. Two Position, Four-Way
   27. Unloading Valve
   28. Relief Valve
       a. Simple
       b. Compound
   29. Check Valve
       a. In-line
       b. Pilot-pressure
       c. By-pass
   30. Flow Control
       a. Fixed
       b. Variable
       c. Direction Control Valve
   31. Counterbalance valve

C. Explain the basic principles of operation and use of the following hydraulic systems.
   1. Loop – Open/Closed
   2. Re-Generative

D. Describe the procedure for Cleaning and Flushing Hydraulic Systems IAW prescribed standards.

E. State the relationship between:
   1. Flow rate and actuator speed.
   2. System pressure and load capacity.

**SECTION 1105 – ELECTRIC DRIVE PROPULSION FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 235
   3. Manufacturers' Technical Publications
   4. Student Engineer Performance Qualification Guide

B. Describe the function of the propulsion generator and motor.

C. Explain why some electric drive propulsion plants do not require reduction gears.

D. Describe the theory and operation of DC and AC propulsion plants.

E. State the advantages of an electric drive propulsion plant.

F. Discuss the following System Components and Component Parts.
   1. Central Power-plant System
   2. Cycloconverter
   3. Synchro Converter
   4. Permanently Magnetized Motor
   5. DC Rectifier
   6. High Voltage (HV) Transformer

G. Principles of Operation
   1. State how the above components work together to achieve system operation.
   2. How does this system integrate with the other portions of the machinery plant?
   3. State the procedure(s) for using this system.
   4. Describe the differences between a Central Power-plant System and a split bus electric drive configuration.
   5. Safety precautions:
      a. What general safety precautions apply to these systems?
      b. What special training is required to perform maintenance on these systems?

H. Describe what is meant by the term "Regenerative Power".
I. Discuss the advantages and disadvantages of podded propulsion drives.

**SECTION 1106 – WELDING AND CUTTING FUNDAMENTALS**

A. Reference Material.
   1. Naval Ships Technical Manual, chapter 074 (V1, V2, V3)
   2. Naval Ships Technical Manual, chapter 550
   3. Manufacturers' Technical Publications
   4. Student Engineer Performance Qualification Guide

B. Describe the following:
   Joints:
   1. Butt joint
   2. Edge joint
   3. Corner joint
   4. Tee joint
   5. Lap joint

   Types:
   1. Bead
   2. Fillet
   3. Groove
   4. Plug
   5. Slot
   6. Seam
   7. Tack
   8. Clad

   Parts:
   1. Face
   2. Toe
   3. Root

C. Define the following terms:
   1. Pass
   2. Bead
   3. Overlay

D. Explain the welding procedure used for the following:
   1. Shielded metal arc welding
   2. Plasma arc welding
   3. Gas metal arc welding
   4. Gas tungsten arc welding
   5. Submerged arc welding
   6. Stud arc welding
   7. Brazing

E. Define the following terms:
   1. Arc
   2. MIG
   3. TIG
   4. Stud
   5. Plasma
   6. Submerged
   7. Striking the arc
   8. Scratch or Lift GTA
   9. Pressed up
   10. Tapping

11. Layer
12. Deposition Sequence
13. Backstep Sequence
14. Wandering Sequence
15. Buildup Sequence
16. Cascade Sequence
17. Block Sequence
18. Heat Affected Zones

F. State the difference between a “weld symbol” and a “welding symbol”.

G. Describe the parts of a “welding symbol”.

H. Explain the purpose of welding rods.

I. Explain when and why flux is used.

J. Explain purpose and types of shielding gases.

K. Describe the following types of flames associated with oxyacetylene welding:
   1. Neutral
   2. Reducing (Carburizing)
   3. Oxidizing

L. Describe brazing and braze welding.

M. Define soldering and its limitations.

N. Define the following Nondestructive Testing (NDT) techniques:
   1. X-ray
   2. Magnaflux
   3. Dye penetrant
   4. Hydrotesting
   5. Air testing
   6. Ultra Sonic Testing

O. Describe the following weld defects:
   1. Spatter
   2. Overlap
   3. Undercut
   4. Void
   5. Inclusions
   6. Brittleness
   7. Incomplete fusion
   8. Inadequate joint penetration
   9. Inadequate root penetration
   10. Cracks

P. Discuss the following safety related items:
   1. Personal protective equipment (i.e. helmet, shield, eye protection, gloves, leather clothing, respirator).
   2. Condition of hoses and torches.
   3. Operation of backfire flame arrestors and check valves.
   4. Condition of regulators.
   5. Proper sequence for lighting the torch.
   6. Dangers of excessive acetylene pressure. Define excessive pressure.

7. Presence of flammables in the area.
8. Protecting the deck and adjacent compartments.
9. Importance of Hotwork chit / Gas-Free Certificate.
10. Security of cylinders in rack and importance of keeping the oxygen and acetylene bottles upright.
11. Dangers of working on metals painted with lead, chromate, galvanized, or vinyl based paints.
12. Proper cleaning of cutting tips.
13. Leak testing for regulators.
14. Proper routing of hoses and welding leads.
15. Storage of oxy-acetylene bottles.
16. Proper grounding for Plasma Welding procedures.

**SECTION 1107 – CASUALTY CONTROL FUNDAMENTALS**

A. Reference Material.
   1. Cutter Casualty Control Manual (CCM)
   2. Naval Engineering Manual, COMDTINST M9000.6 (series)
   3. Naval Ships Technical Manual, chapter 079, VOL 3
   4. Damage Control Book and Drawings
   5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   6. Student Engineer Performance Qualification Guide

B. Become familiar with the content and procedures of the Casualty Control Manual.

C. Discuss engineering plant casualty control reporting procedures between watchstations, EOW, and the bridge.

D. Discuss the basic procedural differences in casualty control between multiple screw ships and single screw ships and the effect on the maneuverability of the ship.

E. Discuss the training/qualifications and uses of the shipboard Engineering Casualty Control Training Team (ETT).

F. Describe the relationship between Restricted Maneuvering Doctrine and Casualty Control Manual.

**SECTION 1201 – DIESEL ENGINE SYSTEM (Main Diesel Engine (MDE), Ships Service Diesel Generator (SSDG), Emergency Diesel Generator (EDG)**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapters 233 and 262
   3. Manufacturers' Technical Publications
   4. Student Engineer Performance Qualification Guide

B. Define the following:
   1. Intake/Exhaust
   2. Compression
   3. Combustion
   4. Timing/Injection
   5. Intake Stroke
   6. Compression Stroke
   7. Power Stroke
   8. Exhaust Stroke
   9. Flash point
   10. Hydraulic lock
   11. Scavenging
   12. Cylinder Block
   13. Crankcase/bedplate
   14. Cylinder head and liner
   15. Governor
   16. Pistons and Connection rods
   17. Turbocharger
   18. Camshafts
   19. Ports/valves
   20. Crankshaft
   21. Flywheel
   22. Aftercooler/Intercooler
   23. Manometer
   24. Blower shutdown
   25. Remote fuel shutdown
   26. Pyrometer
   27. Overspeed trip
   28. Explosion covers
   29. Fuel Rack
   30. Fuel Pump Control Shaft & Crossover Linkage
   31. Water Pump
   32. Exhaust Manifold
   33. Rocker Assembly
   34. Fuel Injectors
   35. Governor Control Linkage
   36. Fuel Injector Pump Support and Drive
   37. Pneumatic, Electric, and Mechanical Control system
   38. Thermostatic Control Valve
   39. Monitoring Console/Panels
   40. Emergency Shutdown
   41. Local/Remote Control Panels

C. Explain the two-stroke diesel cycle, including the events in sequence that occur during one cycle.

D. Explain the four-stroke diesel cycle, including the events in sequence that occur during one cycle.

E. Describe the types of starting mechanisms used on diesel engines.

F. Describe the operation and uses of the five types of governors:
   1. Speed-Limiting
   2. Automatic Shutdown
   3. Constant Speed
   4. Knockdown / Topping
   5. Load Sharing: Governor and controls

G. Identify the types of diesel cylinder arrangements.

H. List the causes and effects of engine overspeed.

I. Referencing the appropriate system line diagram on local cutter, explain the lube oil and fuel oil flow paths through the two stroke and four-stroke engine.

J. Define "crankweb deflection" and how/when is it measured.

K. Explain the purpose of pyrometers. When is this device used?

L. What is the purpose of a center section overhaul/top end overhaul and when does each take place?

M. System Interface.
   1. What is the relationship between lube oil temperature, jacket water temperature, and seawater cooling temperature?

N. Hazards
   1. List the safety precautions that apply to positive crankcase pressure on diesel engine systems.
   2. Discuss precautions required after a crankcase explosion.
   3. List the precautions that must be taken when walking around any diesel exhaust piping.

**SECTION 1202 – GAS TURBINE SYSTEM**

A. Reference Material.
   1. Naval Ships Technical Manual, chapter 234
   2. Manufacturers' Technical Publications
   3. Student Engineer Performance Qualification Guide

B. Define the following as applied to the gas turbine engine:
   1. High-pressure turbine
   2. Free turbine
   3. Accessory drive assembly
   4. Freewheeling
   5. Compressor stall
   6. Compressor surge
   7. Power measurement
   8. Single-shaft gas turbine
   9. Power takeoff assembly
   10. Igniters
   11. Hydra-start
   12. Precipitator
   13. Air assist
   14. Base enclosure assembly
   15. Fire detection and extinguishing system
   16. Water wash system
   17. Compressor inlet plenum
   18. Compressor
   19. Combustion section
   20. High pressure (HP) turbine
   21. Free power turbine
   22. Ignition system
   23. High-speed flexible coupling
   24. Gas turbine bearings
   25. Accessory drive assembly
   26. Compressor variable stator vanes
   27. Engine bleed air manifolds
   28. Customer bleed air manifold
   29. Inlet guide vanes
   30. Altair solenoid valves
   31. Motor-operated fuel valve
   32. Anti-icing system

C. Principles of Operation.
   1. Referencing system line diagram of local cutter, show the path of primary and secondary air through the engine.
   2. What are the sources and uses of bleed air within the gas turbine?
   3. What are the effects of a "hot shutdown"?
   4. How do the variable stator vanes prevent compressor stalls of a gas turbine?

D. Safety Hazards.
   1. State the safety precautions that apply when entering or leaving a gas turbine.
      a. Plenum
      b. Enclosure

E. Explain the difference between an open and closed engine cycle.

F. Explain the energy conversion process that occurs in the following:
   1. Compressor
   2. Combustion chamber
   3. Turbine

G. Explain the effects of the marine environment on gas turbine engines and the precautions taken to compensate for this environment.

H. State the possible causes of ice formation on air inlets.

I. Explain the effect of foreign object damage on compressor blades.

**SECTION 1203 – PROPULSION SHAFTING, BEARINGS, PROPELLERS, AND REDUCTION GEARS SYSTEMS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual chapters, 078 (V1 & V2), 241, 243, 244, 245
   3. Manufacturers' Technical Publications
   4. Student Engineer Performance Qualification Guide

B. Define the following:
   1. Thrust
   2. Reduction ratio
   3. Auxiliary Drive
   4. Quill shaft
   5. Solid Coupling
   6. Spring Bearing
   7. Controllable Pitch Propeller (CPP)
   8. Clutch
   9. Come home bolts
   10. Pinion
   11. Intermediate gear
   12. Bull Gear
   13. Turning Gear
   14. Pedestal Bearing
   15. Gear (Spur, Helical, Herring Bone)
   16. Fixed Pitch Propeller
   17. Line shaft
   18. Thrust shaft
   19. Stern tube shaft
   20. Tail shaft
   21. Line shaft bearings
   22. Shaft seal (CPP)
   23. Mechanical shaft seal (John Crane)
   24. Stuffing tube
   25. Stern Tube bearing
   26. Strut Bearing
   27. Inflatable Shaft Seal
   28. Journal bearing
   29. Shaft liners
   30. Thrust Bearing

C. Explain the procedures for opening/inspecting/working on main propulsion reduction gear.

D. State the importance of taking thrust bearing readings.

E. Explain the advantages/disadvantages of the various types of gear (e.g. straight, helical).

F. State the reasons for using Reduction Gear oil sump heaters.

G. How do the following effect reduction gears?
   1. Lubrication
   2. Locking/unlocking of the shaft
   3. Gear tooth inspection (Tooth contact and wear)
   4. Vibration
   5. Spray Pattern

H. State the advantages and disadvantages of fixed-pitch propellers.

I. Define "freewheeling" or "trailing" a shaft.

J. Explain how or when the following are accomplished:
   1. Lubrication of line shaft bearings
   2. Lubrication of stern tube and strut bearings

K. State the differences in operation between a Combined Diesel or Gas Turbine (CODOG) and a Combined Diesel and Gas Turbine (CODAG) system.

