17

KEEPING AN ENGINEERING WATCH

Part I.

- The watch consists of an Engineer Officer in charge with one or more ratings. Each member of the watch should have a through knowledge of his duties, the safety equipment in the machinery space and the survival procedures in case of emergency. In addition with being familiar with the location and operation of the fire-fighting equipment, he should be able to distinguish the different alarms and perform the action required, use the communication systems to summon help and be aware of the escape route from the machinery space.

Complete the following

- The watch consists of ……. . …….. .
- Each member of the watch should have a through knowledge of his duties, the safety equipment in the machinery space and the ……. . …….. . .
- In addition with being familiar with the location and operation of the fire-fighting equipment,
  - he should be able to ……. . …….. . and
  - perform the action required,
  - use the communication systems to summon help and
  - be aware of ……. . …….. . .

- At the beginning of the watch the Engineer Officer in charge should note if there are any special orders or instructions relating to the operation of the main machinery or auxiliaries. He should verify the current operational parameters and the condition of all machinery and see if these correspond to the log readings.

Insert the missing terms

- At the beginning of the watch the Engineer Officer in charge should note if there are any special orders or _____ relating to the operation of the main machinery or _____. He should verify the current operational parameters and the condition of all machinery and see if these correspond to the log _____.

- All records are importaint but a careful watch should be kept on exhaust temperatures. A sudden rise in the temperature of the exhaust gas from the cylinder is a certain indication that some part in that cylinder needs attention.
- Upon taking over duty the Engineer Officer should verify that the amount of fuel oil in the service tank is sufficient for the duration of the watch. The level of the other tanks containing fresh water, lubricating oil, slop, etc. should also be checked.

Complete the following

- All records are importaint but a careful watch should be kept on ……. . …….. . .
- A sudden rise in the temperature of the exhaust gas from the cylinder is a certain indication ……. . …….. . .
- Upon taking over duty the Engineer Officer should verify that the amount ……. . …….. for the duration of the watch.
- The level of the other tanks containing fresh water, lubricating oil, slop, etc. ……. . …….. .

- At appropriate intervals inspections should be made of the main propulsion plant, auxiliary machinery and steering gear spaces.
- Any routine adjustment may then be made and malfunction and breakdowns can be noted, reported and corrected. During these tours of inspection bilge levels should be noted, piping and systems observed for leaks and local indicating instruments can be read.

*Fit the following phrases (*at appropriate intervals, noted, reported and corrected, during these tours of inspection *) in the right place below*

- inspections should be made of the main propulsion plant, auxiliary machinery and steering gear spaces
- any routine adjustment may then be made and malfunction and breakdowns can be
- bilge levels should be noted, piping and systems observed for leaks and local indicating instruments can be read

- In addition to these regular tasks other repair or maintenace tasks may be required of the watchkeeping personnel. Bridge orders must be promptly carried out and a record of any changes in speed and direction should be kept. When under standby or manoeuvring conditions with the machinery being manually operated the control unit or console should ce continually manned.

Supply the right term

- In addition to these regular tasks other repair or maintenace tasks may be _____ of the watchkeeping personnel.
- Bridge orders must be promptly _____ out and a record of any changes in speed and direction should be _____.
- When under standby or manoeuvring conditions with the machinery being manually operated the control unit or console should ce continually _____.

- Where a situation occur in the machinery space which may affect speed, manoeuvrability, power supply or other events essential for the safety of the ship, the bridge should be informed as soon as possible.
- This notification should preferably be given before any changes are made to enable the bridge to take appropriate action.

Supply the right preposition

- Where a situation occur ___ the machinery space which may affect speed, manoeuvrability, power supply or other events essential ___ the safety ___ the ship, the bridge should be informed as soon as possible.
- This notification should preferably be given ___ any changes are made ___ enable the bridge ___ take appropriate action.

- The Engineer in charge should notify the Chief Engineer of any serious occurrence or a situation where he is unsure of the action to take, as for example, if any machinery suffers severe damage or a malfunction occurs which may lead to serious damage. However, where immediate action is necessary to ensure the safety of the ship, its machinery and crew, it must be taken by the Engineer in charge.

