California Maritime Academy
Watch Training Workbook

The Program:

The Watch Training Program was designed with the intent of providing useful, practical, and efficient training to deck cadets while on watch. The theory behind the program is that the Quartermaster (or 3/C cadet) serves as the Watch Training Officer, and leads training activities for the Security watchstanders on every watch. These training duties are not to distract the cadets from their normal watchstanding duties, but should supplement those duties in order to better train the underclass. For every watch, either the Chief Mate or Night Mate will select a lesson topic that will be taught by each of the Quartermasters or CWOs to the 4/C cadets. After the training sessions has been completed, the Quartermaster is to fill out the Watch Training Evaluation Form in the form of a log entry, noting specifically what was taught and what methods were used. If normal watch duties prevented the training from taking place, the Quartermaster is to log an explanation for why the training was not carried out. It is the responsibility of the Night Mate to ensure that these training sessions are conducted properly, and that the CWO and Quartermaster both sign the Watch Training Evaluation Form. If the CWO or Night Mate finds that a cadet is not performing the training to his/her satisfaction, he/she is to check the Unsatisfactory box and circle Unsatisfactory Watch under Overall Evaluation on the Watch Evaluation Form for that cadet.

In addition to the Quartermaster-led training sessions, the 4/C cadets should be allowed to look through this workbook and ask questions of the Quartermaster and CWO in topic areas that may not have been covered. Additionally, if the cadets on watch have already been trained on the topic designated by the N/M or C/M, the Quartermaster should be permitted to engage in the training of another topic, but should note the reason for this exception on the Watch Training Evaluation Form.

The Workbook:

This workbook was designed to provide lesson plans and training information to the deck watchstanders to be used in the Watch Training Program. Provided within are lesson topics, outlines and suggestions for the training of each topic, as well as a short quiz that can either be given to the cadets after the training session. These quizzes will form the majority of the question bank to be used in the Deck Skills examinations, and therefore also serve as study guides for these examinations.

As the workbook is designed to merely provide outlines for training topics, it is the responsibility of the Quartermaster to know or research the material to be taught. The Quartermaster should also feel free to ask the CWO or N/M's assistance in the training if needed. Additionally, links to outside resources both in print and online will be listed in the workbook should the cadet require additional information.

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Links and Resources

If you need to perform further research in order to properly train as per the Deck Training Workbook, follow these links or use these books as a guide.

Links:

- Deckskills.com: A cadet run website that publishes lessons and tutorials on a variety of deck topics.
- Gcaptain.com: A collection of tools and pubs for mariners. Also hosts a forum if you are seeking an answer to a specific question.
- Csum.edu: Contains official information regarding school policy or practices, watchbills, student handbook, links to other resources.

Books:

1. Nautical Almanac: Contains information and provides examples on how to perform celestial calculations.
2. American Practical Navigator: Contains lessons and equations for navigation, stability, and vessel handling.
3. American Merchant Seaman's Manual: Contains information regarding deck procedures and responsibilities such as line handling, rigging, and line splicing.
4. **Merchant Marine Officers Handbook: Contains information regarding navigation, watch procedures, and engineering for the deck officer.**

Training Lesson Plans

In Port Watch Duties

Summary:

The primary responsibility of every watchstander is to stand a proper watch and perform all of their assigned duties effectively and efficiently. The better prepared cadets are to perform their standard duties, the more time they will have available for further training, and the better they will be able to perform future duties. Hence, better preparation now equates to better watches later.

Training Outline:

- Log Entries
  - How to make them
  - Why they are so important
- Passes and Ids
  - Yellow v. Blue
  - Who needs to be escorted
  - Who needs to show ID
  - Security precautions
  - MARSEC conditions
- Rounds
  - Routes to take
  - Spaces to check
  - What to look for
  - What to report
- Weather Observations
  - What to note
  - How to report
- Flags
  - Where and when
- Lights
  - Where and when
  - How many
  - Which panels control which lights
- Soundings
  - Ullage v. Innage
  - Calculating fluid level from measurements

Suggestions:

Escort the cadets on a complete round, identifying spaces that need to be checked, how to make weather observations, what hazards should be reported, where the various light panels are located, where the sounding tubes are located, and the most efficient ways to cover the entire ship. Demonstrate to the cadets how to take a sounding via both the innage and ullage methods, and also how to calculate the level of fluid in the tank based on the measurements found. Allow the cadets to observe as log entries are made into the logbooks, and ensure that they are making entries into the deck logs properly. Ensure that the cadets know where all of the light panels are located for In-Port Lights, and that they know which panels control what lights.

Questions:

1. How many light panels are there that must be checked when illuminating in port lights?
   (a) 7
   (b) 9
   (c) 11
   (d) 13

2. The California state flag is flown where on the ship while in port?
   (a) Forward mast
   (b) After mast
   (c) Port yard
   (d) Starboard yard

3. During which watch are the heads cleaned and butt cans emptied?
   (a) 1600-2000
   (b) 2000-0000
   (c) 0000-0400
   (d) 0400-0800

4. How often are weather observations made?
   (a) Every hour
   (b) Every 2 hours
   (c) Once per watch
   (d) At sunrise and sunset

5. The ensign is flown where on the ship while in port?
   (a) Forward mast
   (b) After mast
   (c) Port yard
   (d) Starboard yard

6. When writing in the log book, entries should be made how?
   (a) In black or blue ink, in all capital letters
   (b) In black ink only
   (c) In black ink only, in all capital letters
   (d) In blue ink only, in all capital letters

7. You would sound via innage under which of the following circumstances?
   (a) The tank is thought to be full
   (b) The tank is thought to be empty
   (c) There should be 23'07" of water in the tank
   (d) There should be 13'07" of water in the tank

8. What should be done after every sounding?
   (a) Rechalk the entire line
   (b) Rechalk the bob
   (c) Wipe the line with a rag and spray with WD-40
   (d) Wipe the line with clean water

9. If someone not from CMA insists on coming aboard unescorted and without ID, what should be done immediately?
   (a) Hold them at the gangway, and call the N/M
   (b) Allow the person aboard, but give them a blue pass
   (c) Allow the person aboard, noting who they will be visiting
   (d) Allow the person aboard and log as Special Visitor

10. What two documents are the CWOs required to read and sign before relieving the watch?
   (a) The TSGB daily accountability form and the Smooth Log
   (b) The N/M and C/M Night Orders
   (c) The Smooth Log and the underclass watch evaluation forms
   (d) The TSGB daily accountability form and the Standing Orders

Fire Fighting Systems/Equipment

Summary:

Fixed fire fighting systems vary greatly in use and availability and thus cadets should know which systems are available on the TSGB and under what conditions they should be used. They should know how to operate each system and be able to explain why each is effective in different situations.