L. Describe the operation of a combined diesel or gas turbine (CODOG) plant.

M. Describe the operation of a combined diesel and gas turbine (CODAG) plant.

**SECTION 1204 – CONTROLLABLE PITCH PROPELLER SYSTEM**

A. Reference Material.
   1. Naval Ships Technical Manual, chapter 245
   2. Naval Engineering Manual, COMDTINST M9000.6 (series)
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide

B. System Components and Component Parts. State the function of the following system components and component parts.
   1. Oil Distribution Box
   2. Control Valve Manifold
   3. Electric pumps
   4. Relief valves
   5. Reducing valves
   6. Control Piston
   7. Pilot Piston
   8. Emergency pitch positioner
   9. Rod Control
   10. Electric Actuator/Pneumatic Actuator
   11. Blade seals
   12. Crosshead
   13. Hub piston/Servomotor piston
   14. Regulating valve
   15. Sump Tank
   16. Head Tank
   17. Gear driven hydraulic oil pump

C. Principles of Operation.
   1. Referencing the system line diagram on local cutter, show the path of hydraulic oil from the sump tank through the system and back to the sump.
   2. What is the sequence of component involvement for:
      a. Supplying control oil to the oil distribution box to vary the position of the valve rod.
      b. Supplying high pressure (HP) hydraulic oil to the propeller hub to effect a change in pitch.
      c. Prevent water from entering the hub & oil leaking out.
   3. Explain how to verify and adjust pitch.

**SECTION 1205 – STEERING SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 562
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide

B. Define the following System Components and Component Parts.
   1. Transmission Equipment
      a. Steering control cable selector switches
      b. Steering control cables (PORT and STBD)
      c. Trick wheel
      d. Auto pilot systems

   2. Manual Control Unit

   3. Power Unit
      a. Steering motors
      b. Steering pumps
      c. Emergency hand pump
      d. Block & Tackle

   4. Ram Unit
      a. Ram
      b. Cylinder
      c. Rudder Linkage
      d. Crush blocks (Copper)
      e. Stops (Mechanical and Hydraulic)

   5. Rudder Angle Indicating System

   6. Rudder Roll Stabilization System (RRS).

C. Principles of Operation.
   1. How do the components work together to achieve system function?

   2. What are the principles of operation of the autopilot?

   3. How is the vertical weight of the rudder and rudderstock supported?

   4. Explain the transmittal of forces (via the rudder) necessary to cause the ship to change its heading.

   5. Explain the difference among the following steering modes.
      a. Gyro
      b. Non Follow Up
      c. Follow Up
      d. Hand Electric
      e. Manual (hand pump)

**SECTION 1206 – DIESEL ENGINE JACKET WATER SYSTEM (MDE, SSDG)**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 233
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide

B. Define the following Components and Component Parts (MDE, SSDG).
   1. Suction Valves
   2. Pump
   3. Discharge Valves
   4. Jacket Water Cooler
   5. Lube Oil Cooler
   6. Temperature Regulating Valve
   7. Expansion Tank
   8. Heat exchanger
   9. Intercooler
   10. Orifice Plates
   11. Jacket Water Heater
   12. Gauges and Thermometers
   13. Relief Valves

C. Principles of Operation.
   1. Explain how the above components work together to achieve system function.
   2. State the importance of the Temperature Regulating Valve (AMOT valve) concerning MDE and SSDG cooling.
   3. Explain the importance of conducting a J/W Test.

**SECTION 1207 – SEAWATER SYSTEM**

A. Reference Material.
   1. Naval Ships Technical Manual, chapter 233
   2. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   3. Student Engineer Performance Qualification Guide

B. Define the following System Components and Component Parts.
   1. Sea chest
   2. Suction and Discharge valve
   3. System Cross Connects
   4. Overboard discharge valves
   5. Auxiliary seawater –reducing station adjusting valve
   6. Pressure and temperature gauges
   7. Piping (Specify size and material)
   8. Sea strainers
   9. Vent valves
   10. Keel cooler
   11. Pumps
   12. Deicing valves (if installed)
   13. Zincs
   14. Sea Bay

C. Principles of Operation.
   1. How do the above components work together to achieve system function?
   2. What is the effect of a clogged sea chest? What are the indications?
   3. What is the effect of an air bound sea chest?
   4. Describe the difference between a Sea Bay and a sea-chest, and its associated advantages and disadvantages.

D. System Interface. How does this system interface with the following:
   1. Main Propulsion Diesel Engine Cooling System
   2. Main Gas Turbines
   3. Ship's Service Diesel Generator (SSDG) Engine
   4. Main Reduction Gear Cooling System
   5. Water purification Unit
   6. Firemain
   7. Air Conditioners
   8. Reefers
   9. Oily Water Separator
   10. Bilge and Ballast System
   11. CPP System
   12. Shaft Seals
   13. Fin Stabilizers
   14. Sewage System

**SECTION 1208 – FUEL OIL AND LUBE OIL SYSTEMS**

A. Reference Material.
1. Naval Engineering Manual, COMDTINST M9000.6 (series)
2. Vessel Environmental Manual COMDTINST M16455.1 (series)
3. Naval Ships Technical Manual, chapters 262, 505, 541, 542, and 571.
4. USCG ELC Fuel Testing Program Website
5. Cutter Damage Control Book and Drawings
6. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
7. Student Engineer Performance Qualification Guide

B. State the purpose of the following:
1. Fuel and Water Report
2. NAVY Oil Analysis Program (NOAP)
3. ELC Fuel Testing Program
4. Lube Oil Test Log

C. Define the following terms:
1. F-76 (MIL-SPEC fuel product)
2. JP5 (F-44) Aviation fuel
3. NPD-MGO (Navy Purchase Description- Marine Gas Oil)
4. Cetane index
5. Cetane requirements
6. Viscosity
7. Vapor pressure
8. Atomization
9. Combustion
10. Flash point
11. Fire point
12. Pour point
13. Bottom sediment
14. Spectrographic Analysis
15. MIL-L-9000
16. Fuel Dilution
17. Emulsion
18. Gravity Feed
19. Coalesce
20. Wedge Action (Bearings)
21. "Clear and Bright"
22. Fuel dyes
23. Batch Purification
24. Free Water
25. Seybold viscosity
26. Biocide Treatment
27. Specific Gravity
28. MIL-L-2104
29. Lube oil pump
30. Lube oil pump (standby/emergency)
31. Attached lube oil pump
32. Lube oil filter and strainer
33. Lube oil cooler
34. Unloading valve
35. Lube Oil Pre-lube pump
36. Lube Oil Sample valves
37. Lube Oil Purifier
38. Lube oil heater
39. Lube oil storage/settling tanks
40. Fuel oil filling piping and valves
41. Fuel oil transfer piping/valves
42. Fuel oil storage tanks and overflow tanks
43. Fuel oil service tanks
44. Fuel oil transfer pump and hand priming pump
45. Oily Water Separator System
46. Dirty oil and stripping tanks
47. Sludge tanks
48. Fuel Oil Drain lines
49. Fuel Oil Manifold
50. Fuel Oil Pre-filter
51. Fuel Oil Coalescer/Purifier
52. Lube Oil and Fuel Oil Emergency cut out valves
53. Lube Oil and Fuel Oil Tank Level Indicators
54. Fuel Tank Ballast System
55. Dedicated Ballast Tanks

Briefly identify the function of the following equipment:

56. Hydrometer
57. Flash screen
58. Water-Indicating Paste
59. Tank level Indicators (TLIs)
60. Fuel Oil Filter Coalescer
61. Purifier
62. Sight Flow Indicator
63. Filter-Separator
64. Sounding tubes

D. Explain how lubricating oil protects a system from friction and heat.

E. Explain the purpose of dyes in fuel products. What does red dye in diesel fuel indicate? What does black or dark brown dye indicate?

F. Explain the purpose and method of application for the ELC Fuels Testing Program.

G. Define and explain typical shipboard fuel problems encountered.

H. Explain the storage concerns over NPD-MGO fuels.

I. Explain the methods and reasoning for use of biocide treatments.

J. Explain the USCG In-Line fuel quality sampling program.

K. Identify the physical appearance of improperly purified lube oil or contaminated oil.

L. Identify the process (es) by which a purifier can do its job.

M. Principles of Operation.
   1. What is the functional relationship between the emergency standby and attached lube oil pumps?

N. System Interface
   1. How does operation of the Ballast, Deballast and Stripping System affect the fuel system?
   2. How do variations in propulsion engine RPM effect lube oil and fuel oil parameters?

O. Safety Hazards. Explain the appropriate safety precautions and procedures that apply when:
   1. Shifting duplex strainers.
   2. Opening and closing system valves.
   3. Transferring Fuel Oil and Lube Oil.
   4. Fueling at Sea and Inport.
   5. Ballasting and Deballasting.

P. State the procedures for the storage and handling of lube oil, fuel oil, hydraulic oil, and JP-5.

Q. State Commandant (CG-45)’s policy regarding Rubber Expansion Joints (Flex Joints).

**SECTION 1209 – COMPRESSED AIR SYSTEM (Low Pressure, High Pressure, and Starting Air)**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 551
   3. Damage Control Book and Drawings
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. System Components and Component Parts. State the function, associated safety precautions, and relationship of the following items to the Low Pressure, High Pressure, and Starting Air Systems.
   1. Air compressors (LP, HP, Start)
   2. Air receivers/accumulators
   3. Relief valves
   4. Air dehydrator
   5. Receiver Blowdowns
   6. Moisture separators
   7. Controller
   8. Air Flask
   9. Intercooler
   10. Alternate Sources of Air
   11. Cross-connect valves
   12. Cut Out Valves
   13. Unloader
   14. In-line oilers
   15. Water Flask
   16. Regulators
   17. Reducing Stations

C. Principles of Operation.
   1. Explain how the above components work together to achieve system function.
   2. Explain the importance of regular receiver blowdowns.

**SECTION 1210 – BALLAST, DEBALLAST, AND STRIPPING SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapters 079 (V1), 541
   4. Cutter Damage Control Book and Drawings
   5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   6. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Fuel oil storage tanks
   2. Ballast, deballast, and stripping/valves
   3. Bilge and fuel oil stripping pump
   4. Fuel and Ballast transfer pumps
   5. Firemain connection
   6. Bilge Eductors
   7. Designated ballast tanks
   8. Sounding Tubes/Vents

C. Explain the advantages/disadvantages of an independent ballast system (Fuel tanks are not used for Ballasting) over a fuel tank ballast system (Fuel tanks serve the purpose of fuels storage and ballast).

D. System Interface
   1. Explain how ballast system can be used to maintain optimum draft, trim, and overall vessel stability.

**SECTION 1211 – BILGE DRAINAGE SYSTEMS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapters 503, 505, 541, and 593.
   4. Damage Control Book and Drawings
   5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   6. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Bilge Eductors
   2. Check Valves
   3. Bilge high level alarms
   4. Suction Valves and Manifold
   5. Suction strainer
   6. Overboard Discharge Valves
   7. Pumps, Piping, and Valves
   8. Dirty Oil Pump
   9. Sand Piper
   10. Dirty Oil Tank
   11. Oily Water Separator (OWS)
   12. OWS Monitoring System
   13. OWS Filter Stages
   14. Oil Content Monitor (OCM)
   15. Pneumatic valve
   16. Gauges
   17. Electrical Controllers

C. Principals of Operation. Explain how the above components work together to achieve system function.

D. Safety Hazards.
   1. What general safety hazards apply to this system?
   2. State Shipboard, Federal, State, and local regulations and procedures for disposing of Oily Waste.

**SECTION 1212 – SEWAGE COLLECTION, HOLDING, AND TRANSFER (CHT) SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Coatings and Color manual, COMDTINST M10360.3C (series)
   3. Vessel Environmental Manual COMDTINST M16455.1 (series)
   4. Naval Ships Technical Manual, chapters 074 (V3), 593
   5. Manufacturers' Technical Publications
   6. Student Engineer Performance Qualification Guide

B. State the contents of the following items as they pertain to ships and related shore facilities (all incorporated in the Uniform National Discharge Standards, UNDS):
   1. Federal Water Pollution Control Act amendments
   2. Oil Pollution Act as amended
   3. National Environmental Policy Act
   4. MARPOL Regulations
   5. State the regulations regarding the dumping of plastics, garbage, sewage, and bilge water.