Insert the right term

- The Engineer in charge should notify the _____ Engineer of any serious occurrence or a situation where he is unsure of the action to take, as for example, if any machinery _____ severe damage or a malfunction occurs which may lead to _____ damage. However, where _____ action is necessary to ensure the safety of the ship, its machinery and crew, it must be taken by the Engineer in _____ .

QUESTIONS AND DISCUSSION

1. What system of watches is usually adopte on board traditionally manned vessels ?
2. What must each watchkeeper be perfectly acquainted with ?
3. What should each crew member be able to do in case of emergency ?
4. Why does the engineer first look at the Notice-board (engine room black board) when taking over the watch ?
5. Why must particular attention be given to the exhaust temperature ?
6. When is the watchkeeping engineer required to be at the control unit or console ?
7. What may personell be required to do besides current watchkeeping tasks ?
8. What orders come there from the bridge ?
9. What situation should immediately be notified to the bridge ?
10. When should the Chief Engineer be summoned to the engine room ?

I. Say which of the following statements are TRUE and which are FALSE. If false state why.

1. The word “watch” refers only to the time period of attendence in the machinery space.
2. The watchkeeping arrangement and make up of the watch may be decided by the Chief Engineer.
3. It is ususal for the Chief Engineer to keep watch.
4. The watch engineer has full responsibility for the operation of the propelling machinery and auxiliaries as well as full authority over men on his watch.
5. The engineer in charge alone is responsible for carrying out all orders received from the bridge.
6. In case of malfunction or damage to machinery the Officer-of-the-bridge must be informed in the first instance.
7. The engineer of the watch is to take such immediate action as he may consider necessary for the safety of the ship, machinery and crew without advising the Chief Engineer.
8. The watch engineer may leave the engine room at any time during his watch provided someone is there.

I I. State the duties of the watch engineer in relation to the following items:

1. Log readings
2. Exhaust temperatures
3. Service tank
4. Fresh water and lubeoil tank
5. Steering gearspace
6. Bilges
7. Piping systems
8. Pressure gauges, thermometers and other indicating instruments
9. Bridge order
10. In case of speed reduction or trouble to power supply

III. Examine this sentence from Lesson 17:

- *At appropriate intervals inspection should be made of the main propulsion plant, auxiliary machinery and steering gear spaces.*

- In the sentence the phrase make inspection of may be replaced by the verb inspect:

- *At appropriate intervals the main propulsion plant, auxiliary machinery and steering gear should be inspected.*

- (Note the different arrangement of words)

Replace the phrasal verb in the following sentences with the single verb as in the examples given above rearranging the sentences as necessary.

Compare both form of verbs listing them in your copybook.

1. Adjustment can be made in the timing of fuel injection by raising or lowering the plunger.
2. All records are importaint but a careful watch should be kept on exhaust temperatures.
3. Notification of events essential for the safe operation of the ship should be given to the bridge.
4. A record of any changes in speed nand direction should be kept.
5. Immediate action must be taken by the engineer in charge to ensure the safety of the ship, its machinery and crew.
6. Reversal of engines can speedily be made when the ship is moving slowly.
7. Every revolution of the engine makes its contribution to wear.

Part II.
UMS

Part I – UMS OPERATION

- Where the machinery space is unattended, a Duty Engineer will be responsible for supervision. He will normally be one of the three watchkeeping engineer being 24 hours, 48 hours off duty. During his watchkeeping period he will make tours of inspection about every four hours beginning at 7 or 8 o'clock in the morning.

- The tour of inspection will be similar to that for conventional watch due consideration given to the unattended mode of machinery operation. Trends in parameter readings must be observed and any instability in operating conditions must be rectified. A set list or mini-log of readings may have to be taken during the variuos tours. Between tours of inspection the Duty Engineer will be on call and should be ready to investigate any alarm relayed to his cabin or the various public rooms. The Duty Engineer should not be out of range of these alarms without appointing a relief and informing the bridge.

Part I – UMS OPERATION

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- The _____ of inspection will be similar to that for conventional watch due consideration given to the unattended mode of _____ operation. Trends in parameter _____ must be observed and any instability in operating conditions must be rectified. A set list or mini-log of readings may have to be _____ during the variuos tours. Between tours of inspection the Duty Engineer will be _____ and should be ready to investigate any alarm relayed to his _____ or the various public rooms. The Duty Engineer should not be _____ these alarms without appointing a _____ and informing the bridge.