Training Outline:

- Fire Plan
  - Symbols and other data
  - Coverage of each system
- Fire Classes
  - A,B,C,D
  - Fire fighting methods that work best for each
- Fixed systems on the TSGB
  - Halon
    - Spaces Covered
    - Activation Procedures
    - Precautions and warnings
  - AFFF
    - Regions covered
    - Associated equipment
    - Application methods
  - CO_2
    - Spaces covered
    - Activation Procedures
    - Precautions and warnings
  - Water
    - Associated equipment
    - System line-up for in-port/at-sea
    - Nozzle technique
- Portable systems on the TSGB
  - Dry chemical extinguishers
  - CO_2 extinguishers
  - Portable foam
    - Associated equipment
    - Eductor usage

Suggestions:

First show the cadets the Fire Plan outside the Chief Mate's office. Identify which spaces are covered by which systems and also identify how and where those systems are operated from. Explain the use of the Fire Plan as an asset in the event of emergency. Have the cadets locate the portable extinguishers on the Fire Plan, then when they make a round, have them check each to ensure that they are properly stored in the correct location and are properly charged. Have them locate the Fire Control Room and explain to them how the various systems are activated. Demonstrate the proper line-up and activation procedures for charging the fire main in port and at sea. Explain considerations such as

excess pressure within the house and stress the importance of checking each fire station once the main has been pressurized to ensure that no leaks are found.

Questions:

1. Which valve should be opened first when charging the ship's fire main from a shore connection in order to prevent over-pressurization of the house system and the shore connection hose?
   (a) The shore-side isolation valve or hydrant
   (b) The ship-side isolation valve at the International Shore Connection
   (c) The fire main bleeder valves at the after fire stations on the main deck
   (d) The isolation valve at a fire station with no hose attached

2. Which space is not covered by a fixed extinguishing system?
   (a) After paint locker
   (b) Bosun's workshop
   (c) Horseshoe paint locker
   (d) Engine room

3. The discharge stations for the fixed AFFF system are located where?
   (a) Paint lockers
   (b) Cascade room
   (c) 04 deck on either side of the stack
   (d) Main deck on either side of the house

4. AFFF stands for:
   (a) Aqueous film forming foam
   (b) Automatic foam fire fighting system
   (c) Aqueous fire fighting foam
   (d) Aqueous flash free foam

5. What automatically happens before halon is dispersed into covered spaces?
   (a) An alarm sounds to alert personnel within the space to evacuate
   (b) A delay is activated, preventing the halon from being dispersed for 90 seconds
   (c) All fuel supply systems are automatically shut down
   (d) Both A and B

6. What size hoses are used within the house? On the weather decks?
   (a) 2”, 2.5”
   (b) 1.5”, 2”
   (c) 1.5”, 2.5”
   (d) 2”, 3”

7. In order to connect a hose from within the house to a fire station on a weather deck, what device could you use?
   (a) Y-gate
   (b) Reduction coupling
   (c) Flux gate
   (d) Both A and B

8. When fighting a Class C fire, the first step should be to:
   (a) Activate the fixed CO_2 system
   (b) Make use of the nearest portable CO_2 extinguisher
   (c) De-energize the equipment
   (d) Rig fire hoses at 2 nearby stations

9. Which is the most effective when fighting a deeply embedded Class A fire?
   (a) Water
   (b) Carbon dioxide
   (c) Halon
   (d) Dry chemical

10. What is the most important step to take after a fire has been extinguished?
   (a) Clean and put away fire fighting gear neatly
   (b) Bleed the pressure from the fire main system
   (c) Overhaul the burned area and maintain a watch to prevent reflash
   (d) Ensure that all fire fighting personnel are well rested in the event they need to be called out again

Fire Detection, Prevention, and Emergency Procedures

Summary:

The TSGB is fitted with two fixed fire detection systems, but we cannot completely rely on these systems to detect any fire. The security watchstanders in port and at sea are also responsible for finding, reporting, and containing fires. All Deck watchstanders should by now be familiar with the particularities of the fire detection systems aboard the ship, as well as the proper procedure for reporting a fire both in port and at sea.

Training Outline:

- Fire detection systems
  - Wormald
    - Spaces covered
    - Detection method
    - Alarm panel
  - Pyrotronics
    - Spaces covered
    - Detection method
    - Alarm panel

Suggestions:

Quiz your lower class on the specifics or fire reporting? Who do you call first? Should the fire alarm be pulled? Should you put it out, or call first (common sense and wits)? Ensure they understand how each system detects the presence of fire. Show them the different detectors. Quiz them on the process for each station to make sure they understand. Ensure they understand how the fire dampener pulls work, and what the numbers on them mean.

Questions:

1) The pyrotronics system protects which spaces
   a) the boathouse
   b) the captains stateroom
   c) machinery spaces
   d) berthing spaces

2) The Wormald system protects
   a) the boathouse
   b) the lifeboats
   c) machinery spaces
   d) berthing spaces

3) If you discover a fire in port on a security round you should first…
   a) Grab the nearest extinguisher.
   b) Call 911
   c) Call Public Safety
   d) Report it via telephone, UHF radio, or by pulling an alarm

4) The Halon system in the main engine space can be used an unlimited number of times
   a) T
   b) F

5) The paint lockers are located where?
   a) _
   b) _

6) The paint lockers are protected by?
   a) Sprinkler systems
   b) Fixed Foam systems
   c) CO_2
   d) Halon

7) You are on a security round at sea and you notice smoke coming from under a stateroom door, you should…
   a) Dial 911
   b) Ignore it because it will go away
   c) Report it to the bridge
   d) Call the Captain

8) You have found a fire, reported it, and are leaving the area, what should you do with the doors as you leave the space
   a) kick them in
   b) close them securely
   c) leave them open
   d) leave them as you found them

9) You discover a small trash can fire, report it, and request to fight it. You are given permission. It is small enough to use a portable extinguisher, which type(s) should you use?
   a) Water
   b) Foam
   c) CO_2
   d) Any of the above

Station Bills

Summary:

The Station Bill serves as a list of the crew's responsibilities and duties in the event of an emergency. It is designed to organize and direct the crew and allows everyone to know their duties prior to an actual emergency. The Station Bill designates each crew member's muster station in the event of an emergency and also which liferaft/lifeboat they are to report to in the event that it is necessary to abandon the ship. The Station Bill is organized by billet number and designates the duties of a crew member in the event of fire/emergency, abandon ship, and man overboard.

Training Outline:

- Identify what is designated by each column
- Identify what a billet number is
- Explain briefly the duties of each group (OPC, CSO, MEG, etc)
- Explain briefly the duties of various billets within a group (CPIC, On-Deck Commander, etc)
- Identify where various muster stations and life rafts are located

Suggestions:

Physically take the underclass cadets to the Station Bill outside of the Chief Mate's office and identify it's various parts and information. Identify how each group is structured with an officer in charge, cadet person in charge, etc. Quiz the cadets by asking the various duties of a specific billet number or by asking them to find the billet that corresponds with a specific duty or position.

