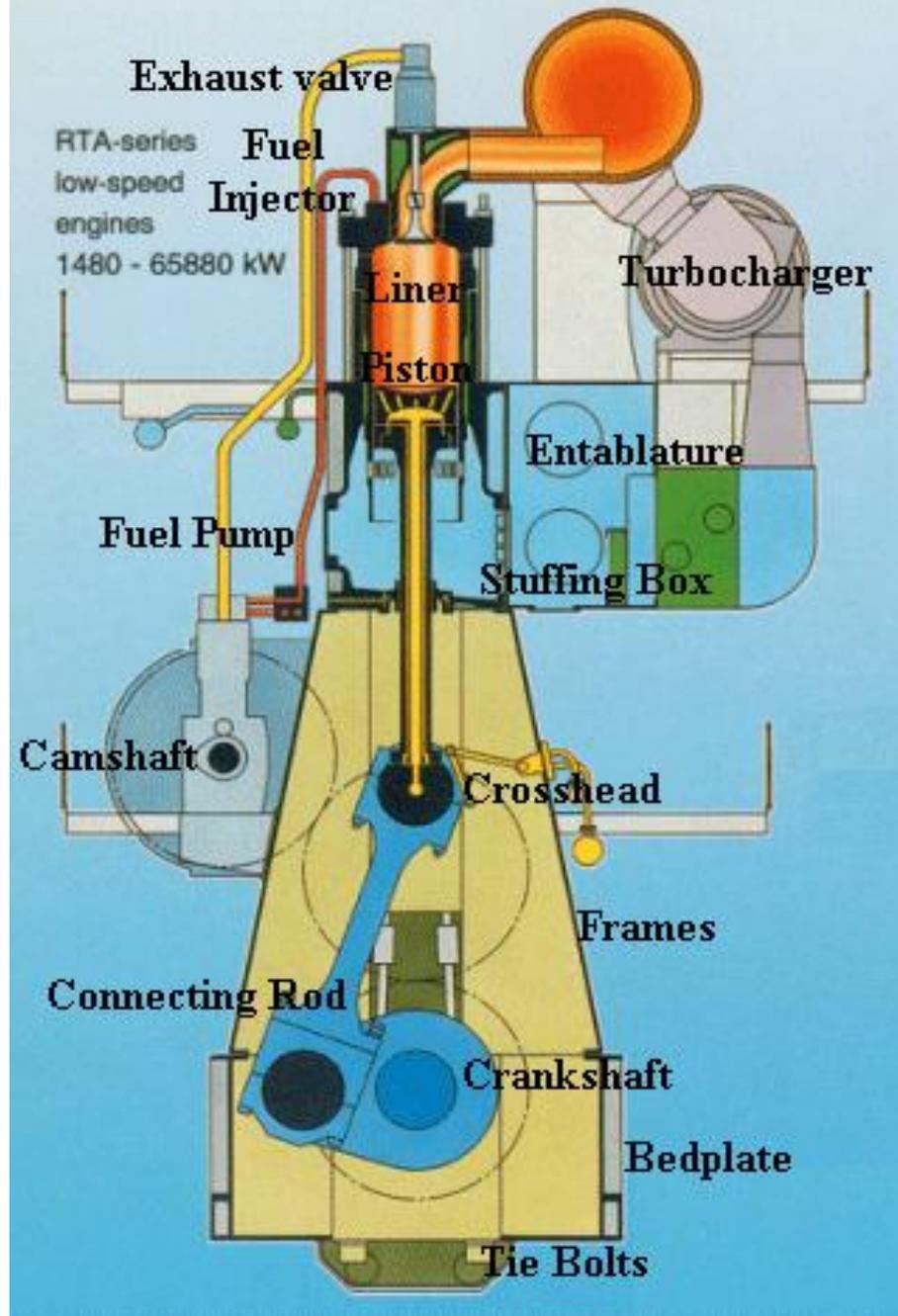


Engine-room Department Watchkeeping and Manning System



- *watchkeeping officer*
- *engine-room*
department
- *engineer officer,*
- *chief engineer*
- *staff*
- *pumpman*
- *oiler*
- *sweeper*