- The various regular duties, such as fuel transfer, pumping of bilges, and so on, should be _____ during the daywork period, but it remains the responsibility of the Duty Engineer to _____ that they are done.

- The main log book readings will be taken as _____ while on tour of inspection.

- Engine rooms of some recent vessels have a computer _____ which continuously stores machinery data and the head office is able to _____ the information via satellite and _____ it _____ without any intervention by the shipboard staff. Indeed, they are unlikely even to be _____ that the computer is being interrogated.

- The various regular duties, such as fuel transfer, pumping of bilges, and so on, should be carried out during the daywork period, but it remains the responsibility of the Duty Engineer to ensure that they are done.

- The main log book readings will be taken as required while on tour of inspection.

- Engine rooms of some recent vessels have a computer installed which continuously stores machinery data and the head office is able to acess the information via satellite and read it off without any intervention by the shipboard staff. Indeed, they are unlikely even to be aware that the computer is being interrogated.

QUESTIONS AND DISCUSSION

1. What essential difference is there between a traditionally manned and an unattended machinery space ?
2. Since continuous presence of staff is not required in UMS operation, how is watchkeeping carried out ?
3. What are tasks of the engineer officer during watchkeeping ?
4. How is the safety of operation ensured during the period of unattendance ?
5. Are routine duties and repair and maintenance tasks carried out in the same way as in the conventionally operated engine rooms ?
6. How are the various parameters of main and auxiliary equipment logged on modern vessels ?
7. What advantages do computers and stellite communication systems offer to marine engineering operation ?

Consider the following sentences:

- *Any routine adjustment may then be made and malfunctions and breakdowns can be noted, reported and corrected.*
- *The engineer in charge should notify the Chief Engineer if any machinery suffers damage or a malfunction occurs which may lead to serious damage.*

The boldface words refer to deficiency or improper operation of the engine in general. Other common terms are : trouble, fault, defect, failure, blackout.

- The following list outlines their similarities and differences of meaning.
- ***malfunction (noun) – bad, abnormal functioning, irregular operation; irregularity***
- ***trouble (noun) – difficulty; disturbance***
- ***defect (noun) – imperfection, deficiency, fault***
- ***defective (adjective) – imperfect, deficient,***

- *faulty*
- *fault (noun) – imperfection, defect, damaged part*
- *faulty (adjective) – defective, imperfect*
- *breakdown (noun) – stoppage, failure*
- *break down (verb) – stop functioning, fail to operate*
- *failure (noun) – non – performance, omission to function, breakdown*
- *fail (verb) – be unable to continue functioning, omit to function, break down*

- *damage (noun) – partial or complete breakage or wear of element essential to functioning*
- *damage (verb) – cause partial or complete breakage or wear of element*
- *blackout – sudden failure of electric power supply*

I. Complete the following sentences choosing the correct words:

1. A minor engine trouble, if not recognized and corrected in its early stages, may easily develop into a major

a) fail.
b) blackout.
c) breakdown.

2. If the _____ lies in the governor itself, the special governor instruction book should be consulted.

a) fault
b) faulty
c) defective

3. Ringing a bearing with the light hammer strokes is one of the methods used when inspecting bearings which

a) have damaged
b) have failed
c) have troubles

4. If the controllable pitch propeller system_____ it is possible to manually reverse and start the engine.

a) breaks down

b) breakdown

c) failure

5. a) Defect

b) Malfunction casting is a possible cause of many failures.

c) Faulty

6. The alarm systems are extended to the bridge area and the “off duty” rooms of the engineer to indicate any _____ that may occur in an unattended machinery space.

a) faulty

b) faults

c) fails

7. If one or more cylinders _____to fire, the cause may be: low compression or presence of water.

a) fail
b) trouble
c) break down

8. Water may get into the fuel oil by leakage through_____ riveting or welding of tanks.

a) malfunction
b) defect
c) defective

Part III.