C. Define the following:
   1. Contiguous zone
   2. Collection Holding Tank
   3. Effluent
   4. Sludge
   5. Grey water
   6. Sewage

D. Discuss the following System Components and Component Parts.
   1. Swing Check Valve
   2. Deck/bulkhead stop valve
   3. Bypass line
   4. Eductors / Vacuum pumps
   5. Tank Level Indicators (TLIs)
   6. Three Way Valve
   7. Sewage Holding Tank
   8. Grey Water Collection Tank
   9. Water Seal Tank
   10. Sewage Holding Tank Discharge
   11. Pumps
   12. Air Break (or funnel cup)

E. System Interface.
   1. How does this system interface with the following:
      a. Setting of "ZEBRA"
   2. How would a vacuum leak affect the system?
   3. How would restrictions in the suction and discharge piping effect the system?

F. Safety Hazards.
   1. What special safety precautions must be observed when operating this system?
   2. What precautions must be taken prior to entering a tank?

**SECTION 1213 – POTABLE WATER SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapter 533
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Potable water storage tanks
   2. Manifold
   3. Potable water pumps
   4. Priming pumps
   5. Deck risers
   6. Tank level indicators
   7. Chlorinator/Brominator
   8. Hydro pneumatic Tank
   9. Hot Water Accumulator Tank
   10. Dechlorinator

C. Principals of Operation.
   1. How do the components work together to achieve the system's function?
   2. State the proper storage, handling, and use of:
      a. Bromine Cartridges
      b. Calcium Hypochlorite
   3. What are established limits and testing frequencies for the following items:
      a. Chlorine
      b. Chloride
      c. Bromine
      d. PH
   4. State the treatment procedures for potable water using the following methods:
      a. In-line brominator
      b. Recirculating brominator
      c. Batch method
      d. Superchlorination

D. System Interface.
   1. How does loss of electrical power effect the operation of this system?
   2. How does this system interface with the Bromine Feed System?

E. Safety Hazards
   1. Potential hazards of unlocked sounding tube access.
   2. Discuss the use of dedicated sounding tapes.

**SECTION 1214 – WATER PURIFICATION SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapters 531 (V1, V2, V3), 220 (V1, V2)
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Define the following.
   1. Distillation
   2. Evaporation
   3. Condensation
   4. Feed
   5. Vapor
   6. Feedwater Treatment
   7. Distillate
   8. Brine
   9. Potable water
   10. Salinity cell
   11. Salinity indicator
   12. Reverse Osmosis System
   13. Permeate
   14. Membranes
   15. Vapor separators
   16. Distillate condenser
   17. Air ejector condenser
   18. Seawater heater
   19. Distillate pump
   20. Brine pump
   21. Vacuum pump
   22. Relief Valve
   23. Temperature Regulator
   24. Condensate Pump
   25. De Superheater
   26. Feed valve
   27. Salinity indicator
   28. Solenoid valve
   29. Air ejectors
   30. Seawater feed pump
   31. Distillate cooler
   32. Automatic Dump Valve
   33. Air Eductor
   34. Overboard Discharge Valve
   35. Suction Valves
   36. Superheater
   37. Array filters
   38. High pressure pump (RO system)
   39. Low pressure pump (RO system)

C. Explain the basic difference between the following types of water purification systems:
   1. Flash
   2. Low-pressure submerged tube
   3. Vapor-compression
   4. Reverse Osmosis

D. State the restrictions for distilling potable water when astern of another vessel or when in close proximity to land.

E. Principals of Operation.
   1. How do the above components work together to achieve the function of producing distillate?

F. Safety Hazards.
   1. Why are there requirements for maintaining the 1st stage vacuum? What is the set value?

**SECTION 1215 – SHIP SERVICE BOILER SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual, COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapters 220 (V1 & V2), 225
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Discuss the following Components and Components Parts.
   1. Boiler Fuel Pump and Regulators
   2. Fuel Solenoid Valve
   3. Feedwater Pumps
   4. Coolers
   5. Relief Valves
   6. Make-up Feedwater Pump
   7. Sight Glasses
   8. Condensate Tank
   9. Steam Shoretie Connections
   10. Chemical Treatment
   11. Fusible Plug
   12. Fire Tube Boiler
   13. Water Tube Boiler

C. Principals of Operation.
   1. Explain how the above components work together to achieve system function.

D. System Interface.
   1. How do the following outside influences affect this system?
      a. Loss of electrical power.
      b. Loss of Auxiliary S/W pressure.
      c. Loss of F/O boost system pressure.
      d. Atmospheric pressure/Engine room vent changes.

   2. How does this system interface with the Feedwater system?

**SECTION 1216 – REFRIGERATION SYSTEM**

A. Reference Material.
1. Naval Engineering Manual, COMDTINST M9000.6 (series)
2. Vessel Environmental Manual COMDTINST M16455.1 (series)
3. Naval Ships Technical Manual, chapters 510 and 516
4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
5. Student Engineer Performance Qualification Guide

B. Define the following terms:
1. High Pressure side
2. Low Pressure side
3. Refrigerant
4. British Thermal Unit (BTU)
5. Super heat
6. Sensible heat
7. Liquid Floodback
8. Latent Heat of Vaporization
9. Compressor(s)
10. Low-temperature switch
11. Low L/O Pressure switch
12. Chilled water pump(s)
13. Strainer(s)
14. Water Regulating Valves (WRV)
15. Thermostatic Switch
16. Seawater reducing station
17. Water failure cutout switch
18. Thermostatic expansion valve (TXV)
19. Evaporator (chiller/freeze box)
20. Rupture Disk
21. Receiver
22. King Solenoid valve
23. Condenser
24. Heat exchanger(s)
25. Dehydrator
26. Evaporator Pressure Regulator valve (EPR)
27. Expansion valves
28. High pressure cutout switch
29. Low pressure cutout switch
30. Compressor capacity control
31. Unloader
32. Hot Gas Circuit
33. Refrigerant Recycling

C. Principals of Operation. Using a line diagram, describe the path of:
1. Refrigerant from the compressor discharge through the system and back to the compressor suction. (Indicating the places where it changes states)
2. Chilled water from the pump discharge through the system and back to the pump suction.
3. Defrost drainage.
4. Refrigerant emergency overboard relief.

D. Safety Hazards.
1. What special safety hazards apply to charging and handling refrigerant?
2. What special safety devices are associated with the chiller?
3. Describe current refrigerant reclamation requirements.

**SECTION 1217 – AIR CONDITIONING AND CHILLER SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Naval Ships Technical Manual, chapter 510
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. A/C Sea Water Pump
   2. Chill Water Pump
   3. Chill Water Loop Cross-Connect System
   4. Chilled Water Head Tanks
   5. Auxiliary S/W to A/C S/W Cross Connect
   6. A/C Compressors
   7. Thermal Expansion Valve (TXV)
   8. Chiller
   9. Heat Exchanger
   10. Condenser
   11. Refrigeration Gas Systems
   12. Chilled Water Expansion Tank
   13. Chiller low temperature cutout

C. System Interface.
   1. How do the following outside influences affect this system?
      a. Loss of Electrical Power.
      b. Loss of Chilled Water Pressure.
      c. Loss of S/W Cooling System Pressure.
   2. How does this system interface with the Auxiliary S/W system?
   3. How does the chill water system interface with the heating system?
   4. How does this system interface with shipboard vital spaces?

D. Safety Hazards.
   1. What are the general safety hazards that apply to this system?
   2. What type of inhibitor is used in the chill water system?

**SECTION 1218 – HEATING AND VENTILATION SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapters 510 and 512.
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Forced Ventilation Units
      a. Ducting
      b. Fans/blowers
      c. Flash Arrestors
      d. Ventilation closures
      e. Vent screens
      f. Air filters

   2. Vent Duct Heaters
      a. Insulation
      b. Heating coils

   3. Steam Heaters
      a. Supply valve
      b. Drain valve
      c. Steam trap
      d. Coil fins
      e. Heating coil fins

   4. Grease Interceptor
      a. Damper control switch
      b. Trap
      c. Drain gutter

   5. Electrical Unit Heaters
      a. Power supply
      b. Unit coils

   6. Fan Coil Units (FCU)
      a. Filter
      b. Coil
      c. Trapped air-bleeding
      d. Draining line

C. Describe the operation and use of two steam traps:
   1. Mechanical (Ball / Bucket)
   2. Thermostatic

D. Explain how to set Positive and Negative ventilation in all Engineering Spaces.

E. System Interface.
   1. Explain the process to shift the cutter chill water system from cooling to heating.
   2. Explain the interface between the ship's boiler system and hot water supply to FCU's.

**SECTION 1219 – ELECTRICAL DISTRIBUTION SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapters 300, 302, 310, 320, 330, 400, and 491.
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide
   5. Student Engineer Personnel Qualification Standard, Section 1102 – Electrical Fundamentals COMDTINST M3502.11 (series)

B. Discuss the following System Components and Component Parts.
   1. Ships service generator
   2. Generator switchboards
   3. Bus Ties and breakers
   4. Distribution and load centers
   5. Synchroscope
   6. Manual Voltage Adjust Rheostat
   7. Droop/Isochronous Switch
   8. Circuit Breaker Mechanical Interlock
   9. Speed Control Potentiometer
   10. Automatic and Manual Bus Transfers
   11. Emergency Generator SWBD
   12. Vital/Non-Vital Circuits
   13. Generator breakers
   14. Voltage Regulator
   15. Automatic Voltage Adjust Rheostat
   16. Phase Sequence Indicator
   17. Reverse Power relays
   18. Voltmeter Switch
   19. Ground Detector Indicators
   20. Synchronizing Mode Select Switch

C. Principles of Operation.
   1. Explain how the above components work together to achieve system function.
   2. What are the sources of power for semi-vital and vital loads using ABTs and MBTs?
   3. What is the function of an ABT? MBT?
   4. What are the principles of overcurrent devices (i.e. Time vs. Amps)?
   5. Explain how the 400HZ Distribution System functions, and how it interfaces with the 60HZ Distribution System.
   6. Explain how generators operate in parallel in terms of voltage and frequency.

D. System Interface.
   1. How do the following outside influences affect this system:
      a. Loss of Shore Power
      b. Loss of Cooling Water to online unit
      c. Load variations
   2. What is loop current? Eddy Current? Self exciting/external excitation?

E. Protection Devices.
   1. State the advantages of fuses vs. circuit breakers.
   2. What is single phasing? Loss of phasing?
   3. What is the difference between marine and shore electrical systems? (i.e. Wye vs. Delta Connections, ungrounded vs. grounded, volt/amp relationship, power factor, 3 phase vs. 1 phase power).

**SECTION 1220 – INTERIOR COMMUNICATIONS SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 430
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. IC Electrician, Volume I, NAVEDTRA 14120
   5. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Ships Telephone System
   2. Sound Power Telephones
      a. List all Sound Powered Phone circuits aboard local cutter.
      b. Discuss the purpose and use of each Sound Powered Phone circuit.
   3. 1 MC
   4. 21 MC
   5. Engine Order Telephone (EOT)
   6. Emergency Bells
   7. Salt and Pepper Line (X40J)
   8. VHF Radio
   9. Messenger
   10. WIFCOM
   11. Switchbox
   12. Jackbox
   13. Selector Switches
   14. Primary Circuit
   15. Auxiliary Circuit
   16. Supplementary Circuits
   17. E-call System
   18. Fiber Optic Cables and Connectors

**SECTION 1221 – GYROCOMPASS SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 420
   3. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   4. Student Engineer Performance Qualification Guide

B. Define the following:
   1. Precession
   2. Apparent rotation
   3. Tumble

C. State the three degrees of freedom exhibited by a gyroscope.

D. Describe the effects of the earth's rotation on a free-spinning gyroscope.

E. Explain how corrective forces (torques) are generated and can change a gyroscope into a gyrocompass that accurately seeks/indicates true North.

F. Explain how roll and pitch information is generated by a gyrocompass and how this information is used.

G. System Components and Component Parts. State the function of the following system components and component parts.
   1. Master gyrocompass
   2. Control cabinet
   3. Synchro amplifier
   4. Repeater(s)
   5. Standby power supply
   6. Alarms and annunciators

H. System Interface.
   1. How does loss of electrical power affect this system?
   2. How does this system interface with the following:
      a. Fire Control Systems
      b. Navigation Systems

**SECTION 1222 – FIREMAIN SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 079 (V1) & 555 (V1)
   3. Cutter Damage Control Book and Drawings
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. Fire Pumps
   2. Pressure Regulating Valve
   3. Firemain Isolation Valves
   4. Firemain Cross Connect Valves
   5. Automatic Regulating Valves
   6. Strainers
   7. Fire Stations

C. Principles of Operation.
   1. How do the above components work together to achieve system function?
   2. State the operating theory of the fire pumps' automatic pressure regulator valve.