- *Certificate of*
Competency:
- *First Class*
- *Second Class*
- *electrical officer*
- *1st Engineer*
- *2nd Engineer*
- *3rd Engineer*

Engine-Room Department

- The modern ship's propulsive unit, whether steam turbine or diesel engine, is run on oil, and the engine-room department is composed of a team of **engineer officers** and **ratings** controlled by the chief engineer, who ranks after the master.
- The main engine is only one part of the work of the engine-room staff. Every service on board has to come from the engine-room of a seagoing vessel: electric light, heat, running water and refrigeration.

Complete the following

- The modern ship's propulsive unit may consist of
(a) _____ or
(b) _____
- engine-room department is composed of a team of _____ and _____
- They are controlled by the _____, who ranks after the master.
- The services on board coming from the engine-room of a seagoing vessel are: _____, heat, running water, _____, and many more.

- The Chief Engineer, or Chief Engineering Officer, is in charge of the Engine Department. He is responsible for all technical operations of the vessel, including engineering, electrical and mechanical units. In particular, he is responsible for all the propulsion machinery, power generating equipment and auxiliaries. He has to keep documents on the machinery working as well as all the repairs carried out on the vessel. He also logs fuel oil consumption. A varying number of officers, petty officers and ratings assist the chief engineer.

Complete the following sentences

- The Chief Engineer, or Chief Engineering Officer, is
.....
- He is responsible for all technical operations of the vessel,
including
- In particular, he is responsible for all the propulsion machinery,
.....
- He has to keep documents on the machinery working as well as all
the
- He also keeps the log records of
- A varying number ofassist the chief
engineer.

Engineer officers – jobs and duties

- 1) The First Engineer. He is responsible for maintenance and operations of the engineering and technical units.
- 2) The Second Engineer. His responsibilities usually include the maintenance of lubricating systems, engine room auxiliaries, and electrical equipment.
- 3) The Third Engineer. He is usually responsible for fuel and water systems. He also supervises tanks soundings and monitors the boiler room equipment.
- 4) The Fourth Engineer. His responsibilities may include, for instance, the operation and maintenance of engine room auxiliaries.

Match the jobs and duties

1	The Second Engineer.	He is responsible for maintenance and operations of the engineering and technical units.	a
2	The Fourth Engineer.	His responsibilities usually include the maintenance of lubricating systems, engine room auxiliaries, and electrical equipment.	b
3	The First Engineer.	He is usually responsible for fuel and water systems. He also supervises tanks soundings and monitors the boiler room equipment.	c
4	The Third Engineer.	His responsibilities may include, for instance, the operation and maintenance of engine room auxiliaries.	d

Engine room ratings

- The propulsion plant department can also include some **petty officers**, such as the **donkeyman** and the **storekeeper** and, if the ship is a tanker, there may also be the **pumpman**. The first one mentioned attends a donkey, auxiliary boiler, especially when the ship is in port. A storekeeper is in charge of all the spare parts and equipment stored for the engine room. The last one, a pump man, is employed to maintain and operate cargo pumps.
- The **Motorman's** duties are defined by the head of the engine department and can include, for example, the daily maintenance and cleaning of specific engine parts. The engine room **ratings**, e.g. **fire-fighters**, **greasers** are usually employed on watches to assist the engineer in charge. They are responsible for daily cleanliness of the engine room and for routine oiling, greasing and machinery servicing.

Insert the missing terms

The propulsion plant department can also include some _____ officers, such as the _____ and the storekeeper and, if the ship is a tanker, there may also be the _____. The first one mentioned attends a _____, auxiliary boiler, especially when the ship is in port. A _____ is in charge of all the spare parts and equipment stored for the engine room. The last one, a _____, is employed to maintain and operate cargo pumps.

The Motorman's duties are defined by the head of the engine department and can include, for example, the _____ and cleaning of specific engine parts. The engine room _____, e.g. fire-fighters, _____ are usually employed on watches to assist the engineer in charge. They are responsible for daily cleanliness of the engine room and for routine _____ greasing and machinery servicing.