WATCHKEEPING

WATCHKEEPING

- **STCW 1978 (1995) (2010)**
- **Watch** (1) time period; (2) personnel
- **Personnel**: Engineer officer in charge (watchstanding engineer; watchkeeping engineer; engineer on duty; duty engineer) & rating (donkeyman)
- **Traditional**: four hour period
- **Fully automated ships**: Unattended machinery space (UMS)

WATCH DUTIES (1) PAPERWORK

- Orders or instructions regarding M/E or A/E
- Operational parametres should correspond to the log readings
- Any work in progress
- Any hazards or limitations

WATCH DUTIES (2)
TOUR OF THE ENGINE

- Inspection of bilge levels
- Observing for leaks
- Observing instruments
- Operation of oily water separators (environmental considerations)

PERIODIC SAFETY ROUTINES (1)

- 1. Emergency generator should be started and run for a reasonable period. Fuel oil, lubricating oil and cooling water supplies and tank levels should be checked.
- 2. Emergency fire pump should be run and the deck fire main operated for a reasonable period. All operating parameters should be checked.
- 3. Carbon dioxide cylinder storage room should be visually examined. The release box door should be opened to test the alarm and check that the machinery-space fans stop.

PERIODIC SAFETY ROUTINES (2)

- 4. One smoke detector in each circuit should be tested to ensure operation and correct indication on the alarm panel. Aerosol test sprays are available to safely check some types of detector.
- 5. Fire pushbutton alarms should be tested, by operating a different one during each test.
- 6. Any machinery space ventilators or skylights should be operated and greased, if necessary, to ensure smooth, rapid closing should this be necessary.

PERIODIC SAFETY ROUTINES (3)

- 7. Fire extinguishers should be observed in their correct location and checked to ensure they are operable.
- 8. Fire hoses and nozzles should likewise be observed in their correct places. The nozzles should be tried on the hose coupling. Any defective hose should be replaced.
- 9. Any emergency batteries, e.g. for lighting or emergency generator starting, should be examined, have the acid specific gravity checked, and be topped up, as required.

PERIODIC SAFETY ROUTINES (4)

- 10. All lifeboat engines should be run for a reasonable period. Fuel oil and lubricating oil levels should be checked.
- 11. All valves and equipment operated from the fire control point should be checked for operation, where this is possible.
- 12. Any watertight doors should be opened and closed by hand and power. The guides should be checked to ensure that they are clear and unobstructed.

PERIODIC SAFETY ROUTINES (1)

- 1. Emergency g_____ should be started and r _____ for a reasonable period. Fuel oil, l_____ oil and cooling water supplies and tank levels should be c_____.
- 2. E_____ fire pump should be run and the deck fire m _____ operated for a reasonable period. All operating p_____ should be checked.
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- 4. One smoke detector in each circuit should be _____ to ensure operation and correct indication on the alarm panel. Aerosol test sprays are available to safely _____ some types of detector.
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- 7. Fire _____ should be observed in their correct location and checked to _____ they are operable.
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PERIODIC SAFETY ROUTINES (4)

- 10. All lifeboat _____ should be _____ for a reasonable period. Fuel oil and lubricating oil _____ should be checked.
- 11. All valves and equipment _____ from the fire control point should be checked for _____, where this is possible.
- 12. Any _____ doors should be opened and _____ by hand and _____. The guides should be checked to _____ that they are clear and _____.

Part IV.

Part IV.

Ship Engine Room Watch Keeping Duties and Routines

- http://www.brighthub.com/engineering/marine/articles/51272.aspx

- Ship engine room watch keeping duties and routines are carried out by Engineer Officers. The watches are split into three 4-hour spells of duty, that goes by quite quickly as there are many checks to be carried out on the main and auxiliary engines, along with the numerous pumps and coolers.
- A new marine engineer may need to learn several things on their own, since not everything can be taught at the marine school in a practical manner. Some of these things might seem very simple but could be quite confusing for a trainee engineer. So I thought of penning down my experiences of watch keeping and hence will continue in the next few articles along the same line.