D. System Interface.
   1. Discuss how the following outside influences affect this system.
      a. Energizing fire pump with F/M shoretie on the line.
   2. Discuss how this system interfaces with the following systems:
      a. AFFF System
      b. Magazine Sprinkler
      c. Counter Measure Washdown
      d. Ballast/Deballast
      e. Auxiliary Sea Water
      f. Secondary Drainage
      g. LP Air
      h. Emergency Drainage

**SECTION 1223 – AQUEOUS FILM FORMING FOAM (AFFF) SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Naval Ships Technical Manual, chapter 079 (V1) & 555 (V1)
   3. Cutter Damage Control Book and Drawings
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Discuss the following System Components and Component Parts.
   1. AFFF Tank
   2. Proportioner
   3. Balancing Valve
   4. Manual Bypass
   5. Motor Operated Valves

C. Safety Hazards.
   1. What general safety hazards apply to this system?
   2. What are disposal procedures for AFFF? Discuss both regular and emergency disposal.

**SECTION 1224 – AVIATION JP-5 FUEL SYSTEM**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Shipboard – Helicopter Operational Procedures Manual, COMDTINST M3710.2 (series)
   3. Vessel Environmental Manual COMDTINST M16455.1 (series)
   4. Naval Ships Technical Manual, chapter 542
   5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   6. Student Engineer Performance Qualification Guide

B. Discuss the following Components and Component Parts.
   1. Service and Transfer Pumps
   2. Service and Transfer Tanks
   3. Filter Separators
   4. GO-NO-GO Filter
   5. Piping and Valves
   6. Fuel Meter
   7. Stripping and Recirculation Pump
   8. Electrical Controllers
   9. Helicopter In-Flight Refueling (HIFR) Rig
   10. AEL MK I tester
   11. AEL MK III tester

C. Principles of Operation.
   1. State how the above components work together to achieve system function.
   2. State the importance of maintaining clean JP-5 fuel and the importance of recirculation and stripping the service and storage tanks prior to servicing Helicopters.
   3. List the equipment that is required when conducting a HIFR.
   4. Become familiar with the procedures and safety precautions for conducting a HIFR, HOT FUEL, or normal refueling.
   5. State the requirements for conducting JP-5 lab tests.
   6. What is the Flash Point of JP-5?
   7. State the requirements for using non-sparking tools in or near the vicinity of JP-5.

**SECTION 1225 – MISCELLANEOUS AUXILIARY EQUIPMENT**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Vessel Environmental Manual COMDTINST M16455.1 (series)
   3. Applicable Naval Ships Technical Manual chapters; refer to chapter 001, Publication Index.
   4. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings
   5. Student Engineer Performance Qualification Guide

B. Anchor Windlass
   1. What is the function of this system (Wildcat Engaged v/s Wildcat Disengaged)?
   2. Discuss the following System Components and Component Parts.
      a. Master Switch
      b. Wildcat Clutch Lever
      c. Locking Pin
      d. Wildcat Brake Handwheel
      e. Bevel drive and driveshaft
   3. Principles of Operation.
      a. State how the above components work together to achieve system function.
      b. Describe the following modes of operation:
         i. Electrical Control.
         ii. Wildcat Clutch Control.
         iii. Wildcat Brake Control.
         iv. Electric Disc Brake Control.
   4. Safety precautions.
      a. What general safety precautions apply to this system?
      b. How is the load on a SSDG affected by Anchor Windlass operations?

C. Warping Capstan
   1. What is the function of this system?
   2. Discuss the following System Components and Component Parts.
      a. Capstan Head
      b. Disc Brake
      c. Motor Reducer
      d. Bevel drive and drive shaft
      e. Master Switch Control
   3. Principles of Operation.
      a. State how the above components work together to achieve system function.
   4. Safety Hazards.
      a. What general safety precautions apply to this system?
      b. How is the load on a SSDG affected by system operation?

D. Motor Surfboat Davits.
   1. What is the function of this system?
   2. Discuss the following System Components and Component Parts.
      a. Wire rope falls and fittings
      b. Davit arms
      c. Hydraulic Cylinder and Ram
      d. Hoist Winch
      e. Payout Mechanism
      f. Overriding Clutch and brake drum
      g. Hydraulic Reservoir
      h. Motor Operated Pump
      i. Boat Grips
      j. Keel skid/rest

k. Limit Switches
l. Hydraulic Flow Control Valves

3. Principles of Operation.
   a. State how the above components work together to achieve system function.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. How is the load on a SSDG affected by system operation?
   c. What is the normal hoisting weight of this system?

E. Single Point Davit.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Mast
   b. Base
   c. Inner Boom/Outer Boom
   d. Winch
   e. Fairleader
   f. Hydraulic Power Unit (Pump, Motor Reservoir, motor controller)
3. Principles of Operation.
   a. State how the above components work together to achieve system function.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. How is the load on a SSDG affected by system operation?
   c. What is the normal hoisting weight of the system?

F. Cutter Cranes.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Crane Boom
   b. Crane Winches
   c. Stops/Automatic Cutout Devices
   d. Wire Rope/Rigging
   e. Turrent and Swing Drives
   f. Crane Controls
3. Principles of Operation.
   a. State how the above components work together in this system.
   b. How does this system integrate with the buoy handling system?
   c. State the locations and methods of crane control.
   d. What are the rated speeds and load limits of crane operation?
   e. What system provides power for crane operations? Discuss method of power transmission.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. Discuss the importance of the crane rigging system.

G. Cross Deck Winch System.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Hydraulic Motor
   b. Brake
   c. Planetary Gearbox
   d. Winch Drum
   e. Warping Head
   f. Drum Jaw Clutch
   g. Tension Display
3. Principles of Operation.
   a. State how the above components work together in this system.

b. How does this system integrate with the buoy handling system?

4. Safety Precautions.
   a. What general safety precautions apply to this system?

H. Buoy Mooring Chain and Sinker Handling System.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Chain Stoppers (Mechanical/Hydraulic)
   b. Rising Sheave Assembly
   c. Chain Winch
3. Principles of Operation.
   a. State how the above components work together in this system.
   b. How does this system integrate with the buoy handling system?
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. What specific safety concerns involve the recovery of excessive weights?

I. Buoy Griping System.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Hydraulic Cylinder
   b. Self adjusting Sheave
   c. Wire Rope Assembly and Grab Hook Clevis
3. Principles of Operation.
   a. State how the above components work together to achieve system function.
   b. How does this system integrate with the buoy handling system?
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. What specific safety devices prevent over-tension?

J. Self-Contained Breathing Apparatus (SCBA) Compressors.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Drive Engine
   b. Compressor Unit
   c. Pre-filter Assembly
   d. P1 Purification System
   e. Hose Fill Assemblies
3. Principles of Operation.
   a. State how the above components work together to achieve system function.
   b. State the procedure for filling SCBA cylinders.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. What actions are required when oil residue is detected in delivered air?
   c. What actions are required if compressor fails to achieve rated final pressure?
   d. What are the procedures for SCBA air quality testing?
   e. How are air quality discrepancies corrected?

K. Telescopic Helicopter Hangars.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Hangar Drive Assembly
   b. Door Drive Assembly
   c. Track Assembly
   d. Door Assembly
3. Principles of Operation.

a. State how the above components work together to achieve system function.
b. State the environmental limits for hangar operation.

4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. What is the procedure for retracting and extending the hangar?
   c. What is the procedure for opening and closing the door?

L. Cutter Incinerators.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Burner
   b. Flue Gas Fan
   c. Flue Gas Damper
   d. Sludge Burner
   e. Sludge Burner Valve
   f. Sludge Tank
   g. Circulating Pump
   h. Thermostat
   i. Electrical Heater
3. Principles of Operation.
   a. State how the above components work together to achieve system operation.
   b. What actions are required for a malfunctioning sludge dosage valve?
   c. How are remnants of particulate matter in the gas flow neutralized?
4. Safety Precautions.
   a. What general safety precautions apply to this unit?
   b. How are remnants of particulate matter in the gas flow neutralized?
   c. What actions are required for a “Flame Failure” alarm?
   d. What actions are required for Flue Gas Temp or Combustion Chamber Temp High Temperature alarms?

M. Aircraft Ship Integrated Secure and Traverse (ASIST) System.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Aircraft probe
   b. Rapid Securing Device (RSD)
   c. Helicopter Positioning and Sensing Equipment (HPSE)
   d. Track Assembly
3. Principles of Operation.
   a. State how the above components work together to achieve system operation.
   b. How does this system integrate with the other portions of the aviation facilities onboard the cutter?
   c. State the procedure(s) for using the system.
   d. Describe the differences between an ASIST system versus a TALON equipped flight deck, including operation.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. State the limits of operation for this system.
   c. What advantages and disadvantages does this system provide in regards to flight operations?

N. Small Boat Stern Launch and Recovery System.
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Stern Notch
   b. Overhead Traveling Crane
   c. Boat Hoist Trolley Carriage(s)
   d. Small Boat Cradles

e. Capture/Carriage Winches
f. Stern Doors
g. Controls, Interlocks, and Human Interface

3. Principles of Operation.
   a. State how the above components work together to achieve system operation.
   b. How does this system integrate with the other portions of the small boat handling facilities on the cutter?
   c. State the procedure(s) for using the system, including:
      i. Launching of the small boat(s)
      ii. Recovery of the small boat(s)
      iii. Traversing and stowage of the small boat(s)
   d. Describe the difference between the NSC Stern Launch and Recovery System versus other stern launch and recovery systems in the Coast Guard.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. State the environmental limits of operation for this system.
   c. What advantages and disadvantages does this system provide in regards to small boat operations?
   d. What emergency procedures exist for the system?

O. Fin Stabilization System(s).
1. What is the function of this system?
2. Discuss the following System Components and Component Parts.
   a. Fin Stabilizers
   b. Rudder Roll Stabilizers (if any)
   c. Hydraulic Power Unit
   d. Control system
   e. Gain and Speed Controls
   f. Automatic and Manual Operation Modes
   g. Inflatable Boot
   h. Manual hand Pump
3. Principles of Operation.
   a. State how the above components work together to achieve system operation.
   b. How does this system integrate with the other portions of the cutter's propulsion system.
   c. State the procedure(s) for using this system.
4. Safety Precautions.
   a. What general safety precautions apply to this system?
   b. State the environmental limits of operation for this system.
   c. What advantages and disadvantages does this system provide?
   d. What emergency procedures exist for this system?
   e. What precautions should be followed prior to maintenance being performed on the system?

**SECTION 1301 – REQUIRED TASKS**

**SIGNATURE/DATE**

**A.** Complete the Personnel Qualification Standard for Basic Damage Control **(NAVEDTRA 43119 (series))** within six months of reporting aboard. _____

**B.** Complete the Scene Leader and Repair Party Leader Sections of Advanced Damage Control Emergency Parties Personnel Qualification Standard **(NAVEDTRA 43119 (series))**. _____

**C. CASUALTY CONTROL**

1. Demonstrate ability to recognize and associate casualty symptoms on the respective machinery and systems outlined in the Casualty Control Manual. _____
2. At the following positions, successfully demonstrate proficiency in executing initial response and remedial action procedures for the machinery and systems outlined in the Casualty Control Manual.
   a. Oiler _____
   b. Throttleman _____
   c. Engineer of the Watch _____

**D.** Successfully pass the Chapter 1 Basic Shipboard Engineering knowledge written test within 1 year of reporting aboard. _____

**E. QUALIFY AS SYSTEM OPERATOR ON THE FOLLOWING NON-WATCH STATION EQUIPMENT**

1. Oily Water Separator (OWS) _____
2. Fuel Oil Purifier (FOP) _____
3. Lube Oil Purifier (LOP) _____
4. Boiler Feedwater Treatment _____
5. Air Conditioner & Refrigeration Machinery _____
6. Incinerator _____