Listening skills

Listening for gist. Listen to the audio clip and discuss the main idea (topic or theme) – (MarEng)

-
.....
-
.....

Listening for specific information. Listen to the text and answer the following questions:

- What is the chief engineer in charge of?
- What is he responsible for?
- What is he responsible for in particular?
- What kind of documents must he keep?
- He must log
- Who assists the chief engineer?

Listening for specific information. Listen to the text and complete the sentences below: Group work (each row/bench/student answers one particular question)

1) The First Engineer is responsible for

.....

2) The responsibilities of the Second Engineer usually include the maintenance of lubricating systems,, and

.....

3) The Third Engineer is usually responsible

.....

He also supervises tanks soundings and monitors

.....

4) The responsibilities of the the Fourth Engineer may include the operation and

5) The Motorman's duties are defined by the

..... and can include, for example, the

and cleaning of specific engine parts

Listening for specific information. Listen to the text and supply the missing words

The Chief Engineer, or Chief Engineering Officer, is in _____ of the Engine Department. He is responsible for all technical operations of the _____, including engineering, electrical and mechanical units. In particular, he is responsible for all the _____ machinery, power generating equipment and _____. He has to keep documents on the machinery working as well as all the _____ carried out on the vessel. He also logs fuel oil consumption. A varying number of officers, petty officers and _____ assist the chief engineer.

The engine officers' hierarchy goes as follows:

- 1) The First Engineer. He is responsible for _____ and operations of the engineering and technical units.
- 2) The _____ Engineer. His responsibilities usually include the maintenance of _____ systems, engine room auxiliaries, and electrical equipment.
- 3) The Third Engineer. He is usually responsible for fuel and water systems. He also supervises tanks _____ and monitors the boiler room equipment.
- 4) The Fourth Engineer. His responsibilities may include, for instance, the operation and maintenance of engine room _____.
- 5) The Motorman – His duties are defined by the _____ of the engine department and can include, for example, the daily _____ and cleaning of specific engine parts.

WATCH KEEPING

The standard system of watches adopted on board is usually a four-hour period on duty followed by eight-hour rest. The word “watch” means both the period and the crew working at that time. The three watches in any 12 hour period are usually: 12 to 4, 4 to 8, 8 to 12. Thus, for instance, an engineer on duty for the 8 to 12 watch works from 8 a.m. to 12 noon and from 8 p.m. to 12 midnight.

A watch is usually made up of an engineer in charge with an assistant engineer and a rating. Their duties include inspecting the main propulsion plant, auxiliary machinery and steering gear spaces. They should note any malfunctions and breakdowns, report and correct them.

Choose the appropriate term (MCT)

- The standard system of watches adopted on board is usually a *two/three/four*-hour period on duty followed by eight-hour rest.
- The word “*hour/watch/guard*” means both the period and the crew working at that time.
- The *two/three/four* watches in any 12 hour period are usually: 12 to 4, 4 to 8, 8 to 12.
- Thus, for instance, an engineer on *job/duty/work* for the 8 to 12 watch works from 8 a.m. to 12 noon and from 8 p.m. to 12 midnight.
- A watch is usually made up of an engineer in *cargo/charge/job* with an assistant engineer and a *mate/rating/greaser*.
- Their duties include inspecting the main propulsion plant, auxiliary machinery and *starting/stearing/steering* gear spaces.
- They should note any malfunctions and *stoppages/defects/breakdowns*, report and correct them.

- In the traditional (UK) system of manning the **chief engineer** must hold a DT (Department of Trade) Certificate of Competency First Class and his **second engineer** is required to have a Second Class certificate. The latter keeps the 2x4 watch and is also responsible for the general maintenance of the engine-room. The **third engineer**, who may or may not hold a certificate of competency, keeps the 2x2 watch and where an **electrical officer** (electrotechnical officer) is not carried usually maintains the ships electrical equipment. The fourth engineer, who is usually uncertificated, keeps the 8-12 watch and is often responsible for overhauling the pumps and maintaining the boilers when the ship is in port.