The watch keeping duties of an engineer at sea in charge of a marine diesel engine and will include the following:

Main engine components subject to pressure and temperature change

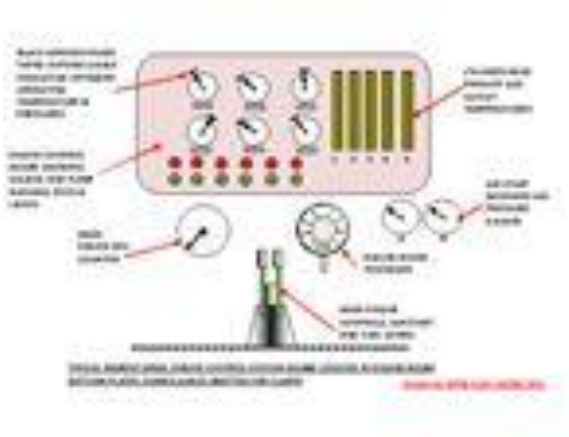
- The reason or cause of a rise or fall in temperature to an engine-room item of machinery
- The consequences of these changes in pressure and temperature on the diesel engine efficiency
- The rectification of a rise or fall in temperature or pressure
- The affect a rise or fall has on various cooling and lubricating liquids

Standard Pressure and Temperature Checks

- There are standard pressures and temperature checks to be carried out by the watch keeping engineer, as he gains experience these will become second nature; the various thermometers and pressure gauges being scanned as he walks around the engine room checking the components. This means when a rouge value turns up it is spotted right away either on the component or the engine control station instrument board. This is situated just above the engine control station, either in the engine room or in the modern control room. The board contains the pressure and temperature gauges for the main systems such as; exhaust temperatures, jacket cooling and lub-oil pressure. We used an arrow to mark the optimum temperatures and pressures on these gauges, and endeavor to maintain them; again any rouge value will show up instantly.

- The board is located above the controls, being easily consulted from here. The other main gauges and components that are easily reached are the engine room telegraph, rev-counter, air start reservoirs pressure gauges and of course the controls themselves. Depending on the engine manufacturer, these consist of two levers; left hand one usually air start, right hand lever; fuel control and are used when maneuvering.

A sketch of an engine room control station and board is shown below



Standard Pressure and Temperature Checks

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Heavy Fuel Oil System (HFO)

- The temperature of the HFO system must be kept at the recommended value to control its viscosity. This is important as it must not turn "waxy" when being pumped through various heaters, the fuel pump and into the injectors.

Lube-oil System

- The temperature of the lube-oil must be carefully controlled through use of the lube-oil coolers seawater inlet valve. Remember that as the temperature of the lube-oil rises the pressure drops. Conversely, a low lube â€“oil temperature will increase the oil pressure. A sudden unexplained rise in temperature could signify a bearing in the main engine running hot.

Jacket cooling System

- The pressure and temperature of the jacket water cooling also need close monitoring and maintained at optimum values as the cooling water also supplies the turbo-blower air coolers. The pressure in this case is controlled by the circ pump, so any change could be a faulty pump, however, down to the pump or a loss of pressure through a faulty cylinder liner rubber sealing ring, or even a cracked liner.
- Temperature is another matter; this must be kept at the recommended value. Any rise could signify a scavenge fire a rise in sea temperature or cooler problem.

- The generators temperature and pressures are checked as per the main engine ones.
- This leave the thrust block, prop shaft bearings, and stern gland. Here again the sense of touch should be used as a guide to overheating, but there will be temperature gauges on the thrust and prop bearings along with oil – level sight gauges.

- OOW
- Engineering watch
- Engineer officer
- Watchkeeping engineer
- Duty officer
- IMO STCW 1978/1995/2010
- Relieve the watch

PART IV

- Chief engineer's standing orders for ships machinery operation – instructions for ships engineers

- The Chief Engineer shall designate an engineer and an engine rating to carry out the watchkeeping in port and the onboard duty after consultation with the Master.

  The Chief Engineer shall deploy personnel for machinery operation in engine room . If the vessel is at anchor, the Chief Engineer shall ensure a watch order similar to that at sea as required preparing for an emergency.

During machinery operations chief should provide written instructions for watchkeepers. Such instruction shall cover but not limited to following standard items. Each Chief Engineer may add specific items for a particular vessel and if deviating from the standard, send a copy to the Chief Marine Superintendent.

- Watches
- Start and stopping of the main propulsion plant
- Port arrival
- Port departure
- Power failure
- Breakdown
- Fire in engine room
- Flooding
- Scavenging fire
- Air and sea pollution
- Bunkering
- Bilge and sludge handling
- Reefer plant
- Engine room cleanliness
- Workshop and changing room
- Emergency devices

- The standing orders shall be signed by all staff in the engine room. Deviations from these orders shall be treated as non-conformities.