**F. QUALIFY AS INPORT EOW** _____

**G. QUALIFY IN ALL UNDERWAY ENGINEERING WATCHES THROUGH EOW** _____

**H. QUALIFY AS FUEL OIL AND WATER KING (FOWK)** _____

**I. QUALIFY AS SMALL BOAT ENGINEER** _____

**J. OER/EDUCATION RECORD ENTRY OF CHAPTER 1 COMPLETION (SUPERVISOR ACTION)** _____

**COMPLETION RECORD OF CHAPTER 1**

| **FUNDAMENTALS** | **SIGNATURE/DATE** |
|---|---|
| 1101 Mechanical Fundamentals | _____ |
| 1102 Electrical Fundamentals | _____ |
| 1103 Safety Fundamentals | _____ |
| 1104 Hydraulic Fundamentals | _____ |
| 1105 Electric Drive Propulsion Fundamentals | _____ |
| 1106 Welding and Cutting Fundamentals | _____ |
| 1107 Casualty Control Fundamentals | _____ |
| **SYSTEMS** | |
| 1201 Diesel Engine System (MDE, SSDG, EDG) | _____ |
| 1202 Gas Turbine System | _____ |
| 1203 Propulsion Shafting, Bearings, Propellers, and Reduction Gear Systems | _____ |
| 1204 Controllable Pitch Propeller System | _____ |
| 1205 Steering System | _____ |
| 1206 Diesel Engine Jacket Water System (MDE, SSDG) | _____ |
| 1207 Seawater System | _____ |
| 1208 Fuel Oil and Lube Oil Systems | _____ |
| 1209 Compressed Air System (Low Pressure, High Pressure, and Starting Air) | _____ |
| 1210 Ballast, Deballast, and Stripping System | _____ |
| 1211 Bilge Drainage Systems | _____ |
| 1212 Sewage Collection, Holding, and Transfer (CHT) System | _____ |
| 1213 Potable Water System | _____ |
| 1214 Water Purification System | _____ |
| 1215 Ship Service Boiler System | _____ |
| 1216 Refrigeration System | _____ |
| 1217 Air Conditioning and Chiller System | _____ |
| 1218 Heating and Ventilation System | _____ |
| 1219 Electrical Distribution System | _____ |
| 1220 Interior Communications System | _____ |
| 1221 Gyrocompass System | _____ |
| 1222 Firemain System | _____ |
| 1223 AFFF System | _____ |
| 1224 Aviation JP-5 Fuel System | _____ |
| 1225 Miscellaneous Auxiliary Equipment | _____ |
| **PERFORMANCE QUALIFICATION** | |
| 1301 Required Tasks | _____ |

# Chapter 2
# DAMAGE CONTROL ASSISTANT/SENIOR ENLISTED SCHOOL

Damage Control Assistant/Senior Enlisted (DCASE) School. Completion of chapter 1 is normally a prerequisite for attending DCASE School. Officers shall not be assigned to the position of DCA without having successfully completed DCASE School. EOs shall screen student engineers for their career intentions for remaining on a naval engineering career track. Student engineers identified with career intentions outside of naval engineering are authorized waivers of chapter 2, "DCASE School Requirements", by their Commanding Officer.

## SECTION 2101 - DAMAGE CONTROL ASSISTANT / SENIOR ENLISTED (DCASE) SCHOOL

**A. DAMAGE CONTROL ASSISTANT.** Upon completion of chapter 1, the student engineer shall attend Damage Control Assistant/Senior Enlisted (DCASE) School (A-4G-1111, USCG Course Code 240140). COMDTINST M3502.4, Cutter Training and Qualification Manual require a prospective Engineer Officer (EO), to successfully complete DCASE School prior to assignment as EO on the following cutter classes: WAGB, WHEC, WMEC, WTGB, WMSL, WLBB, WLB, and WIX. DCASE school is also a prerequisite for holding the position of Damage Control Assistant. Completion of DCASE school shall be documented within the student engineer's Officer Evaluation Report (OER) and form CG-4082, Officer Educational Record.

1. Successfully completed Damage Control Assistant/Senior Enlisted course:

_____
Date of course completion

_____
Signature (Supervisor)

2. Enter Damage Control Management (NE-DCM) competency into officer's Direct Access record:

_____
Date of competency entry

_____
Signature (Supervisor)

3. OER Entry of chapter 2 completion (Supervisor Action)

_____
Date

_____
Signature (Supervisor)

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# Chapter 3
# Engineering Training and Administration Afloat

Engineering Training & Administration. The emphasis of chapter 3 is to develop the knowledge and skills to serve in the capacity of an engineering department division officer and to sharpen EOW skills acquired in chapter 1.

A. The student engineer shall:
   1. Be assigned (at the EO's Discretion) and serve in the capacity of an engineering department division officer.
   2. Serve as a member of the EOW watch rotation.
   3. Continue to seek feedback from the EO.

B. The EO shall:
   1. Continue to supervise, instruct, and provide frequent feedback to the student engineer.
   2. Continue counseling sessions at least once per month to review the student engineer's notebook and evaluate his/her progress.

**SECTION 3101 – ENGINEERING AFLOAT ADMINSTRATION FUNDAMENTALS**

A. Reference Material:
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. Cutter Organizational Manual, COMDTINST M5400.16 (series)
   3. Naval Ships Technical Manual, chapter 074 (V3) & 555 (V1)
   4. Engineering Department Organization & Regulations Manual
   5. Manufacturers' Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings.

B. Discuss the content of the following documents:
   1. Cutter Organization Manual (COM)
   2. Standard Operating Procedures (SOP)
   3. Casualty Control Manual
   4. Machinery Space Firefighting Doctrine
   5. PMS Manuals for Main Propulsion, Auxiliary, Electrical, and Damage Control
   6. Damage Control Books and Drawings
   7. Ship's Information Books
   8. EO Standing Orders
   9. Training and Education Manual, COMDTINST M1500.10
   10. Cutter Training and Qualification Manual, COMDTINST M3502.4I
   11. Supply Policies and Procedures Manual, COMDTINST M4400.19
   12. Safety and Environmental Health Manual, COMDTINST M5100.47
   13. Directives, Publications, and Reports Index, COMDTNOTE 5600

C. State the duties of the following as defined in the COM.
   1. Commanding Officer
   2. Engineer Officer
   3. Main Propulsion Assistant
   4. Auxiliary Assistant
   5. Electrical Officer
   6. Damage Control Officer
   7. Training Officer
   8. Safety Officer
   9. Executive Officer

10. Officer of the Deck
11. Damage Control Petty Officer
12. Engineering Admin Assistant
13. Damage Control Assistant
14. Gas Free Engineer
15. Engineer Officer of the Watch (EOW)

D. For all watchstations listed below, explain the duties and responsibilities as defined in the EO Standing Orders:
   1. EOW
   2. Security Watch
   3. Throttleman
   4. Auxiliary Watch
   5. Fuel Oil and Water King
   6. Duty Damage Controlman
   7. Duty Electrician
   8. Damage Control Petty Officer

E. State the purpose of the following logs/reports. Which are legal records?
   1. Bell Log/Data Log
   2. Engine Operating Record
   3. Engineer Officer's Standing Orders
   4. Machinery Log
   5. Fuel and Water Report
   6. Fueling Record
   7. Cutter Monthly Fuel Message
   8. Engineer Officer's Night Order Book
   9. Heat Stress Survey
   10. Tag-out Log
   11. Damage Control (DC) Closure Log
   12. EC File
   13. Cathodic Protection Log (Zinc Log)
   14. Hose Log
   15. Flex Joint Log
   16. Diesel Engine Maintenance Program (DEMP) log
   17. Water Chemistry Log
   18. Light Off and Securing Schedule
   19. Cutter Engineering Report
   20. End of Patrol Summaries
   21. Boat Inspection Reports
   22. Underwater Body Inspection Report
   23. Monthly Fuel Report
   24. Post Availability Reports
   25. CASREP File
   26. LOGREQ File
   27. Machinery History Files
   28. Hull History Files
   29. Gyro Maintenance Log
   30. Marine Gas Turbine Log
   31. Gas Free Engineering Log
   32. J/W Test Log
   33. Underwater Body Inspection Report

F. State the purpose of the following:
   1. Gas-Free Engineer
   2. Gauge Calibration Program

3. PMS Program
4. CSMP Program
5. ECR Program
6. Hazardous Material Control Program
7. Hot Work Safety Program
8. Damage Control Petty Officer Program
9. Long Range Maintenance Program
10. Cutter Class Maintenance Plan

G. Explain the following as applied to the equipment safety tag-out system:
   1. Duties of authorizing officer, person attaching tag, person checking tag, and repair activity.
   2. Use of Caution Tag or Danger Tag.
   3. Out-of-calibration label.
   4. Out-of-commission label.
   5. Location and custody of tag-out log on your ship for both Engineering and Operations.
   6. Function of tag-out log audit.
   7. Equipment or conditions requiring Commanding Officer's permission.
   8. Independent checks by the person attaching the tag and person checking the tag (i.e. 1st person hangs all the tags, then the 2nd person does their check).

H. Explain your ship's restricted maneuvering policy.

I. Explain the procedures for drafting the following correspondence:
   1. CASREP
   2. BOAT ECR
   3. PMS Change Request
   4. ECR
   5. LOGREQ
   6. ORDALTS

**SECTION 3102 – STABILITY AND BUOYANCY FUNDAMENTALS**

A. Reference Material.
   1. Naval Ships Technical Manual, chapter 079 (V1)
   2. Cutter Repair Party Manual
   3. Naval Engineering Manual, COMDTINST M9000.6 (series)
   4. Cutter Damage Control Book and Drawings
   5. Manufacturer's Technical Publications, Ship's Information Books, Casualty Control Manual, Ship's Drawings

B. Define the following terms, and discuss how they effect and relate to cutter stability:
   1. Displacement
   2. Volume
   3. Density
   4. Weight
   5. Buoyancy
   6. Trim
   7. Stability
   8. Moment
   9. Displacement
   10. Draft
   11. Calculative draft marks
   12. Force of buoyancy
   13. Mean draft
   14. Heel marks
   15. Freeboard
   16. Pitch
   17. Limiting draft marks
   18. List
   19. Roll period
   20. Free surface
   21. Lolling
   22. Wind
   23. Center of buoyancy
   24. Center of gravity
   25. Force
   26. Solid flooding
   27. Loose water
   28. Free surface effect
   29. Free communication effect
   30. Maximum load condition
   31. Force of gravity
   32. Navigational draft marks
   33. Reserve buoyancy
   34. Center of floatation
   35. Overall stability
   36. Righting moment
   37. Righting arm
   38. Metacenter
   39. Metacentric height (positive and negative)
   40. Danger angle
   41. Floodable length
   42. Yaw
   43. Ice build-up
   44. Minimum load condition

C. Describe the use and mechanics of the inclining experiment.

D. Discuss changes of trim and list and the effect on overall stability.

E. Identify the effects on transverse and/or longitudinal stability when the following are applied to liquid load and/or solid load (cargo, equipment):
   45. Weight additions
   46. Weight removals
   47. Weight shifts

F. Define the following methods of correcting list and trim caused by unequal weight distributions:
   1. Ballasting
   2. Jettisoning Weights
   3. Counter-flooding
   4. Lower solid weights

G. Describe the impact of Free Surface Effect on stability and why it should be minimized.

H. Describe the three possible causes of list and how to correct for each.

I. Define Critical Draft. Why is it important to know during drydocking or grounding situations?

J. State the most common causes of flooding.

**SECTION 3103 – TRAINING FUNDAMENTALS**

A. Reference Material.
   1. Cutter Organization Manual, COMDTINST M5400.16 (series)
   2. Cutter Training & Qualifications Manual, COMDTINST M3502.4 (series)
   3. Training & Education Manual, COMDTINST M1500.10 (series)

B. Define the following types of training:
   1. PQS
   2. Command Assessment Of Readiness & Training (CART)
   3. Tailored Ship's Training Availabilities (TSTAs)
   4. Tailored Annual Cutter Training (TACT)
   5. Team Training
   6. Divisional training
   7. Training Teams (DCCT, ETT)
   8. Correspondence courses
   9. Standard Training Requirements (STRS)
   10. Departure Readiness Exams (DERE)
   11. Training Availability (TRAV)
   12. On-the-job training
   13. Striker program
   14. Drills
   15. Battle problems
   16. Fast Cruise
   17. Training and Readiness Evaluation (TRE)
   18. MLC Compliance Inspection Training Component
   19. Resident Training Courses
   20. Fleet Exercises (FLTEX)
   21. Basic Engineering Casualty Control Exercise (BECCE)
   22. Helo Standardization Training (STAN)
   23. Limited Team Training (LTT)

C. State the responsibilities of the following personnel in developing the department/division training plan:
   1. Division Officer
   2. CPO/LPO
   3. Safety Officer
   4. Medical Dept Rep
   5. Department Head
   6. Training Officer
   7. Executive Officer
   8. DCA

D. State the purpose, content, and procedures for completing the following records:
   1. Quarterly Training Plan
   2. Divisional Training Plan
   3. Watch Qualifications Record/Board
   4. Individual Training Record (ITR)
   5. Individual Development Plan (IDP)
   6. Training Management Tool (TMT)
   7. Personnel Competency Codes

E. Explain how the department maintains records of personnel qualification in the following:
   1. Watchstanding
   2. Advanced Damage Control
   3. First Aid

4. Basic Damage Control
5. Repair Locker Team Member
6. Helo Firefighting

F. Explain how to properly document (i.e. letter, CG-3307 Admin Remarks, Officer Educational Record CG-4082) PQS completion.