Complete the following sentences

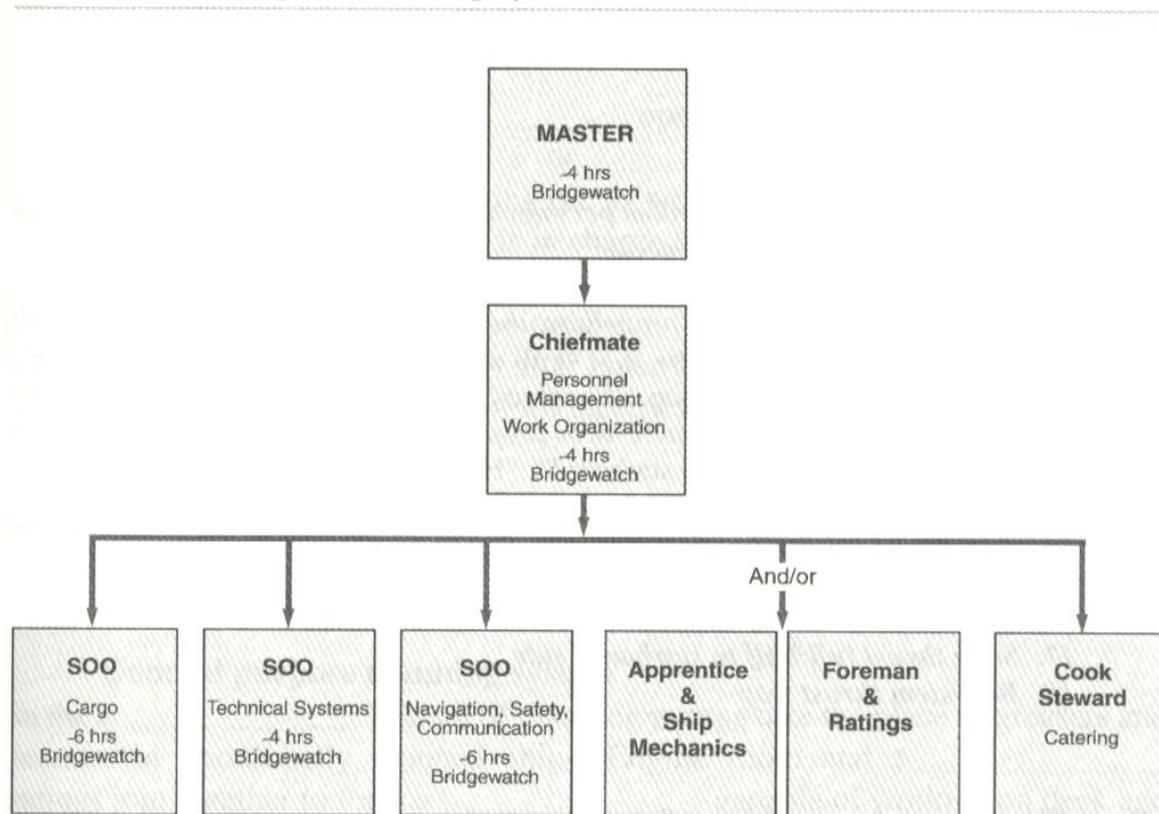
- In the traditional UK system of manning the **chief engineer** must hold a
- His **second engineer** is required to have a
- The latter (i.e. 2nd Engineer) keeps the 2x4 watch and is also responsible for
- The **third engineer** keeps the 2x2 watch and where an **electrical officer** (electrotechnical officer) is not carried usually
- The fourth engineer, who is usually uncertificated, keeps the 8-12 watch and is often responsible for and maintaining the boilers when the ship is in port.

General Purpose Manning

- In the GP manning system officers and ratings are trained to have knowledge and skills common to all departments in addition to their own qualifications. This reduces the number of people employed on board, but requires many changes and improvements in the ship's control systems.