Practical standards of handing over engineering watch- instructions for ships engineers

- The Chief Engineer shall designate an engineer and an engine rating to carry out the watchkeeping in port and the onboard duty after consultation with the Master.

  The Chief Engineer shall deploy personnel for machinery operation in port preparing for an emergency. If the vessel is at anchor, the Chief Engineer shall ensure a watch order similar to that at sea as required .

- During handing over watch for machinery operations some key points should be given priority. The taking Engineer shall go to the engine room in ample time prior to the time for such watch transfer, check the present situation of the machinery and read the Engine Logbook & log sheets for the development of events.

  The handing over Engineer, shall, on successful confirmation of various parameters with his successor hand over the following information to the successor.

  Matters concerning the main engine revolution per minute, operational condition of main and auxiliary machinery, and the handle notch of the diesel engine.

- Matters concerning the present condition of bilge, oil tanks, boiler water tanks, etc.

  Matters concerning abnormal machinery.

  Matters concerning the present situation of various operations of the Engine Department and the movement of Engine Ratings.

  Matters concerning special instructions from the Chief Engineer or other Engineer, and any information given from the bridge.

- The Engineer of the watch shall, on watch transfer, receive necessary information from the Officer of the watch such as weather and sea conditions, and the distance run, and enter them in the Engine Logbook, as well as giving information to the Officer of the watch on the average revolution of the main engine and other necessary items.

- The Duty Engineer shall observe the following items during machinery operation:

  a) He shall be within the audible range of alarms while on duty.

  b) When the alarm is actuated, he shall directly go to the engine control room to acknowledge the alarm and take appropriate measures.

  c) If necessary, he shall report to the Chief Engineer thereafter and receive instructions regarding measures to cope with such accident.

  d) If necessary, He shall inform the Officer of the watch of the situation. The operation shall only be interrupted by the Chief Engineer, in such case the Duty Engineer shall notify the Officer of the watch to request him to switch over the indicator lamp to 'Manned' and enter such change shall be noted in the Logbook.

- The Engine Rating shall, under the command of the Engineer of the watch, be engaged mainly in the following operations.

  a) Checking of temperatures and pressures at specified locations of the machinery.

  b) Surveillance of the machinery.

  c) Inspection rounds throughout the machinery spaces, shaft tunnel & steering room, reefer rooms, etc.

  d) Oiling, greasing of the machinery.

  e) Measurement of tank levels in the machinery spaces.

  f) Transfer of bilge to holding tanks from the machinery spaces and shaft tunnel.

  g) Housekeeping of the machinery spaces.

  h) Other operations as instructed by duty engineer.

- **Instructions to Engine Rating on watch or ordered to be on duty**

  The Engine Rating of the watch shall observe the following items during his watch.

  1) He shall not absent himself from the engine room without permission of the Engineer of the watch.

  2) He shall pay attention to the operational condition of the main engine and auxiliary engines, and the bilge of the engine room & shaft tunnel, and report to the Duty Engineer immediately when he has found abnormal conditions.

- **Practical standards of engineering watch in port**

The Chief Engineer shall designate an engineer and an engine rating to carry out the watchkeeping in port and the onboard duty after consultation with the Master. He shall deploy personnel for machinery operation in port preparing for an emergency. If the vessel is at anchor, the Chief Engineer shall ensure a watch order similar to that at sea as required .

- The Chief Engineer must not leave the vessel in port until he transfers his duties and gives necessary instructions to the First Engineer or other engineer with equivalent ability. However, during cargo operation on tankers (include LPG and LNG carriers), either the Chief Engineer or the First Engineer must be on board in preparation for the emergency of the vessel.

  The Chief Engineer shall ensure necessary personnel to deal with troubles of cargo work equipment of the vessel during cargo handling operation to reduce the delay time.

  The Chief Engineer may arrange a manned watch system in port during loading and discharging or as required.