Questions:

1. The primary purpose of the Station Bill is what?
    (a) Designate which berthing space each crew member is assigned to
    (b) Delineate the chain of command in the event of an emergency
    (c) Designate each crew member’s responsibilities and muster locations in the event of an emergency
    (d) Lay out a plan of action in the event of fire/emergency/MOB

2. What are the duties of billet number 163 in the event of fire/emergency?
    (a) Assist as Directed
    (b) Equipment Support
    (c) Hoses and Lights
    (d) Messenger

3. Where does billet number 110 report to in the event of an abandon ship?
    (a) Boat 4
    (b) Muster 12
    (c) Muster 11
    (d) Raft 11

4. Which billet number corresponds to the CPIC of Emergency Squad 1?
    (a) 88
    (b) 103
    (c) 90
    (d) 93

5. How many billet numbers are assigned to life raft number 8?
    (a) 8
    (b) 9
    (c) 10
    (d) 11

6. What does the designation OPC stand for?
    (a) Operational Control
    (b) Operational Command
    (c) Official Communications
    (d) Official Person in Charge

7. What does the designation CSO stand for?
    (a) Chief Sanitation Officer
    (b) Chief Stern Officer
    (c) Continued Ship Operations
    (d) Chief Safety Officer

8. Which billet designates who will man the Fire Control Station?
    (a) 88
    (b) 93
    (c) 100
    (d) 102

9. The primary duties of the Limitations group are what?
    (a) Ensure all cadets have PFDs and hard hats handy
    (b) Secure areas designated as dangerous and prevent people from entering
    (c) Determine the capacity of each firefighter's SCBA as exercises progress
    (d) Assist in refilling SCBA bottles

10. What does the designation MEG stand for?
    (a) Mobile Equipment Group
    (b) Mobile Emergency Group
    (c) Machinery and Engine Gear
    (d) MOB/Evacuation Group

Cruise Watch Positions and Duties

Summary:

On cruise, watches are conducted very differently than in port. There are new watch positions to fill, each with their own duties. If a cadet arrives prepared and ready to work for the duty assigned, they will likely perform that duty better.

Training Outline:

- Lookout
    - Use of sound powered phone
    - Point System for reporting contacts
    - Binocular usage
    - Basic light signals, sound signals, and dayshapes
- Helm
    - Helm commands
    - Rudder angle indicator
    - Rate of turn indicator
    - How to check a course via magnetic compass
    - Relief procedures
- Security
    - Note more hazardous spaces to be checked regularly (fan rooms, paint lockers, etc.)
    - Proper reporting procedures in the event a hazard is found
- Ballast and Safety
    - Ullages v. Innages
    - Ullage tables to derive weight of fluid
    - Basic systems including valves, pumps, controls, piping
- CC
    - Use of dishwasher
    - Safety Precautions

Suggestions:

Run the cadets through the standard responsibilities of each watch position. Specifically include information regarding where to report and when, what to wear, what they should bring, and what to expect from their watch. If possible, show the cadets the Ullage Tables found in the Chief Mate's office and explain their use in finding the stability of the vessel. Invent problems for the cadets to calculate, ie. Make up an ullage and ask the cadets to find the volume of fluid in the tank. Also, on night watches, have cadets identify vessels passing through the straits by their light characteristics before they come into view.

Questions:

1. If the tube length and tank height are both 50'01" and you sound an ullage of 32'09", what is the level of fluid within the tank?
    (a) 16'08"
    (b) 17'04"
    (c) 18'08"
    (d) 18'04"

2. Which of the following is the correct dialog for relieving a helm watch?
    (a) “Cadet A now stands steering course X, checking course Y.”
    (b) “Cadet A relieving Cadet B steering course X, checking course Y.” “Cadet B stands relieved.”
    (c) “Cadet A relieving Cadet B, one vessel 2 points to starboard, another 1 point to port.”
    (d) “Cadet A checking course Y with 10 degrees Westerly deviation.”

3. What should be done to the sounding tape when transferring it between a fuel oil tank and a salt water ballast tank?
    (a) Clean it off with a rag and WD-40
    (b) Dunk the tape a few times in the ballast tank to remove the oil from the tape
    (c) Mark the bottom 6 inches of the tape clearly with chalk
    (d) You should never use the same tape to sound both ballast and fuel tanks

4. You wish to make a call via Sound Powered Phone and you have just turned the crank, what do you do now?
    (a) Continue turning the crank to power the unit
    (b) Press the button on the handset to talk and release it to hear a response
    (c) Press the button on the handset to talk and continue holding down to hear a response
    (d) Nothing, the phone operates like a standard telephone

5. You are on the bow and spot a light in the distance. Your report to one of the senior watchstanders as follows: “I just spotted a light, flashing white for 3 seconds, then a 1 second pause, then white for 3 seconds, then a 10 second pause.” What will the senior likely ask you next?
    (a) How far away is it?
    (b) Is there anything else near it?
    (c) What does that signal stand for?
    (d) Where is it?

6. When given the command “Port Twenty” while on the helm, what should your response be?
    (a) Left Twenty
    (b) Port Twenty
    (c) Swinging to Port
    (d) Rudder Swinging

7. You are in the middle of the ocean and spot a green light 2 points to starboard. Knowing that the light is not from a buoy, what can you assume that you are looking at?
    (a) A liferaft equipped with a green LED beacon
    (b) A buoy that has floated free of its mooring
    (c) The port side of another vessel
    (d) The starboard side of another vessel

8. When given the command “Steady on 020” while on helm, what should you do?
    (a) Hold the rudder steady at 20 degrees until told otherwise
    (b) Maintain a heading of 020 pgc, adjusting the rudder as needed, but using only as much as needed (to prevent oversteering)
    (c) Maintain a heading of 020 psc, not more than 20 degrees of rudder to maintain course
    (d) Maintain a heading of 020 pgc, unless traffic causes you to deviate from course

9. Where should you report for a Ballast/Safety Watch?
    (a) Chief Mate's office
    (b) Quarterdeck
    (c) Bridge
    (d) Fantail

10. A vessel reported as “4 points to starboard” could also be reported as what?
    (a) Broad on the starboard bow
    (b) 45° abaft the starboard beam
    (c) Broad on the starboard quarter
    (d) Abeam to starboard

Bridge Familiarization

Summary:

Working on ship it is of paramount importance that you be familiar with your equipment. Having a good working understanding of the equipment you will use on regular basis is essential for any job especially as a watchstander. Knowing and understanding the layout of the bridge will help you as you go on cruise and in future work. Many wheelhouses are laid out in a similar fashion, and there is a reason for the placement of certain pieces of equipment. The TSGB has a small wheelhouse, and a separate chart room attached, the GMDSS console and Gyro room are all on the same deck in the after rooms. The wheelhouse has 4 gyro repeaters, and 3 steering type gyros all based off of the master gyro in the gyro room.