- In an experiment NYK, a Japanese shipowner has developed a system where dual purpose watchkeeping duties (**dual-purpose officer**, poli-valent officer or **MarOff**) are allocated to the second officer and second engineer and a single watch officer is assigned for the third officer/engineer level. Ratings are trained to perform the duties of the dual and **general purpose crew**. By providing only two departments (Operational and Life) the total crew of some bulk carriers, tankers and containership has been cut down to 14 men.

- For operation with a reduced crew the vessels are required to meet several requirements: unmanned engine-room (**UMS** = unmanned machinery space), satellite navigational system, remote control of mooring winches, remote control of liquid cargo handling and ballasting operations, Inmarsat communications, collision avoidance system (ARPA) and engine control and monitoring station located on the bridge.



Certificates of competency (1)

Under the Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1995 (**STCW 95**) the following certificates are issued for watchkeeping duties in the engine department:

- *engineer officers in charge of a watch in a manned engine-room or designated duty engineer in a periodically unmanned engine-room (UMS) (A-III/1)*
- *Chief Engineer Officers and Second Engineer officers on-ships-with 3,000kw propulsion power or more (Regulation A-III/2)*

IMO STCW 1978/1995/2010

Certificates of Competency (2)

- *chief engineer officers and second engineer officers of ships powered by main propulsion machinery of between 750 kW and 3,000 kW propulsion power (A-III/3)*
- *ratings forming part of a watch in a manned engine-room or designated to perform duties in a periodically unmanned engine-room (A-III/4)*
- STCW 95 also provides guidance for certification of radio personnel, particularly in the **Global Maritime Distress and Safety System** (GMDSS).

Insert the missing terms

- For operation with a reduced crew the vessels are required to meet several requirements: _____ (**UMS**), satellite navigational system, remote control of mooring winches, remote control of liquid cargo handling and _____, Inmarsat communications, collision avoidance system (ARPA) and _____ and monitoring station located on the bridge.

- **Regulation III/2 - Chief Engineer Officers and Second Engineer officers on-ships-with 3,000kw propulsion power or more**

IMO STANDARD MARINE COMMUNICATION PHRASES (SMCP 2001)

- IV-A/2 - *STANDARD ENGINE ORDERS*
- *Any engine order given should be repeated by the person operating the bridge telegraph(s) and the officer of the watch should ensure the order is carried out correctly and immediately.*

Engine orders

- 1. Full ahead*
- 2. Half ahead*
- 3. Slow ahead*
- 4. Dead slow ahead*
- 5. Stop engine(s)*
- 6. Dead slow astern*
- 7. Slow astern*
- 8. Half astern*
- 9. Full astern*
- 10. Emergency full ahead*
- 11. Emergency full astern*
- 12. Stand by engine* (engine-room personnel fully ready to manoeuvre and bridge manned to relay engine orders)
- 13. Finished with engine(s)* (movement of engine(s) no longer required).

- *In vessels fitted with twin propellers, the word "both" should be added to all orders affecting both shafts, e.g. "Full ahead both", and "Slow astern both", except that the words "Stop all engines" should be used, when appropriate. When required to manoeuvre twin propellers independently, this should be indicated, i.e. "Full ahead starboard", "Half astern port", etc.*

Where bow thrusters are used, the following orders are used:

14. Bow thrust full / half to port side

15. Bow thrust full / half to starboard side

16. Stem thrust full / half to port side

17. Stem thrust full / half to starboard side

18. Bow / stern thrust stop



A.1 Complete the following sentences:

In the past each ocean-going vessel was legally required to carry _____
for communicating with shore or other ships.

The radio officer or navigating officers not only deal with navigational
information, but also send and receive _____

3. In case of receiving a distress signal the auto-alarm system

The propulsive unit of a ship may be a _____ or
_____ .

5. The following engineer officers rank above the fourth engineer:
_____ .

6. The Chief Engineer is required to hold _____ .

7. The 2nd and 3rd engineers are responsible for _____ .

A.2 Supply the missing words:

The Chief Engineer ranks after the _____ .