- **Operational guidance for engineering watch in port**

  The person designated by the Chief Engineer as Engineering watch shall carry out his duty according to the following regulations:

  Company Rules for Seafarers

  International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 1978 AS AMENDED IN 1995)

  (a) Section A-VIII/2 part 3-2, Principles to be observed in keeping an Engineering Watch

  (b) Section A-VIII/2 part 4-2, Taking over the engineering watch

  (c) Section A-VIII/2 part 4-4, Performing the engineering watch

  International Convention for the Prevention of Pollution from ships (MARPOL-73/78)

- **Chief Engineer's role in Engine watchkeeping**

  The Chief Engineer shall command and supervise the operation of machinery; in person; in the following cases at minimum

  When entering and leaving port and shifting in a port.

  When navigating a narrow fairway.

  When it is deemed necessary to do so for the operation of machinery.

  As instructed by Master, such as while in heavy density of traffic, restricted visibility, confined waters, heavy weather etc.

- **Instructions to the Engineer of the Watch**

  The Engineer of the watch shall not be absent from the engine room during his watch.

  The Engineer of the watch shall observe the following items during his watch.

  a) He shall arrange things so that he can react immediately to notices and instructions from the bridge.

  b) He shall adhere to the specified operational standards of machinery and may not change such standards unnecessarily without permission of the Chief Engineer.

  c) He shall appraise operational conditions and make efforts to be prepared to take emergency measures.

  d) He shall make frequent inspection rounds as appropriate in Engine room, paying attention to such abnormal conditions of the machinery, difficult to detect from the engine control room, as leaks, sound, vibrations & heating and smells thereby to prevent accidents.

  e) He shall appraise the present quantities of fuel oils, lubricating oils and feed water.

  Bearing in mind the present condition of bilge in the engine room, he shall follow the Chief Engineer's instructions as to its disposal.

  f) Other things instructed by the Chief Engineer.

- The Engineer of the watch shall take proper measures immediately in the following cases and report to the Chief Engineer without delay.

  1. When he is informed from the bridge of the schedule (Time) of the engine to be placed on stand-by or to be used.

  2. When he has found abnormal conditions of machinery or is in doubt.

  3. When he has received emergency orders or instructions.

  4. When it is deemed necessary in situations other than those as specified in the previous items.

- The Engineer of the watch shall notify the Officer of the watch in following cases:

  When such a failure of machinery which may affect navigation has occurred

  In other cases when it is deemed necessary.

- Part V.

- **Shipboard safety inspection checklist**

Modern shipping industry recognizes safety is the prime concern for all shipboard activities. Summarized below are some basic check items ensuring safe working environment onboard vessel

Accommodation –Safety checklist

1. All emergency lights operational, color coded and marked with "E"
2. Internal and external lighting in accommodation ok
3. Escape routes unobstructed; exits clearly marked
4. Safety signs and placards posted and clearly readable
5. All portable fire extinguishers & stowage locations numbered, in place & inspection dated
6. Life jackets, immersion suits & EEBDs correctly stowed & marked
7. Adequate number of ashtrays provided and correctly placed. (On Tankers-Safety ash trays)
8. For safety reasons, fire station not locked but only sealed
9. Internal communications equipment tested and operating correctly
10. Muster list signed and properly displayed at appropriate locations

Accommodation – Housekeeping/General checklist

11. Is the cleanliness of common rooms satisfactory

- Mess rooms & smoking rooms
- Gymnasium
- Laundry
- Ship's Office & Cargo control room
- Changing rooms
- Common toilets and showers

12. Cleanliness of all cabins, alleyways and staircases satisfactory

13. All garbage bins & lids in common spaces, color coded, labeled and made of non-combustible material. In cabins, 2 bins available (1 for plastic)

14. Area free of overloaded, unauthorised or jury-rigged electrical items

Accommodation – Housekeeping/General checklist

15. Galley and food storage areas:

- Cold chambers set at correct temperatures
- Pots, knives, cooking utensils are clean
- Provision chambers are clean
- Any signs of cockroaches or other
- Infestation in the galley or storage areas
- Reefer chamber alarm tested and working
- Food products are within expiry dates

16. Catering personnel comply with the following:

- Any wound, cut or illness reported to master
- Wounds, cuts are appropriately covered
- No smoking in galley/mess rooms (tankers)
- Washing hands with soap prior handling food