Training Outline:

- Helm station
  - Wheel
  - Rate of turn indicator
  - Rudder angle indicator
  - Gyro and magnetic compasses
- Radar
  - Basic controls
- ECDIS
- Engine Order Telegraph
  - Use and how it works
- GPS units
- AIS unit
- Chart table
- Chart room
- GMDSS station

Suggestions:

You will notice the helm station, with the ships wheel in the center of the bridge. Forward of that is the main bridge control panel. On the starboard side are the Doppler speed log and fathometer readouts. Towards the center are a series of alarm indicator lights and buttons. These were meant to be used when the ship ran with and unmanned engine room. The most prominent feature is the Engine Order Telegraph (EOT) One side is for engine room control the other is for bridge control. There are three independent standing consoles next to the control panel. The two most inboard are the ships ARPA's (automatic radar plotting aid). One is a 10cm radar and the other is a 3 cm radar. The newest addition to the ships bridge is the ECDIS (electronic chart display information system) it is the outboard console on the starboard side. This display system assists in navigation by giving us a real-time image of where we are. There is a chart table on the port side of the wheelhouse, this one is used by cadets to plot our position and track our course. The chart table in the chart room aft of the wheelhouse is used by the LWO (licensed watch officer) to plot our position also. Each bridge wing is equipped with a gyro repeater and an alidade for taking bearings, azimuths, and amplitudes. Show your watchstanders as much as you can and explain the features to them, show them how to use the sound powered phones, how to ring bells, and as many other important things as you can.

Questions:

1) Where is the master gyro?
   a) There is no master gyro
   b) the wheelhouse
   c) in the Captains room
   d) in the Gyro room

2) Where is the magnetic compass?
   a) we don't have one because they are outdated
   b) in EOS
   c) in the Wheelhouse
   d) on the flying bridge inside of the its protective cover

3) The Engine Order Telegraph (EOT) is always in bridge control?
   a) True
   b) False

4) The Helmsman's official job is to:
   a) steer the ship
   b) Take orders from the officer who is conning
   c) Talk to the security watchstanders
   d) Keep lookout for traffic

5) Why are there Gyro repeaters on the bridge wings?
   a) so that the ship has symmetry
   b) to take bearings
   c) to calibrate the one on the centerline
   d) in case you are locked out of the bridge

6) When is it okay to shout in the bridge?
   a) if you need to relay a helm command
   b) if the radio's are broken and you need to talk to the Bo'sun on the bow
   c) Whenever you feel like it
   d) If the LWO offends you

7) The GMDSS console in the bridge is for…
   a) fun
   b) taking up space
   c) communication and to oblige the law
   d) watching movies

Ballast System/Drafts

Summary:

Cadets should have a basic knowledge of the ballast systems of the TSGB. As such, they should know where the pumps, valves, discharges, and piping are located and how to operate them on a basic level.

Training Outline:

- Draft marks
  - Locations of measurements
  - How to measure
  - Mid v. Mean
- Tanks
  - Locations of ballast tanks
  - How to ballast to reduce hog/sag/list/shear stresses
- Pumps
  - Types used on board
  - How they operate
- Valves
  - Locations of various valve controls
  - Emergency valve controls
- System Controls
  - Computerized interface in EOS or Chief Mate's Office
- Stability Basics
  - GM, KG, LCG
  - Trim, list, sinkage, rise
  - Moments, MT1, TPI
  - Free Surface

Suggestions:

If possible, and with the permission of the Night Engineer and/or Watch Engineer, ask that an engineering cadet explain in detail the ballast system and lead a tour of the system within the Engine Room. If the engineers allow, have them show the cadets the ballast system control panel on their monitor in the EOS. Take note especially to show the cadets the locations of ballast pumps and valves throughout the ship. If you are unable to take the cadets to the engine room, at least show them the ballast tank diagram outside the Chief Mate's office. Point out the locations of various tanks and explain how they are interconnected through the ballast system.

Questions:

1. Where would you need to add ballast if you observed a starboard list?
   (a) Port side
   (b) Starboard side
   (c) Stern
   (d) Bow

2. What could explain a midship draft being less than calculated mean draft?
   (a) Significant list
   (b) Trim to the stern
   (c) Trim to the bow
   (d) Sag

3. When beginning to ballast, which step should come first when using a centrifugal pump?
   (a) Turn on the ballast pumps
   (b) Open the discharge valves on the outflow side of the pump
   (c) Open the suction valves on the inflow side of the pump
   (d) Open the pressure relief valves on the fire main system

4. Where are the computerized control systems for the ballast system located?
   (a) Chief Mate's office and Bridge
   (b) Bridge and EOS
   (c) EOS and Deck Office
   (d) Chief Mate's office and EOS

5. On which of the following pumps will a 90º turn not open the valve completely?
   (a) Gate valve
   (b) Ball valve
   (c) Plug valve
   (d) Butterfly valve

6. On a standard ship, what will be the resulting condition if the bow and stern tanks are loaded before the midships tanks?
   (a) Port list
   (b) Starboard list
   (c) Hog
   (d) Sag

7. If a ship is already loaded down to her marks, what can be done to increase GM?
   (a) Fill slack tanks completely via internal ballasting
   (b) Transfer ballast internally from upper tanks to bottom tanks
   (c) Transfer cargo carried on the 01 to the 04
   (d) Both A and B

8. Which condition is the most likely result of overspeeding a centrifugal ballast pump or allowing it to run dry?
   (a) Melting the impeller
   (b) Cavitation
   (c) Burst a pipe
   (d) Overfill a ballast tank

9. The most common type of ballast pump on commercial ships is which of the following?
   (a) Reciprocating
   (b) Gear
   (c) Jet/Eduction
   (d) Centrifugal

10. The specialized plate that delivers the motive force to the fluid in a centrifugal pump is called what?
   (a) Propeller
   (b) Impeller
   (c) Fan
   (d) Pinwheel

Lifeboat Lowering Procedures

Summary:

Every ship has different lifeboats, davits, and systems in place to ensure that the passengers and crew can evacuate the vessel safely in the event of an emergency. As these procedures must be conducted during emergency situations, when panic and stress levels are high, it is of the utmost importance that the crew be well versed in the operation of their own ship's lifeboat lowering procedures.

Training Outline:

- Lifeboat and davit parts and equipment
- Operation of winch and hand crank
- Limit switches and their use
- Steps to lower and raise the boat
- Safety precautions to consider when lowering
    - safety equipment
    - danger areas
- Location of power source and circuit breakers
- Use of sea painter
- Pre-lowering checks
- Starting procedures for lifeboat motors

Suggestions:

Go to one of the lifeboat stations and identify all of the various parts, taking note to identify how they are all interconnected. Perform a mock lowering, having the cadets man various stations and reply to your commands as you walk through the steps. Identify where the power supply and circuit breaker are located for each lifeboat, noting at what point and how the winches are to be energized. If the proper PPE is available, and only with the N/M's permission, take the cadets up and show them the location of the Rottmer releasing gear and other gear within the lifeboats themselves.