He is the head of the _____ .

The _____ is in charge of the maintenance of the engine-room, deck gear and other machinery.

These engineer officers normally keep _____ .

The _____ is responsible for loading and discharging the cargo, and for water ballast.

In tankers the _____ operates the pumping arrangement.

The _____'s or _____'s duty is to check and replace the lubricating oil, as well as to clean the engine-room.

The _____ is in charge of the storeroom.

The _____ is a petty officer who attends to the boiler or engine and assists in the engine-room.

_____ look after boilers.

The maintenance and repair of all electrical equipment are the duties of the

A.3 Fill in the following words:

• *chairman* • *deck* • *workforce* • *radio-officer* • *pumpman* • *planning committee* • *general purpose manning system* • *general purpose* • *petty officers*

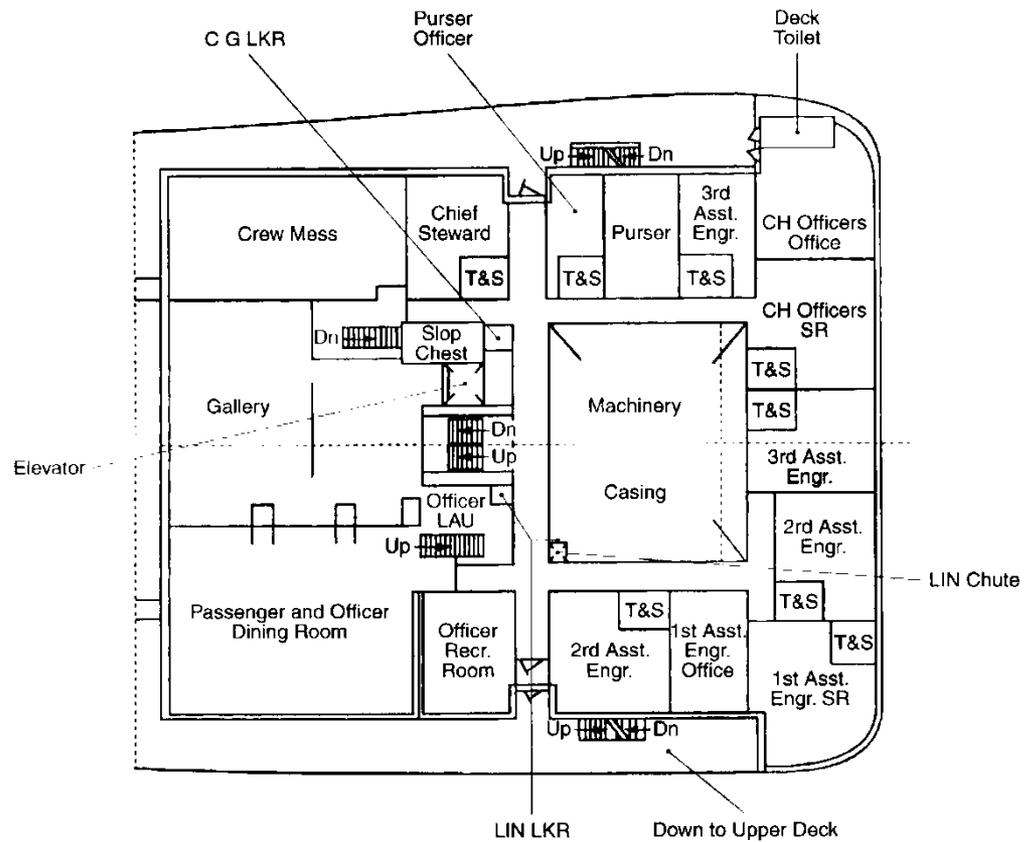
In the 1. _____ system of manning ratings take the place of greasers and seamen in traditionally manned ships. Engine room and 2. _____ ratings join together to form a 3. _____ capable of working on deck and in the engine-room. In the GP system 4. _____ are capable of doing the jobs of Bosun, Carpenter and Donkeyman, and in tankers, doing the job of 5. _____ as well. The work of the GP crew is organized by a Planning Committee. In the Planning Committee the Master acts as 6. _____ .