Accommodation – Housekeeping/General checklist

17. Quality of fresh water is good

18. Stores are neatly stowed in lockers

19. Approved First Aid supplies are readily available, accessible and clearly marked

20. Hospital is clean, unoccupied and ready for use

21. Garbage properly stowed, segregated & disposed

Machinery spaces –Safety checklist

22. Escape routes, ladders and emergency exits unobstructed and clearly marked

23. All handrails, guard-rails and safety guards correctly fitted and secured to protect against fall

24. Spare life-jackets marked and in good order, emergency equipment accessible and operational

25. All lights operational, stairways and work areas adequately lit, emergency lighting in E/R checked

26. “No Hot Work” stenciled on all fuel and lub oil tanks in E/R

27. Safety signs and placards posted and clearly readable

28. Switchboard area clear and free of obstructions and rubber mats in position

29. All portable fire extinguishers correctly stowed, accessible and inspection dated

30. All fixed fire-fighting equipment unobstructed and in good condition

31. All personnel wear correct personal protective gear

32. High voltage areas clearly marked

33. Muster lists displayed

34. Protective guards for rotating machinery properly secured in place

35. Steering gear space free from oil, gratings or non-slip surfaces in place around the steering gear

36. Shielding of high pressure fuel pipes in place, steam pipes properly insulated

37. Self-closing device on sounding pipes and glass level gauges functional & not tied in open posn

38. Steam, water or oil leaks anywhere in the machinery space

39. Area free of spilt oil, grease, combustible rubbish, tools and equipment not in use

40. Area free of combustible liquids in open containers

41. Pipe Insulations are oil free

42. Walkways, stairways and ladders clear of obstructions

43. Walkways, stairways and ladders are clean, dry and have non-skid surfaces where appropriate

44. Low clearance limits stripe marked

45. Oil soaked rags and other flammable materials kept in covered non-combustible bins

46. Supplies and materials properly stored

47. Chemicals properly labelled and stored, acids & alkalis segregated, MSDS & PPE available at site

48. Approved First Aid supplies readily available, accessible and clearly marked

49. Bilges free of oil

50. Is the engine room workshop tidy with equipment protected as required & safety instructions posted

Deck area – Safety checklist

51. Escape routes and embarking areas marked, unobstructed and no slipping and tripping hazards

52. “Danger-Enclosed Space” marked outside all such spaces having access other than via manholes

53. All deck lights operational and in sound enclosures

54. All hand-rails and guard-rails correctly fitted and secure, all ladderways guarded by railings

55. All safety & hazard zone identification signs posted & readable, fire plan wallets updated

56. HRU's for life rafts and EPIRB's correctly fitted (incl. weak link) and within expiry date

57. All lifebuoys correctly stowed, life buoy lights and smoke markers valid & in good condition

58. Lifeboats in good condition

59. All personnel wearing correct personal protective gear

60. Decks and walkways free form oil / grease and is there anti-slip paint at mooring areas

Deck area – Safety checklist

61. Piping systems on deck are properly clamped
62. W/T doors closing properly with packing in good condition
63. All weather tight hatches closing properly with packing in good condition
64. Is the oil pollution clean-up equipment in good condition and are the storage locations clearly marked?
65. Deck cranes, mooring winches & windlasses are free from oil leakages
66. Area free of combustible rubbish and tools and equipment which are not in use
67. Area free of leaking pipes and fittings
68. Supplies and materials are properly stored
69. All cans in paint store are closed, cargo & bunker samples on tankers are stowed in paint store
70. MSDS provided and readily accessible. (Paints, chemicals & Tanker Cargos)
71. Drip trays are in good condition empty and clean with capacity clearly marked
72. All sounding caps in place & properly tightened?

Other areas (Tankers) –Safety & house keeping checklist

73. Cargo pump rooms are marked with entry requirements

74. Pump room rescue equipment ready for use

75. Pump room- Internal communications equipment tested and operating correctly

76. Pump room-Cargo pump glands visually inspected for leaks and marked

77. Pump room- Area free of leaking pipes and fittings, bilges free of oil & water

78. Pump room lighting in good order

79. Emergency towing arrangements forward and aft ready for use

80. No unsafe camera, cell phones, torch, walky-talkie or other electronic equipment in use on deck

81. Electrical conductivity arrangement at flanges of cargo, COW & electric cable pipes in good order