Questions:

1. These steps should be performed in which order: 1) release the gripes, 2) release the tricing pennants, 3) lower the boat to the embarkation deck, 4) lower the boat to the water, 5) release the Rottmer gear, 6) embark passengers
    (a) 1,6,2,3,4,5
    (b) 1,3,6,4,2,5
    (c) 1,3,6,2,4,5
    (d) 5,2,3,6,1,4

2. When embarking passengers, the first passenger should do which of the following?
    (a) Move to the outboard side of the middle seat to make room for others
    (b) Move all the way to the back on the inboard side to release the Rottmer gear
    (c) Move all the way to the bow on the outboard side to rig the sea painter
    (d) Find a seat directly above the Rottmer gear lever and place his foot on it so it is not tripped accidentally

3. As part of the pre-lowering check, you should do which of the following?
   (a) Check that the boat plug is firmly secured
   (b) Release the Rottmer gear and store it in the bilge so it is out of the way
   (c) Ensure the start air system is properly pressurized
   (d) Both A and C

4. The limit switches shut off the winch in order to prevent:
   (a) the boat from being raised if the Rottmer gear is not properly engaged
   (b) the boat from being hoisted by the winch when within the last 12 inches of the track
   (c) the boat from being lowered if the winch is not properly energized
   (d) the boat from being raised under excessive load conditions

5. In order to engage the winch brake, what must be done?
   (a) From inside the enclosed lifeboats, the coxswain must pull on the brake tension cable
   (b) The brake wheel must be turned clockwise
   (c) The hydraulic brake lever must be pushed forward
   (d) Nothing, the brake arm is weighted so that it is always engaged until lifted

Line Handling

Summary:

Line handling is important for docking and undocking procedures. There will be a crew on the bow and stern in charge of handling the lines. In order to communicate effectively certain commands and hand signals are used for specific movements. Handling mooring lines can be a very dangerous time, but complete it quickly and efficiently is important for meeting deadlines.

Training Outline:

- Identify possible line configurations
- List the line commands
- Identify the name of each mooring line
- Explain how to charge the winches
- Explain how to move the ship along the dock by controlling the lines
- Explain the different types of stoppers

Suggestions:

You can look at each line to visually see how they are holding the ship and how the forces effect the ships movement. Demonstrate each line command, and explain what they mean.

Pass One: send the first line over to the pier but do not take a strain
Slack: pay out the line so that it is not under tension and it forms an easy bight
Take a strain: heave on a line until it is under tension
Take in the slack: heave on a line until the bight is removed, but do not take a strain
Ease: pay out just enough slack to remove the tension from the line
Avast heaving: stop heaving a line, but hold whatever tension currently exists
Check: hold the current tension on a line by either paying out or heaving in as appropriate
Hold: take enough turns about the capstan or bitt so that the line will not slip
Double up: run additional lines or bights of lines as needed to make the mooring secure
Single Up: take in all lines except whichever the captain specifies (usually the springs)
Stand by the lines: man the lines, be ready to cast off or moor
Take in: retrieve a specific line from the pier
Cast off: remove the lines from the bitts or bollards

Questions:

1. If the captain gave the orders to "single up," what would you do?
   (a) Haul in all but one line on both the bow and stern
   (b) Haul in all but one line at each station (1 bow, 1 breast, 1 spring)
   (c) Haul in all but one breast line on the stern
   (d) Haul in all but one spring line on the bow

2. If a large tanker passes the ship, what line keeps the ship from moving off the dock?
   (a) Forward spring line
   (b) Breast line
   (c) Stern line
   (d) After spring line

3. When using the winches, on which part of the drum do you want to wrap the loaded line?
   (a) On top on the outer side of the drum
   (b) On top on the inner side of the drum
   (c) On bottom on the outer side of the drum
   (d) On bottom on the inner side of the drum

4. What are the first line to be paid out and the last lines to be brought aboard on most ships?
   (a) Breast lines
   (b) Bow lines
   (c) Spring lines
   (d) Stern lines

5. How many round turns should you put on the bitts before starting the figure eights?
   (a) 1
   (b) 2
   (c) 3
   (d) 4

6. Where are the safest places to stand while hauling mooring lines?
   (a) On the bitt side of the line
   (b) On the open side of the line
   (c) Directly behind the winch
   (d) Between the line and a bulkhead

7. When *checking* mooring lines while tying up, what are you doing?
   (a) Maintaining constant tension, but allowing the capstan to continue turning
   (b) Hauling in slack until there is no belly in the line
   (c) Hauling on the line until tension is felt
   (d) Hauling in slack until the belly is clear of the water

8. Where can you find stoppers?
   (a) In the fore and after line lockers
   (b) Hanging on the rail against the front of the forward house
   (c) In the on-deck line box on both the bow and stern
   (d) Both A and B

9. When coming into port after a long sea voyage, how are the lines prepared for arrival?
   (a) The eyes are fed up through the deck access ports from the line lockers
   (b) The lines are brought onto deck and faked out at their respective stations
   (c) They are faked out in the line lockers and the eyes are hung from the deck hatches
   (d) They are left in their cribs until alongside the berth

10. What PPE should always be worn when handling lines?
   (a) Hardhat and steel toed boots
   (b) Goggles and gloves
   (c) Work vests and knee pads
   (d) Glasses and gloves

Meteorology

Summary:

Weather happens every day, and though mates can control almost every aspect of the ship itself, they have absolutely no control over the weather. What this means is that the mates have to know how to maneuver and route the ship to both take advantage of favorable currents and winds and also be able to recognize and avoid conditions that could harm the ship or her crew.

Training Outline:

- Making weather observations
  - Sea state
  - Wind conditions
  - Cloud cover
  - Visibility
  - Pressure
- Weather routing
  - Navigable and dangerous semi-circles
- World wind patterns
  - High/Low pressure areas
  - Direction of travel
- Ocean current patterns
  - Warm/Cold/Transitional
  - Direction of travel
- Cloud types and formations
  - Appearance
  - Associated weather conditions
- Weather prediction
  - Weather associated with various cloud and front conditions
- Fronts and weather systems

Suggestions:

Explain how storms track one way or another and why one side should be considered to be more dangerous due to compounding wind and storm movement. Go to http://www.weather.gov/ and, using their weather maps, identify fronts and weather systems and how forecasting is done based on wind, temperature, pressure, cloud formations, etc. Use the meteorology section of deckskills.com to explain wind and current patterns as shown on their diagrams. Use the Weather Observer's Handbook on the Quarterdeck to show examples of cloud formations and sea conditions. Explain how weather observations are made and why/how they are sent in to the National Weather Service.