The 7. _____ acts as Secretary. Other members of the 8. _____ are the Chief Engineer, the Chief Officer, the Second Engineer, the Catering Officer and the Chief Petty Officer.

text and then answer the following questions:

1. Why does the term *radio-department* seem out of place?
2. What were the legal requirements as regarded the radio-service on board?
3. Who is in charge of radio watchkeeping nowadays?
4. What are the duties of the radio-department?
5. Who are the members of the engine-room department?
6. What are the duties performed by the engine-room staff?
7. Which certificates must be held by the engineer officers?
8. What are the following engineers responsible for: Chief Engineer, Second Engineer, Third Engineer, Fourth Engineer?
9. What are the names and duties of the engine ratings?
10. What is the GP manning system and where is it employed?

General Arrangement (US Ship)



A.5 Supply the right marine engineering term from the following list:

- **propulsion system - capacity • four-bladed • main diesel engine • maximum continuous rating • consumption • generator sets • emergency**

Propulsion System

Lara Rickmers is fitted with a single, fixed pitch, bronze,

1. _____ propeller, driven by one Cegielski/Sulzer 6RTA58T
2. _____. Built in Poland by the Suizer licensee, this six-cylinder unit is capable of an output of 11,400 kW (15,280 bhp) at 101.5 rev/ min.

Selected to provide the owner with a fuel efficient 3. _____ the main engine gives the vessel a competitive service speed of 15.5 knots at 12 m draught and 85 per cent MCR. The specific 4. _____ is estimated to be 169 g/kWh, within +/-3 per cent. Two Aalborg boilers are installed in the engine room. The auxiliary boiler is designed to burn heavy fuel oil (HFO) with a viscosity up to 600 cSt at 50°C, and has a 5. _____ of about 2,800 kg/hr. The forced circulation type exhaust gas boiler has capacity of 1,500 kg/hr, at 5 per cent

6. _____ (MCR) of the main engine. Electricity onboard of the ship, is provided by three main diesel
7. _____ each with a rated output of 960 kW at 900 rev/min. These are backed up by a MANDEMP 8. _____ generator, which is installed in a separate compartment.

-

B.1 Fill in the gaps with the following modal verbs:

- ***should • would • could • will • might***

- An engine breakdown 1. _____ occur as a result of a human error or machine failure. A total lack of power or "black-out" 2. _____ be dangerous if the ship is in congested waters or is about to meet heavy weather. A black-out 3. _____ cause the inability of the vessel to steer or to manoeuvre. When the engine-room alarm sounds all engineers 4. _____ report to the engine-room in order to assist in the emergency. Total black-outs are rare, but when they occur it 5. _____ take a few hours for the engine to start up again.

B.2 Supply the Present Simple or Continuous of the verbs in brackets:

The MV «Lion» (*steam*) 1. _____ southward from the Hormuz Strait. The 8-12 watchkeeping officers (*stand*) 2. _____ on the control platform in the engine-room. The Fifth Engineer (*leave*) 3. _____ the platform to change over the settling tanks. The Fourth Engineer (*finish*) 4. _____ writing up the engine-room log and (*he*) 5. _____ about to leave the Platform. Suddenly the Third Engineer (*shout*) 6. _____ :

- The steam pressure (*fall*) 7. _____. What (*be*) 8. _____ up? He (*call*) 9. _____ back to the Fourth Engineer:

“Sound the alarm and shut off the steam turbines. Something (*be*) 10. _____ wrong with the change over, the fires (*be*) 11. _____ out. It (*seem*) 12. _____ like water in the fuel oil.”

Meanwhile the Second Engineer (*ring*) 13. _____ the bridge to inform the Master. The Second Mate (*hoist*) 14. _____ the Not Under Command signal and (*change*) 15. _____ from automatic to manual steering.