G. What is the purpose of the Training Board? List the required members and their functions.

H. What is the difference between a JQR (Job Qualification Requirement) and PQS? PQS and formal schooling?

**SECTION 3104 – CORRESPONDENCE FUNDAMENTALS**

A. Reference Material.
   1. Cutter Organization Manual, COMDTINST M5400.16 (series)
   2. Standardized Subject Identification Codes (SSIC) Manual, COMDTINST M5210.5 (series)
   3. Correspondence Manual, COMDTINST M5216.4 (series)
   4. Naval Engineering Manual, COMDTINST M9000.6 (series)
   5. Directives, Publications & Reports Index, COMDTNOTE 5600
   6. Telecommunications Manual, COMDTINST M2000.3 (series)

B. State the purpose of the following types of correspondence:
   1. Business Letter
   2. Memo
   3. Digest

C. State the purpose of the Standard Subject Identification Code (SSIC).

D. Define the following:
   1. Routine
   2. Priority
   3. Immediate
   4. Flash

E. What is the function of a date/time group on a message?

F. State who has “releasing” authority on board your cutter.

G. Discuss “minimize” and its effects on normal traffic.

H. Discuss the purpose and use of address indicating groups.

I. Explain the meaning of “By Direction Authority.”

J. CASREP
   1. Explain how assistance is rendered to a cutter that is underway.
   2. Explain how a cutter receives procurement support for a CASREP. How are CASREPs funded?
   3. How are CASREPs classified?
   4. How is outside assistance requested?
   5. Explain importance of proper CASREP formatting and the impact on autoloading into the FLS system. Explain importance of identifying the appropriate EIC.
   6. Explain how the CASREP System interfaces with:
      a. SORTS
      b. Fleet Logistics System (FLS) for autoloading into system.
      c. Equipment Identification Code (EIC)
      d. CMPlus and CASREP drafting capability.

**SECTION 3105 – MANAGEMENT FUNDAMENTALS**

A. Reference Material.
   1. Personnel Manual, COMDTINST M1000.6 (series)
   2. Leave and Earnings Statement (LES)
   3. Medals and Awards Manual, COMDTINST M1650.25 (series)
   4. United States Coast Guard Regulations, COMDTINS M5000.3 (series)
   5. Training and Education Manual, COMDTINST M1500.10 (series)
   6. Military Justice Manual, COMDTINST M5810.1 (series)
   7. Uniform Code of Military Justice
   8. Personnel and Pay Procedures, PSCINST M1000.2 (series)
   9. Thrift Savings Plan, (www.tsp.gov)

B. Define the Selected Reenlistment Bonus (SRB) system.

C. Explain the TSP Program.

D. Define the available retirement programs.

E. Explain final pay, high-three, and redux. What are the requirements for member counseling at the 15 year point?

F. Explain how to fill out an E-resume.

G. Discuss the procedure required to request the following:
   1. "A" School/"C" School
   2. Officer Candidate School
   3. Tuition Assistance
   4. Naval Engineering Technology (NET) Program
   5. PG/Advanced Training

H. Discuss the information contained in a Leave and Earnings Statement (LES).

I. What is the CG's policy on
   1. Indebtedness and financial responsibility?
   2. Government travel card?
   3. Controlled substances?

J. What assistance can be obtained from the following:
   1. Navy Relief Society
   2. American Red Cross
   3. Mutual Assistance Officer
   4. Family Service Center
   5. Civil Rights Officer
   6. Public Affairs Officer
   7. Morale Officer
   8. Employee Assistance Program
   9. Work Life Office
   10. Special Needs Program

K. Discuss the sequence of events when processing the following requests:
   1. Leave (normal/emergency)
   2. Standby/Exchange of duty
   3. Hardship Transfer
   4. Request Mast
   5. Humanitarian Transfer

6. Unsuitability

L. State the process for recommending an individual for an award.

M. What are the responsibilities of a Command Master Chief (CMC)?

N. What is a Report of Offense and Disposition, CG-4910?

O. What are the responsibilities of a Mast Representative?

P. What are the responsibilities of a Preliminary Investigating Officer?

Q. Explain the duties of the Command OMBUDSMAN.

R. Explain the Commandant's policy on Human Relations, Sexual Harassment, and Equal Opportunity.

S. Display familiarity with procedures for enlisted personnel advancement, enlisted personnel evaluations and administrative remarks.

**SECTION 3106 – LOGISTICS AND FINANCIAL MANAGEMENT FUNDAMENTALS**

A. Reference Material.
   1. Supply Policy and Procedures Manual (SPPMI), COMDTINST M4400.19 (series)
   2. Naval Engineering Manual, COMDTINST M9000.6 (series)
   3. Casualty Reporting (CASREP) Procedures (MATERIEL), COMDTINST M3501.3 (series)
   4. MLC Standard Operating Procedures
   5. Coast Guard Simplified Acquisition Procedures Handbook, COMDTINST M4200.13 (series)
   6. Property Management Manual COMDTINST M4500.5 (series)
   7. Afloat Supply Procedures Manual, NAVSUP PUB 485 (V1)

B. Define the following:
   1. Equipment
   2. Equipage
   3. Repair parts
   4. Consumables
   5. COSAL
   6. CMplus
   7. Vessel Logistics System (VLS)
   8. Fleet Logistics System (FLS)
   9. CG-Part
   10. Mandatory turn-in items (MTI)
   11. Depot level repair (DLR)
   12. DD-1149
   13. Annualized OM&S Consumption Report (AOCR)
   14. Selective Item Management (SIM)
   15. MILSTRIP
   16. Issue Release/Receipt Document (DD-1348)
   17. GSA Schedule
   18. National Stock Number (NSN)
   19. COG Symbol
   20. Allowance Part List (APL)
   21. Combined Parts List (CPL)
   22. Allowance Equip List (AEL)
   23. Manufacture’s Cage number
   24. Manufacture’s Part Number
   25. General Purpose Property
   26. Configuration Change Form (OPNAV 4790/CK)
   27. Cutter Configuration Request (CCR)
   28. Warranty Notice
   29. Government Furnished Equipment/Material (GFM)
   30. Inventory Control and Compliance Program (ICCP)
   31. Defense Reutilization and Marketing Office (DRMO)
   32. CMP
   33. NE-TIMS
   34. SDR/QDR

C. What is the purpose and functional parts of the Vessel Logistics System (VLS)?

D. Explain the importance of Configuration Management and the effects of a configuration change on:
   1. Storeroom Inventory
   2. Equipment Maintenance
   3. Technical Documentation
   4. Casualty Response
   5. Engineering Change Planning
   6. CMplus

7. FLS

E. Discuss the consequences of uncontrolled or undocumented configuration changes.

F. Explain the policy for using CMplus.

G. Discuss the functions of CMplus.

H. Explain the policy for drafting a CASREP.

I. Describe unit procedures for the receipt and storage of supplies during both working and non-working hours.

J. Explain the policy of the Uniform Material Movement and Issue Priority System (UMMMIPS).

K. Discuss using the GSA supply schedule.

L. State the purpose and content of all the supply forms used for ordering parts/services.

M. State the step-by-step procedures for ordering and procuring material through the ship's supply organization.

N. Discuss the type, method, and procedure for tracking outstanding requisitions in material procurement.

O. State the conditions under which material can be surveyed and initiate a survey.

P. Define the QDR/SDR process and use of ELC website for report submission.

Q. State the importance and procedures in handling DLR/MTI items, and the financial consequences to your unit for failure to return these items.

R. Discuss the methods a Division Officer can utilize to improve the material management effectiveness within his/her shipboard supply organization.

S. Explain the difference in the requirements when ordering an item that costs less than $100 and one that costs over $2500.

T. Explain the difference between AFC-30 and AFC-45 funds.

U. Explain how to use APL/CPL/AEL and CMPs as requisitioning guides.

**SECTION 3201 – REQUIRED TASKS**

**SIGNATURE/DATE**

A. **ENGINEERING AFLOAT ADMINISTRATION.**

1. Prepare and submit the following:
   a. Cutter Engineering Report _____
   b. Cutter Monthly Fuel Report/Message _____
   c. End of Patrol Summary _____
   d. Quarterly Energy Consumption Report _____
   e. Quarterly Energy Cost Report _____
   f. Boat Inspection Report _____
   g. CSMP _____
   h. CMplus SMP _____
2. Review, update, and maintain the following files:
   a. Damage Control Closure Log _____
   b. Diesel Engine Maintenance Program _____
   c. Machinery History File _____
   d. Hull History File (Assist 1st LT) _____
   e. PMS Completion Status _____
   f. ECR Files _____
   g. CSMP Files _____
   h. Lube Oil Analysis _____
   i. Machinery Log _____
   j. Daily Fuel, Oil, and Water Report _____
   k. CASREP File _____
   l. Electrical Tag-Out Log (Assist EMC) _____
   m. NEPL _____
3. Document Gas Free and Hot Work evolutions _____
4. Draft a MISHAP Report _____

B. **STABILITY AND BUOYANCY**

1. Provide the Commanding Officer with daily Liquid load status _____
2. Become familiar with the Cutter Stability and Loading Data Booklet or the DC Book _____
3. Demonstrate proficiency in executing the procedures of the Fuel Transfer and Ballast Bill and the Stability and Liquid Loading instructions of your cutter _____
4. Demonstrate correcting and restoring the cutter to correct trim and list _____
5. Calculate your cutters Metacentric Height (GM) in all conditions _____
6. Determine Critical Draft when going into Drydock _____

C. **TRAINING**

1. Develop, implement, and monitor the effectiveness of the Engineering Department and Unit Damage Control Weekly and Quarterly Training (drills, instruction) Plan. _____
2. Qualify as a member of the Damage Control Training Team (DCTT) and the Engineering Casualty Control Training Team (ETT/ECCTT) _____
3. Monitor qualification and ensure that

Engineering Watchstanders and Repair Locker personnel are qualified in their assigned positions. _____

4. Maintain Department Training Records (Formal Schools, PQS, JQR, OJT) _____

D. **CORRESPONDENCE**

1. Properly draft the following forms of correspondence:
   a. Business Letter _____
   b. Memo _____
   c. CASREP/CASREP UPDATE/CASCOR _____
   d. ECR _____
   e. PMS Change Request _____
   f. POLREP _____

E. **COUNSELING**

1. Evaluate Division Personnel; Enlisted Performance Evaluation Forms (EPEF) _____
2. Document adverse and commendable Achievements on CG-3307, Administrative Remarks. _____
3. Draft and submit a sample OER _____
4. Participate in a mentoring session _____

F. **LOGISTICS & FINANCIAL MANAGEMENT**

1. Draft a procurement request for the following amounts:
   a. Under $250 (SF1165) _____
   b. $1 to $2499 _____
   c. $2500 to $25,000 _____
   d. Over $25,000 _____
   e. Sole Source Justification _____

2. Prepare and forward the following:
   a. Shipboard Parts Requisition (NAVSUP 1250-1) _____
   b. Allowance Change Request (NAVSUP 1220-2) _____
   c. Report of Discrepancy (SF-364)
   d. Stock Record Card (1114m) _____
   e. Quality Deficiency Report (QDR) _____
   f. Supply Discrepancy Report (SDR) _____
   g. Requisition and Invoice Shipping Document (DD-1149) _____
   h. MILSTRIP Requisition (DD-1348) _____

3. Draft a Divisional Budget and Spending Plan. _____

4. Prepare a Ship's Configuration Change Form,
   a. Equipment Addition _____
   b. Equipment Modification _____
   c. Equipment Removal _____
   d. Equipment Relocation _____

**COMPLETION RECORD OF CHAPTER 3**

| **FUNDAMENTALS** | **SIGNATURE/DATE** |
|---|---|
| 3101 Engineering Administrative Fundamentals | _____ |
| 3102 Stability and Buoyancy Fundamentals | _____ |
| 3103 Training Fundamentals | _____ |
| 3104 Correspondence Fundamentals | _____ |
| 3105 Counseling Fundamentals | _____ |
| 3106 Logistics and Financial Management Fundamentals | _____ |

**PERFORMANCE QUALIFICATION**

3201 Required Tasks _____

**ENTER COMPETENICES ACHIEVED FOR COMPLETION OF STUDENT ENGINEER PROGRAM. COMPETENCIES FOR CHAPTERS 1, 2, AND 3 ARE: ENG-SH1, MKADMAFL, NE-AE, NE-AT, AND NE-DMM.**

Competencies entered _____

**OER ENTRY OF CHAPTER 3 COMPLETION (SUPERVISOR ACTION)**

OER entry completed _____

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# Chapter 4
# DECK WATCH OFFICER

Deck Watch Officer (DWO) Training. Procedures for completing chapter 4 are outlined in chapter 6 of COMDTINST M3502.4 (series), Cutter Training and Qualification Manual.