Questions:

1. A tropical cyclone is tracking to the North along the coast of Japan. To which direction is the dangerous semi-circle located?
   (a) North
   (b) South
   (c) East
   (d) West

2. Yesterday, you made observations of cirrus, then altostratus clouds. Today you observe more altostratus and stratus clouds. Which weather condition are you likely observing?
   (a) Cold front
   (b) Warm front
   (c) Tropical cyclone
   (d) Tropical depression

3. Name the cold water current that travels along the west coast of South America and identify which way it flows.
   (a) Benguela, to the north
   (b) Ecuador, to the south
   (c) Humboldt, to the north
   (d) Brazil, to the south

4. If you are sailing to Hawaii from Panama, from which direction should you expect the wind to blow for the majority of the voyage?
   (a) NW
   (b) NE
   (c) SW
   (d) SE

5. You have been observing the barometer dropping rapidly and steadily all day, which of the following weather conditions should you expect to observe?
   (a) Tall clouds building and rainfall
   (b) Clearing skies and sunshine
   (c) Heavy fog rising from the sea
   (d) Light wind and clear skies

Engineering for Deck Cadets

Summary:

Despite the fact that deck officers are designated as such, there is much that they should know about the engineering operations on their ship. Without the engine itself we would have no motive force, nothing to carry us across the ocean. Without ballast and cargo pumps, we would have no stability, fuel, or cargo to carry. Without some kind of evaporation or boiler system, we would have no clean water. Therefore, it is imperative that deck students have at least a basic familiarity with the engineering operations on boar the TSGB.

Training Outline:

- Ballast systems
    - Piping layout
    - Pumps types and uses
    - Valves types and uses
    - Controls and operation
- Propulsion systems
    - Engine classes and uses
    - Propeller types
    - Drive train components
- Steering gear
    - Components
    - Methods of control
        - Input selection
        - Follow up
        - Autopilot
        - Non-follow up (bridge and local)
        - Trick wheel
        - Hand pumps
        - Ratchet system
- Steam cycle
    - Boiler components (superheater, register, refactory, steam drum)
    - Other system components (economizer, deaerating feed tank, condenser)
    - Difference between saturated and superheated steam

Suggestions:

As this lesson is a bit advanced for the average 3/C cadet, either the CWO or N/M should lead, or the cadets should request the permission of the engineers to help them through. Cadets should be escorted around the engine room, led by an engineer who will explain the various systems and machinery as they progress. They should be shown the boiler flat, engine, and ballast pumps and controls at the very least. The deck cadet in charge should then continue on, leading the underclass down to aft steering and identify the various controls and how each operates the steering gear. From the quarterdeck, the different types of valves, engines and propellers should be explained with the diagrams found in the additional resources section of this book, in the Merchant Marine Officer's Handbook, or the Tanker Operations book.

Questions:

1. Which of the following steering control methods can not be operated from the bridge?
   (a) Autopilot
   (b) Follow up
   (c) Non-Follow up
   (d) None of the above

2. A slow speed, non-reversing engine would likely require which type of propeller?
   (a) Adjustable pitch
   (b) Controllable pitch
   (c) Fixed pitch
   (d) Variable pitch

3. The ratchet system on the steering gear is most effective when used how?
   (a) To lock the rudder in place
   (b) To steer in the event of an emergency
   (c) When backing at emergency stop
   (d) Under heavy sea conditions

4. The primary difference between saturated and superheated steam is what?
   (a) Saturated steam is wet and moist while superheated is very dry
   (b) Saturated steam contains contaminants while superheated has undergone thorough filtering
   (c) Saturated steam only exists at a given temperature and pressure, while superheated steam can undergo slight changes and still remain as steam
   (d) Saturated steam has been highly pressurized and condensed, while superheated steam remains at atmospheric pressure

5. In non-follow up mode, which of the following is true to hold the rudder at a certain setting?
   (a) the actuator knob must be held at that setting
   (b) the rudder must be brought over to that setting and then the knob must be released
   (c) the rudder must be dialed over with a knob as per the digital readout
   (d) the wheel must be brought over twice the amount it normally is

6. In order to use either the hand pumps or ratchet system to move the rudder manually, which of the following must be true?
   (a) Power must disconnected from steering pumps
   (b) Hydraulic lines must be in tact and operational
   (c) Both A and B
   (d) None of the above

7. In a two-stroke engine, how many times does the camshaft spin for each turn of the crankshaft?
   (a) 1/2
   (b) 1
   (c) 2
   (d) 4

8. All ballast system valves on the TSGB can be operated through an automated system.
   (a) True
   (b) False

9. The economizer does what in a steam system?
   (a) Compresses steam to make it more efficient
   (b) Preheats water entering the boiler
   (c) Removes oxygen from the steam
   (d) Cools the steam to be re-circulated through the system

10. When operating the steering gear locally, what is the easiest method to check your heading?
   (a) Keep constant contact with the bridge via sound powered phone
   (b) Observe the magnetic compass found in the steering gear room
   (c) Observe the gyro repeater found in the steering gear room
   (d) That's not your responsibility, the bridge is still conning

Celestial Navigation

Summary:

Despite the fact that celestial navigation is being largely phased out of the mariner's knowledge base, and many ships no longer carry sextants, being able to navigate by the stars is a very valuable skill in the event that a ship's electronics should fail. Celestial navigation is also a very useful check on the accuracy of of other systems. Many ships still require that azimuths and amplitudes are done on a regular basis in order to find compass error. On each deck cadet's senior cruise on the TSGB, they are also required to complete a celestial navigation project consisting of amplitudes, azimuths, star fixes, finding latitude at LAN, and more.

Training Outline:

- Importance and use of celestial today
- Using the Nautical Almanac
- Tidal forces
- Sunset, Sunrise, Startime, LAN
- Azimuth
- Amplitudes
- Reduction forms
- Fixes from celestial bodies
- Running fixes

Suggestions:

Freshmen need not learn celestial in depth, but should understand its basic use in navigation. They should be able to describe what forces cause tidal changes, calculate sunrise/sunset, how a sextant is used to find location, and how the Nautical Almanac is used.

Questions:

1. If your ship has a deep draft of 36' and you know that you must cross a bar, at a depth of 32', to enter a harbor in which the normal tidal range is 2', which moon condition would you be hoping to find when the sky clears?
   (a) Neap, apogee
   (b) Spring, apogee
   (c) Neap, perigee
   (d) Spring, perigee

2. Amplitudes can only be done at what time?
   (a) Sunrise/Sunset
   (b) LAN
   (c) Noon
   (d) LMT

3. What does LAN stand for?
   (a) Latitude at noon
   (b) Lunar apparent noon
   (c) Local apparent noon
   (d) Lunar altitude at noon

4. When calculating an azimuth, what tool would make your sighting easiest?
   (a) Sextant
   (b) Azimuth ring
   (c) Dividers
   (d) Pelorus

5. When the moon is transiting from Full to Third Quarter, what is it said to be doing?
   (a) Waxing
   (b) Waning
   (c) Springing
   (d) Neaping

6. What is the difference between a lunar and a solar day?
   (a) The solar day is 50 minutes longer
   (b) The lunar day is 50 minutes longer
   (c) There is no such thing as a lunar day
   (d) They are the same

7. What does a dip correction correct for?
   (a) Apparent altitude of the sun
   (b) Refraction through the atmosphere
   (c) Temperature and pressure changes
   (d) Height of eye

8. Which of the following least significantly affects your calculated value of sunrise/sunset?
   (a) Latitude
   (b) Longitude
   (c) Altitude
   (d) Time of year

9. Which force most strongly affects the height of tide?
   (a) Sun's gravity
   (b) Moon's gravity
   (c) Strength of current
   (d) Strength of prevailing wind

10. When choosing stars to use to create a 3 LOP fix, the stars should be about ____ apart.
   (a) 30º
   (b) 45º
   (c) 60º
   (d) 90º

Additional Resources

In-port Light Checklist

- Lower Bear Flag on port yard
- Bridge
    - 1. **Panel** EL-101 starboard aft corner bridge
    - 2. Wall Switch (Aft House lights, linked to **Panel** EL-102 four yellow in-port **circuit breakers** on the 02 deck, **Stair** Tower 4)
    - 3.&4. Bravo/Load Switches (Brass Knobs, to starboard of the door to the chart room. Turn on the bravo/aircraft warning AND the bottom switch charging the top switches)
    - 5. **Panel** L-463 port aft corner bridge
- Chart room
    - 6. **Panel** IL-150 starboard fwd corner chart room
- **Stair** Tower 1
    - 7. 03 Deck - **Panel** 2L-150
    - 8. 01 Deck - **Panel** 5L-150
- **Stair** Tower 3
    - 9. 1 Deck - **Panel** L-109
- **Stair** Tower 4
    - 10. 03 Deck - **Panel** L-104
    - 11. 02 Deck - **Panel** EL-102 – four yellow in-port switches **SHOULD ALWAYS BE ON**, controls aft house, linked to the switch on the bridge. This is so the underway Mate on watch can kill the aft house lights if he/she wants to look aft and not be blinded. One tagged switch for sickbay surgery rechargeable spot **Lights** should also always be on.
    - 12. 01 Deck - **Panel** L-107
- Aft Steering
    - 13. **Panel** L-11**3**
- Lower Ensign and don't forget the Jack. (better know what an Ensign is)
- The beach Ensign is the unofficial responsibility of the 0400-0800/1600-2000 watch on weekends until further notice.

STATION BILL
Organization

All crew are assigned to one of six main groups:

OPC **Operational Command**
- Primary Command
- Incident Commander
- On-Scene Commander
- On-Deck Commander

CSO **Continued Ship Operations**
- Navigation
- Power & Propulsion
- External Communications

MEG **Mobile Emergency Group**
- E-Squads
- Repair Parties
- Ambulance

ESG **Emergency Support Group**
- E.R Response
- Limitation & Isolation
- Fire Control Station, AFFF & Halon Rm.
- Hospital
- SCBA Fill

DPG **Deck Preparation Group**
- Craft Preparation Port
- Craft Preparation Stbd
- Immersion Suits & TPA

EVG **Evacuation Group**
- Muster Accounting
- Search
- Evacuation Supplies
- General Assist

Fixed Fire Fighting Systems Overview

The TSGB has several fixed fire fighting systems, each one is actuated by a different process and requires the proper authorization.

The Engine room main space is protected by a Halon system. Halon is an invisible gas that interrupts the chain reaction responsible for fire. This system can be actuated locally or remotely. ALL ventilation must be secured for a Halon dump to be effective. We only have two Halon dumps available, so if they both fail, we are in trouble.

The bilges of the Engine room are also equipped with a fixed foam system, which can be activated from the foam room, or from EOS.

The upper and lower paint lockers are both protected with CO2 fixed extinguishing systems. The instructions for remote and local actuation are on the bulkheads at the lockers. Ensure the ventilation is secured, and that there are no personnel in the locker. And always obtain the proper authorization.

The flammable liquid storeroom is protected with a single Halon cylinder. The actuation instructions are also mounted on the bulkhead. Ensure all vents are secured.

Fire Detection System Overview

Fire systems are employed to detect and locate fire aboard ships. The TSGB is equipped with two different fire detection systems; The Wormald system which detects smoke and heat inside the house, and the Pyrotronic system that detects light, smoke and heat inside the E/R and other machinery spaces. The main alarm panels for the fire detection systems are located on the bridge, with the Wormald panel located in the chartroom and the Pyrotronic panel located on the bulkhead behind the helm. The repeaters for the two systems can be found in the quarter deck office, but alarms cannot be silenced from this location. There is also a warning light for the Pyrotronic system on the control panel in the EOS, this is just a light that says there is an alarm, but doesn‘t give location. If one or both of the detection systems go off you have 2 minutes to go to the bridge to silence the alarm. Once determined which system was activated hit the white “Silence Alarm” button and determine which space the alarm is coming from. This area should be investigated and if fire is detected the captain or chief mate should be contacted immediately. If no fire is detected, the system should be reset by pressing the “Reset/Lamp Test” button. Area should be monitored continually thereafter. It is also worth mentioning that staterooms use battery operated fire detectors. These should be tested upon taking up berthing for cruise and regularly while underway

Breakers and Power Sources

Deck Equipment

- Bosun's Locker in Focsle
    - Anchor Windlass: Aft bulkhead, starboard side
    - Anchor Windlass Fan: Aft bulkhead, centerline
    - Capstan: Aft bulkhead, just starboard of centerline
    - Focsle Vent Fan: Centerline pillar
- Green Deck Forward
    - CT Winch #1 (bow): Next to Bulkhead Stores and Deck Workshop
- Midships Hatch, Main Deck
    - Stores Crane: Aft bulkhead, centerline
- Steering Gear Room
    - Vent Fan: Aft bulkhead, port side
    - Capstan: Aft bulkhead, port side
    - CT Winch #6 (fantail): Cabinet next to compressor, port side
    - Aft Crane: Aft bulkhead, starboard side