## SECTION 4101 - DECK WATCH OFFICER (DWO) TRAINING

A. Chapter 6 of COMDTINST M3502.4 (series), Cutter Training and Qualification Manual, provides guidance for completing DWO options 1 and 2.

1. Completed option 1

_____
Date of Completion

_____
Signature (Supervisor)

2. Completed option 2

_____
Date of Completion

_____
Signature (Supervisor)

3. Enter appropriate competency (for cutter class) achieved for OOD qualification if chapter 4, option 2 was completed.

_____
Date of Completion

_____
Signature (Supervisor)

4. OER Entry of chapter 4 completion (Supervisor Action)

_____
Date of Completion

_____
Signature (Supervisor)

**********

**NOTE:** While completion of option 2 is not required to be assigned as an EO, it is strongly encouraged, and is necessary to become a fully qualified underway OOD and to be listed in a cutter's Succession to Command. In addition, completion of option 2 enhances an officer's competitiveness for future promotion opportunities, including XO afloat. Completion of option 2 is a prerequisite to screen for command afloat.

**********

# Chapter 5
## Naval Engineering & Engineering Maintenance Management

Naval Engineering and Engineering Maintenance Management. Chapter 5 may be addressed during the initial afloat tour but should be completed during a follow on tour. The EO or Supervisor/Reporting Officer shall properly document the completion in the officer's OER and on Form CG-4082 Officer Educational Record.

**SECTION 5101 – ENGINEERING ADMINSTRATION FUNDAMENTALS**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. MLCP and MLCA Standard Operating Procedures
   3. Financial Resource Management Manual (FRMM), COMDTINST M7100.3 (series)
   4. Major Systems Acquisition Manual (MSAM), COMDTINST M5000.10 (series)
   5. Shipboard-Helicopter Operational Procedures Manual, COMDTINST M3710.2 (series)
   6. Coast Guard Engineering Logistics Concept of Operations COMDTINST 4100.7 (series)

B. Understand and describe the various manager roles presented in the ECONOP, COMDTINST 4100.7 (series). Discuss which part of the naval engineering system performs each role.

C. Naval Engineering Support Unit (NESU)
   1. What are the primary functions and responsibilities of a NESU port engineer?
   2. Explain how a cutter, NESU, and MLC interface.
   3. What type and degree of maintenance and logistic support do the NESU's provide to Area district, and sector cutters and boats?
   4. Explain the annual NESU budget request process.
   5. State the primary function of a Maintenance Augmentation Team (MAT) and Weapons Augmentation Team (WAT). What is the process for requesting and coordinating MAT/WAT assistance for units?
   6. What is the primary function of a Coast Guard Industrial Support Activity? How are Work Orders processed? Who funds Industrial work?

D. Headquarters Naval Engineering Division Commandant (CG-45)
   1. Describe the organizational structure of Commandant CG-45.
   2. What is the function and primary responsibility of:
      a. CG-451, Program Management Division
      b. CG-452, Projects Division
      c. CG-453, Environmental Division

   3. Define, state the purpose of, and identify who is required to serve on the following boards:
      a. Ship Structure and Machinery Evaluation Board (SSMEB).
      b. Machinery Evaluation Board (MEB).
      c. Ship Structure Evaluation Board (SSEB)
      d. Boards of Survey for Boats

   4. Who initiates Resource Proposals (RPs) for Naval Engineering?

   5. Define Resource Proposal (RP), and the role RPs play in the annual Coast Guard budget Request Process.

6. Define the following funds: How are RPs submitted for each? Does Commandant CG-45 control the fund? If not, what HQ division does? How are funds allocated to the MLCs, Districts, and SCCB?
   a. OE: AFC-30, AFC-45, AFC-77
   b. AC&I
   c. EC&R
   d. RDT&E

E. Other CG Headquarters Directorates (CG-7, CG-8, CG-9)
1. What is the function and primary responsibility of:
   a. CG-93, Acquisition Programs
   b. CG-933, Surface Acquisition Programs
   c. CG-934, Non-Major Acquisition Programs
   d. CG-4B, Deepwater Systems Integration
   e. CG-751, Cutter Forces
   f. CG-731, Boat Forces
   g. CG-8, Planning, Resources, & Procurement Directorate
2. Define the following:
   a. Program / Project manager (PM)
   b. Technical Authority
   c. Sponsor's Representative
   d. Life Cycle Logistician & ILSMT
   e. Test Management Oversight Team (TMOT)
3. Describe the relationship between the Acquisition Directorate and the Naval Engineering Directorate.
4. Describe the relationship between the Acquisition Directorate and the Requirements Directorate.
5. How is Configuration Management of a new asset different than one that is already in service?
6. What is the purpose of an Acquisition Program Baseline? What constitutes an Acquisition Program Baseline Breach?
7. Describe the phases of a Major Acquisition Program.
8. Define and describe the ten elements of logistics. Why are they important?
9. Define and describe the content and purpose of an Integrated Logistics Support Plan (ILSP).

F. Coast Guard Yard
1. What is the function and primary responsibility of the following:
   a. Industrial Department
   b. Production Department
   c. Military Support Operations
   d. Facilities Management
   e. Fiscal Department
   f. Planning & Estimating Division
   g. Project Management Division
   h. Engineering and Business Management Division
   i. Quality Department

2. What magnitude of ship repair and construction is the CG Yard capable of undertaking?

3. Explain how the CG Yard can be awarded work without having to compete with commercial repair facilities.

**SECTION 5102 – NAVAL ENGINEERING MAINTENANCE MANAGEMENT**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. MLCP and MLCA Standing and Operating Procedures
   3. ELC Website (http://cgweb.elcbalt.uscg.mil/default.htm)

B. Engineering Changes (ECs)
   1. What is the definition of an Engineering Change? How are Engineering Changes classified and prioritized?

   2. Who has final authorization on EC approval and implementation?

   3. List the criteria used to classify and evaluate EC proposals.

   4. What is the purpose of submitting a Configuration Change Request (OPNAV 4790CK)?

   5. Is a Configuration Change Request (OPNAV 4790CK) required when a change proposal falls outside the definition of an EC Request?

   6. Explain the role and responsibilities of the following commands or units in the EC process:
      a. Originator (cutter, sector, NESU, etc.)
      b. NESU/Sector
      c. Area/District
      d. MLC
      e. CG-45, CG-44, CG-751, ELC
      f. Configuration Control Board

   7. Explain the purpose of initiating an EC prototype. Are EC prototypes always required? Who is authorized to initiate an EC Prototype?

   8. Explain the process for tracking EC status.

   9. Define the World of Work (WoW).
      a. State the purpose of the program.
      b. How are project plans funded?
      c. How are project plans classified and prioritized?
      d. Who is responsible for developing project plans?

C. Current Ships Maintenance Project (CSMP).
   1. Explain how CSMPs are initiated. What criteria are used in developing a good CSMP?
   2. List the applicable reference documents used for preparing CSMPs.
   3. Explain the role and responsibility of the following commands for approving, scheduling, and funding CSMPs:
      a. Cutter
      b. NESU/Sector
      c. MLC(vr), MLC(vs)
   4. State why a CSMP may be disapproved.
   5. How are cost estimates determined for a CSMP?
   6. What are the criteria for determining whether AFC-30 or AFC-45 funds will be used on CSMPs?
   7. How are CSMPs tracked?
   8. How are CSMPs prepared for recurring work items?
   9. Use and reference pre-written Recurring Work Items while drafting a CSMP.

D. CASREP.
   1. Define CASREP. When are cutters required to submit a CASREP?
   2. Explain the role and responsibility of the following commands and units in reporting, funding, and responding to CASREPs:
      a. Cutter
      b. MLC
      c. NESU
      d. Operational Commander, Program Manager
      e. ELC

E. Preventive Maintenance System (PMS)
   1. Explain how to initiate a PMS Change Request.
   2. Explain how Maintenance Procedure Cards are developed and reviewed.
   3. Become proficient in the Maintenance Management functions of CMplus.
   4. Explain how PMS scheduling intervals are determined.
   5. State the resources available to assist cutters in the completion of PMS? What are the procedures for requesting MAT assistance?

F. Engineering Department Maintenance Management
   1. Demonstrate the ability to manage the Preventative Maintenance System:
      a. Provide the tools, spare parts, and consumables required by the maintenance procedure card (MPC) to complete a PMS procedure or casualty repair.
      b. Obtain additional personnel with the skills required by the MPC and assign them to the task.
      c. Upon completion of the maintenance action, clean up the area, stow tools and equipment, and properly dispose of any waste or used parts.
      d. Perform an operational test of the system.
   2. Inform the appropriate personnel (commanding officer, executive officer, first lieutenant, etc.) about the proposed maintenance action and any restrictions on the system during the procedure.
   3. Make the required entries in the engineering log, machinery history file, CMPlus, and Preventative Maintenance System files.
   4. Manage the Engineering Department work schedule that takes into consideration these five items:
      a. Cutter Deployment schedule
      b. Cutter Availability schedule
      c. Planned Maintenance
      d. Unplanned Maintenance
      e. Personnel available
   5. Discuss policy and procedures for flight deck tie-down fitting testing.

**SECTION 5103 – REPAIR AVAILABILITIES**

A. Reference Material.
   1. Naval Engineering Manual, COMDTINST M9000.6 (series)
   2. MLCP and MLCA Standing and Operating Procedures
   3. Naval Ships Technical Manual, chapter 997

B. General:
   1. Define Repair Availability. What is the difference between a Repair Availability and a Charlie Period? What is the difference between a dockside and drydock availability?
   2. Explain the difference between service, ship repair, and procurement contracts.
   3. List the governing documents and explain the process in which the Operational Commander and MLC schedule Repair Availabilities (Drydock and Dockside).

C. Availability Planning Schedule. The generation of a complete contract package for a commercial availability, or a work order package for availability at a base, requires the timely execution of many separate tasks.
   1. What is a Naval Engineering Cutter Material Assessment? When are Naval Engineering Cutter Material Assessments conducted?

   2. How do Naval Engineering Cutter Material Assessments impact the development of the following:
      a. CSMPs
      b. Naval Engineering Project Listing (NEPL)
      c. Availability Worklist Specifications
      d. Class Maintenance Plans

   3. When are Acquisition Teams required to convene?
      a. List the members of the A-Team and their respective responsibilities
      b. What is the goal of a first A-Team meeting?
      c. What is the goal of a second A-Team meeting?
      d. What is the goal of a third A-Team meeting?

   4. Who is responsible for generating the availability worklist?

   5. How many weeks prior to an availability are units required to submit their Worklist Proposal (CSMP Package) to the MLC?

   6. Although full and open competition is the desired approach for soliciting contracts, explain the procedures and requirements for geographically restricting cutter availabilities. When shall requests for geographic restrictions be submitted?

   7. Who determines which work items will require AFC-30 or AFC-45 funding? What criteria are used?

   8. To ensure that AFC-30 work items are included in the availability package, when are units or program managers required to transfer AFC-30 funds to the MLC? What is the method of transferring funds to the MLC?

   9. If the awarded bid price for an AFC-30 item exceeds the government estimate or if there is growth during the completion of those items, who is responsible for paying the difference?

   10. Identify the responsibilities of the following parties in the review, preparation, draft, and generation of a final specification package and government estimate:
      a. Unit/Sector
      b. NESU/ESU

c. MLC(vad), MLC(vr), MLC(vs), MLC(vpl), MLC(t)
d. A-Team

11. What events take place, and who is responsible for conducting the following:
    a. Legal review of the specification package
    b. Solicitation
    c. Issuing IFB/RFP
    d. Bid opening and evaluation
    e. Pre-award survey
    f. Contract award

12. What information are you allowed to provide a bidding contractor during a Bidder's Inspection?

D. Conducting the Availability.
1. What is the responsibility of the following?
    a. Commanding Officer or Officer-in-Charge
    b. Contractor
    c. NESU
    d. MLC
    e. Contracting Officer (KO)
    f. Port Engineer
    g. Contracting Officer's Representative (COR)
    h. Engineer Officer
    i. Damage Control Assistant
    j. Primary Inspector
    k. Dockmaster
    l. Ship's Superintendent

2. Who is responsible for ordering and procuring AFC-30 GFE/GFM and AFC-45 GFE/GFM? Who is responsible for ensuring that the GFE/GFM is received, inventoried, and made available for contract start?

3. Explain the requirements for off-loading fuel and ammunition prior to an availability.

4. What is the purpose of conducting Pre-Availability Safety and Inspector Training? Who is responsible for scheduling the training? Who shall attend?

5. Who is responsible for inspecting drydocking blocks to ensure proper arrangement?

6. When shall the Underwater Body Inspection Board convene? Who convenes the board? Who are the members of the board?

7. What is the responsibility of a Contractor regarding fire prevention, watertight integrity, storm damage, and personnel safety while in drydock and during undocking. What is the responsibility of the Commanding Officer?

8. Explain and define the process for updating and revising the Docking Plan and ship drawings whose contents have been affected by work during maintenance availabilities.

What is the purpose of? Who is responsible for scheduling? Who is required to attend? How often are the following conferences convened?

a. Arrival Conference
b. Progress Meetings
c. Contract Specification Clarification
d. Drydocking Conference

9. State the Coast Guard's (Federal Government) position/policy regarding:
   a. Ship's force work during an availability
   b. Employment of cutter personnel by contractors
   c. Gratuities
   d. Labor relations

10. State the purpose for maintaining the following records: Who is responsible for initiating these reports?
    a. Progress Chart/Reports
    b. Inspector's Work Log
    c. Contract Deficiency Report
    d. Condition Found Reports
    e. Completion Report (Status Reports)

11. When and by whose authority can the Coast Guard stop work?

12. What are the requirements for signing for completed work? Who has sole authority for accepting completed work?

13. State the policy and process (required forms) for initiating, negotiating, and awarding the following contract changes/modifications. Who is authorized to make contract changes? What role does the Cutter's Program Manager, MLC(v), and the NESU have in making such a decision?
    a. Indefinite Items
    b. Growth Work
    c. New Work

14. Can new work be awarded within the context of an original contract? How can a Contracting Officer justify new work without re-advertising for full and open competition?

15. Who is responsible for injuries to contracting personnel that take place on a Coast Guard cutter during availability?

16. Is the Coast Guard required to ensure that a Commercial Contractor is complying with local, state, and federal safety and environmental regulations? If so, what leverage does the Coast Guard have in enforcing compliance?

17. State the purpose for submitting the following correspondence (legal records and reports): What are the submission deadlines?
    a. Departure Message
    b. Final written Completion Report
    c. Post Availability Report

**SECTION 5201 – REQUIRED TASKS**

**SIGNATURE/DATE**

A. **MAINTENANCE SUPPORT**

1. Coordinate and monitor Industrial and MAT/WAT work orders _____
   a. Define Scope of Work _____
   b. Prepare Cost Estimate _____
2. Schedule and execute a cutter preventative maintenance activity _____
3. Develop an Engineering Department work schedule which considers cutter schedule and planned maintenance _____

B. **REPAIR AVAILABILITY**

1. Coordinate and manage a repair availability Contract from the development of the Work List through the completion of the Third A-Team Meeting. _____
   a. Develop a Repair Availability Work List _____
   b. Order, track, and QA GFE/GFM. _____
   c. Attend and participate as a member of the First A-Team Meeting. _____
   d. Assist in the development of a contract specification package. _____
   e. Attend and participate as a member of the Second A-Team Meeting. _____
   f. Assist in or conduct a Pre Award Survey and prepare the Pre Award Repot. _____
   g. Prior to docking a cutter, review the docking plan, load calculations, and verify block location and construction. _____
   h. Attend and participate in the Arrival Conference. _____
   i. Participate on a Underwater Body Inspection Board. _____
   j. Chair weekly Progress Conferences.
      (1) Progress Reports _____
      (2) Contractor Deficiency Report _____
      (3) Inspector Reports _____
      (4) Change Orders for Optional Items, Growth Work, and New Work _____
      (5) Prepare a cost estimate _____
   k. Review and process Condition Found Reports. _____
   l. Draft and process Final Completion Report. _____
   m. Attend and participate as a member of the Third A-Team Meeting. _____
   n. Review and process a change request. _____

**COMPLETION RECORD OF CHAPTER 5**

| **FUNDAMENTALS** | **SIGNATURE/DATE** |
|---|---|
| 5101 Naval Engineering Management | _____ |
| 5102 Naval Engineering Maintenance Management | _____ |
| 5103 Repair Availabilities | _____ |
| **PERFORMANCE QUALIFICATION** | |
| 5201 Required Tasks | _____ |
| **OER ENTRY OF CHAPTER 5 COMPLETION (SUPERVISOR ACTION)** | |
| OER entry completed | _____ |

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# Chapter 6
## Logistics Management

Logistics Management. Chapter 6 shall be completed during a follow on tour (i.e. HQ staff, MLC staff, NESU Staff, ELC staff, CG Yard Staff etc.). Completion should be documented on Form CG-4082, Officer Educational Record, and incorporated into the Officer Evaluation Report.

**SECTION 6101 – LOGISTICS ADMINSTRATION FUNDAMENTALS**

A. Reference Material.
1. Naval Engineering Manual, COMDTINST M9000.6 (series)
2. MLCP and MLCA Standard Operating Procedures
3. Financial Resource Management Manual (FRMM), COMDTINST M7100.3 (series)
4. Supply Policy and Procedures Manual (SPPM), COMDTINST M4400.19 (series)
5. Uniform Supply Operations manual, COMDTINST M4121.4 (series)
6. Property Management Manual, COMDTINST M4500.5 (series)
7. Comptroller Manual, COMDTINST M4400.3 (series)
8. Coast Guard Engineering Logistics Concept of Operations COMDTINST 4100.7 (series)
9. MLC Logistics and Maintenance Assistance Manual
10. CMplus Manual
11. Fleet Logistics System (FLS) Manual

B. MAINTENANCE AND LOGISTIC COMMAND MLC (v).
1. What is the function and primary responsibility of the following branches:
   a. MLC(vr), Support Branch
   b. MLC(vad), Administration Branch
   c. MLC(vs), Specification Branch
   d. MLC(vpl), Procurement and Logistics Branch
   e. MLC(t), Command Control and Communications Division
   f. MLC(k), Health and Safety Division

2. Explain the type of maintenance agreement that exists between the MLCs and Navy Regional Maintenance Command (RMCs).

3. Define a Military Interdepartmental Procurement Request (MIPR). How are MIPRs used by the MLC?

4. State the purpose for developing and maintaining Class Maintenance Plans (CMPs), boat Maintenance Plans (BMPs), and NEPLs for cutters and boats. Which support parties are responsible for maintaining and updating these plans?

5. Explain how the MLC coordinates repair availabilities with the Operational Commander.

6. State the purpose of the Top Ten Maintenance Program. Define the process for identifying Top Ten Maintenance Problems.

7. Explain how the Cutter Engineering Report is processed.

8. Explain how Commandant CG-45 and the MLCs interact.

9. Explain how the MLC allocates AFC-45 funds.

10. Explain the annual MLC budget request cycle.

C. HEADQUARTERS LOGISTICS MANAGEMENT DIVISION Commandant (CG-44)
   1. What is the function and primary responsibility of the following branches?
      a. CG-441, Logistics Program Management
      b. CG-442, Logistics Systems
      c. CG-443, Environmental Management
      d. CG-444, Configuration Management

   2. Define and state the function of the following Commandant (CG-44) initiatives:
      a. Inventory Control and Compliance Program (ICCP)
      b. Centralized Shipboard Supply (CSS)
      c. Finance & Procurement Desktop (IDP)
      d. Configuration Management (CM-PLUS)
      e. Fleet Logistics System (FLS)

   3. State the function of a Configuration Management Board.

D. ENGINEERING LOGISTICS CENTER (ELC)
   1. What is the function and primary responsibility of the following divisions and each of their respective branches:
      a. Platform Management (01)
      b. Equipment Management (02)
      c. Material Management (03)
      d. Comptroller Division (04)
      e. Information Management (05)

   2. Explain ELC policy and procedures for developing, maintaining, and revising the following:
      a. Damage Control Books, Drawings, and CCOLs
      b. Stability and Loading Data Booklets
      c. PMS Manuals
      d. Manufacturer Technical Publications
      e. Master Drawings, Selected Record Drawings
      f. Naval Engineering Advisory
      g. Supply Advisory

E. Performance Based Logistics (PBL)
   1. What is meant by the term “Performance Based Logistics”?
   2. How is PBL fundamentally different from the existing type of logistics support?
   3. Define the following:
      a. Performance Based Agreement (PBA)
      b. Availability
      c. Reliability
      d. Logistics Footprint
      e. Business Case Analysis
      f. Performance Metrics
      g. Product Support Integrator (PSI)
   4. What are the goals of a successful PBL strategy?

**SECTION 6201 – REQUIRED TASKS SIGNATURE/DATE**

**LOGISTIC SUPPORT**

A. Evaluate and recommend approval or disapproval of the following and provide feedback to the originator:
   1. EC Request _____
   2. PMS Change Request _____
   3. Tech Pub Update _____
   4. Cutter Engineering Report _____

B. Respond to unit CASREPs, and coordinate logistic support and repairs. _____

C. Screen, research, endorse CSMPs, and determine funding using AFC-30/AFC-45 criteria. _____

D. Participate in a Naval Engineering Cutter Material Assessment. _____

E. Develop and/or maintain Class Maintenance Plans (CMPs). _____

**COMPLETION RECORD OF CHAPTER 6**

| **FUNDAMENTALS** | **SIGNATURE/DATE** |
|---|---|
| 6101 Naval Engineering Management | _____ |
| **PERFORMANCE QUALIFICATION** | |
| 6201 Required Tasks | _____ |

**ENTER COMPETENICES ACHIEVED FOR COMPLETION OF STUDENT ENGINEER PROGRAM. COMPETENCIES FOR CHAPTERS 5 AND 6 ARE: ENG-MGT AND ENG-SH2.**

Competencies entered _____

**OER ENTRY OF CHAPTER 6 COMPLETION (SUPERVISOR)**

OER entry completed _____

**SUBMIT COMPLETION OF STUDENT ENGINEER PROGRAM VIA OER/EDUCATION RECORD AND MEMO OF COMPLETION TO CG-4.**

_____
Date of Program Completion

_____
Signature (Commanding Officer)

# Appendix A

## Sample Memorandum

U.S. Department of Homeland Security
United States Coast Guard

Commandant (CG-4)
United States Coast Guard

2100 Second Street, SW
Washington, DC 20593-0001
Staff Symbol: CG-4
Phone: 202-475-5554

1520

# MEMORANDUM

From: COMMANDING OFFICER, NESU
PORTSMOUTH

To: COMDT (CG-4)
Thru: COMDT (CG-45)

Subj: STUDENT ENGINEER PERSONNEL QUALIFICATION COMPLETION

Ref: (a) Student Engineer Personnel Qualification Standards, COMDTINST M3502.11 (series)

1. I am very pleased to inform you that LT Student N. Gineer has completed chapters 1-6 of the Student Engineer Personnel Qualification Standards. This accomplishment makes him/her eligible for consideration for assignment as EO afloat and to other Naval Engineering positions effective 01 May 2007.

2. Attached to this letter are copies of the signatures required at the completion of each assigned task in reference (a).

#

Enclosure: (1) Signatures from the Student Engineer Personnel Qualification Standard

Copy: CGPC (adm-3)

U.S. Department of Homeland Security
United States Coast Guard

Commandant (CG-4)
United States Coast Guard

2100 Second Street, SW
Washington, DC 20593-0001
Staff Symbol: CG-4
Phone: 202-475-5554

1520

# MEMORANDUM

From: D. G. Gabel, RADM
COMDT (CG-4)

To: LT NAVAL N. GINEER, NESU PORTSMOUTH
Thru: COMMANDING OFFICER, NESU PORTSMOUTH

Subj: STUDENT ENGINEER PERSONNEL QUALIFICATION COMPLETION

Ref: (a) Training and Education Manual, COMDTINST M1500.10 (series)
(b) Student Engineer Personnel Qualification Standards, COMDTINST M3502.11(series)

1. I am very pleased to note your satisfactory completion of the prescribed course of study as outlined in reference (a). In accordance with reference (b), you are designated a Naval Engineer effective 01 May 2007.

2. On behalf of the Naval Engineering community, let me be the first to congratulate you on your designation as a Naval Engineer and welcome you to a dynamic group within the Coast Guard. We look forward to your membership on a team of professionals dedicated to providing incomparable engineering support to our country. Welcome to the team.

3. A copy of this letter will be filed in your headquarters personnel data record (PDR) at the Coast Guard Personnel Command.

#

Enclosure: (1) Designation Certificate

Copy: CGPC (adm-3)
COMDT (CG-45)