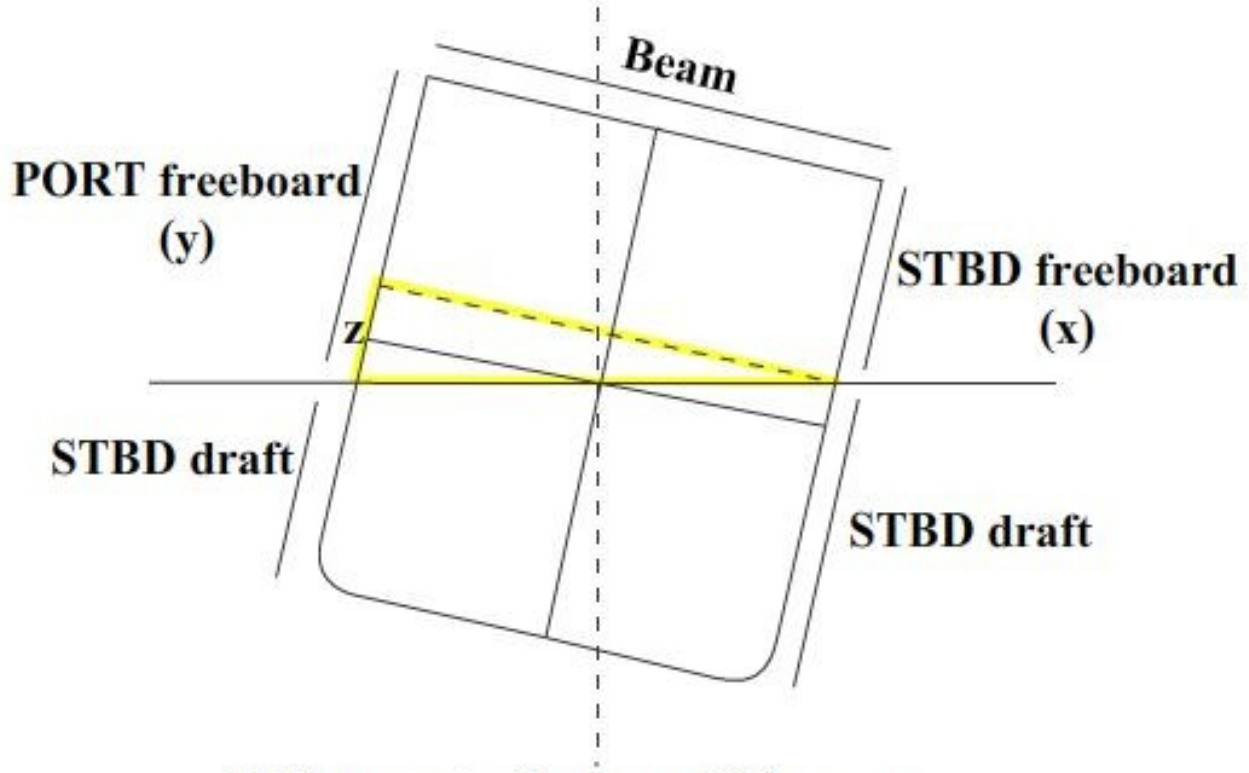
Lifeboats

Power sources and breakers for all lifeboats are located at the boat station itself.

Caluculating List via Sounding Tape

To calcluate list without knowing the draft on either side, you can simply use a sounding tape to find the freeboard on both sides, then compare. The difference between the values (z) you find is equal to the vertical component of the list triangle. You simply plug the beam and z value into a tangent function to find your angle of list.

To calculate your mean draft at midships, you must however know at least one draft. As before find and compare your port and starboard freeboard. If you know the port draft, as you do when the bear is docked in Vallejo, simply add the port draft to the port freeboard to find the overall height of the port side, keel to deck. Use this value and subtract the starboard freeboard to find the starboard draft. To find your mean draft, simply add the port and starboard drafts and divide by 2 (average).



Difference in freeboard (z) =x - y

List = $\tan^{-1}$ (z/beam)

Note: Beam width is 864”

Calculating Sunrise/Sunset

Step 1: Find Value of Celestial Phenomena in Daily Pages of NA

Step 2: Interpolate for DLo.
Interpolate for the difference between your Longitude and the Longitude of Central Meridian of your time zone. If you assume the value from Daily Pages to be in LMT, adjust for your distance from Cent Mer. If assuming value to be GMT, correct for entire value of Longitude.

- From your DR position at the time from the Daily Pages, the time of Meridian Passage you found is in LMT. To find ZT, find your DLo (the distance between you and the central meridian of time zone), and convert that to time either using your calculator or the arc to time conversion table on the first yellow page in the back of the NA.

-If you are west of your central meridian, add your DLo minutes to time of Meridian Passage. If you are east of your central meridian, subtract your DLo minutes to time of Meridian Passage.

Step 3: Interpolate for Latitude using tables.
Do this with tables found just behind the Increments and Corrections pages in the yellow section of your NA.

Long. Correction
Cent. Mer: 30°00'W
You: 31°00'W
DLo: 30-31 = 1°(W) = 4m (W)

Apply Corr: 0630 + 4(W) = 0634
Lat Correction
Correction found in Tables in back of NA, (page xxxii). Entering values are the Tabular Interval and the Diff. between times for consecutive Lats. Tabular Interval is the difference between consecutive values of LAT in Daily pages. ex. The value after N10 is N20, but the value after N56 is N58. The difference between times for consecutive intervals should be self-explanitory, but to clarify, look at your nearest value in the Daily Pages, then look at the next nearest value. The difference between the values that bracket your latitude is the entering value here.
Final Value
Sum of Initial Value and Corrections

Answer Key

In-Port Watch Duties
1.D 2.C 3.C 4.B 5.A 6.C 7.B 8.C 9.A 10.B

Firefighting Systems/Equipment
1.C 2.B 3.C 4.A 5.D 6.C 7.D 8.C 9.A 10.C

Fire Detection Systems
1.C 2.D 3.D 4.B 5.Main deck aft, port side aft of house; 2nd deck horseshoe, port side 6.C 7.D 8.B

Station Bills
1.C 2-5. Lookup on station bill 6.B 7.C 8.A 9.B 10.B

Cruise Watch Positions
1.B 2.B 3.D 4.C 5.D 6.B 7.D 8.B 9.A 10.A

Bridge Familiarization
1.D 2.D 3.B 4.B 5.B 6.A 7.C

Ballast System/Drafts
1.A 2.A 3.C 4.D 5.A 6.C 7.D 8.B 9.D 10.B

Lifeboat Lowering Procedures
1.C 2.D 3.D 4.B 5.D

Line Handling
1.B 2.B 3.D, to prevent the line from popping off the bitts 4.C 5.B 6.A, the line will spring away from the bitt when it parts 7.A 8.D 9.B 10.A

Meteorology
1.C 2.B 3.C 4.B 5.A

Engineering for Deck Cadets
1.D 2.B 3.A 4.C 5.B 6.C 7.B 8.B 9.B 10.C

Celestial Navigation
1.D 2.A 3.C 4.C 5.B 6.B 7.D 8.C 9.B 10.C