B.3 Supply the missing prepositions (of, for, in, on, under):

Catering department

1. _____ a cargo liner the Catering Department is a small but busy department
2. _____ command of the Chief Steward. It is responsible
3. _____ preparing and serving meals, and
4. _____ cleaning the saloons, the accommodation and the alleyways.
5. _____ passenger liners this department employs the largest percentage
6. _____ the vessel's crew as it has to cater
7. _____ a wide range
8. _____ passengers needs and comforts. These include the reception
9. _____ passengers as they come
10. _____ board and attendance
11. _____ their baggage. The management
12. _____ cabins, lounges, restaurants, bars, entertainment, shops etc. are included. Specialized galley and pantry staff are required
13. _____ the cooking and the preparation
14. _____ meals. The Purser is the head
15. _____ the Purser's and Catering Department
16. _____ a passenger ship. He is responsible
17. _____ catering, passengers and wage accounts. The Chief Steward is the head
18. _____ the Department
19. _____ a cargo vessel. The ratings
20. _____ the Catering Dept. are the Ship's Cook, Assistant Cook, Baker, Pantry and Galley Boy, Messman etc.

- The Chief Engineer, or Chief Engineering Officer, is in charge of the Engine Department. He is responsible for all technical operations of the vessel, including engineering, electrical and mechanical units. In particular, he is responsible for all the propulsion machinery, power generating equipment and auxiliaries. He has to keep documents on the machinery working as well as all the repairs carried out on the vessel. He also logs fuel oil consumption. A varying number of officers, petty officers and ratings assist the chief engineer. The engine officers' hierarchy goes as follows:

- 1) The First Engineer. He is responsible for maintenance and operations of the engineering and technical units.
- 2) The Second Engineer. His responsibilities usually include the maintenance of lubricating systems, engine room auxiliaries, and electrical equipment.
- 3) The Third Engineer. He is usually responsible for fuel and water systems. He also supervises tanks soundings and monitors the boiler room equipment.
- 4) The Fourth Engineer. His responsibilities may include, for instance, the operation and maintenance of engine room auxiliaries.
- 5) The Motorman – His duties are defined by the head of the engine department and can include, for example, the daily maintenance and cleaning of specific engine parts.

- The propulsion plant department can also include some petty officers, such as the donkey man and the storekeeper and, if the ship is a tanker, there may also be the pump man. The first one mentioned attends a donkey, auxiliary boiler, especially when the ship is in port. A storekeeper is in charge of all the spare parts and equipment stored for the engine room. The last one, a pump man, is employed to maintain and operate cargo pumps.
- The engine room ratings, e.g. fire-fighters, greasers are usually employed on watches to assist the engineer in charge. They are responsible for daily cleanliness of the engine room and for routine oiling, greasing and machinery servicing.

THE ENGINE DEPARTMENT

(MarEng Intermed – The Crew and its Tasks)

- The **Chief Engineer**, or Chief Engineering Officer, is in charge of the Engine Department. He is responsible for all technical operations of the vessel, including engineering, electrical and mechanical units. In particular, he is responsible for all the propulsion machinery, power generating equipment and auxiliaries. He has to keep documents on the machinery working as well as all the repairs carried out on the vessel. He also logs fuel oil consumption. A varying number of officers, petty officers and ratings assist the chief engineer. The engine officers' hierarchy goes as follows:

THE ENGINE DEPARTMENT

(MarEng Intermed - The Crew and its Tasks)

- THE CHIEF ENGINEER
- I am the head of the Engine Department and am responsible for personnel and the proper operation, maintenance, and safety of the vessel's propulsion system, power generation system and all auxiliary machinery and spaces.
- I have to decide on effective repairs and I report defects that may affect the ship's performance to the Master. I also advise the Master on all matters relating to machinery usage, fuel requirements and an overall economical use of supplies and stores.
- I order, receive, and maintain a proper inventory of spare parts and supplies and supervise bunkering. I see to it that fuel and water is monitored daily. I assign and supervise the work done by engine department personnel. I set engine room watches, specify duties, and make sure that watches are maintained.

A MARINE ENGINEER

- Today various specialists make up the staff working in the Engine Department. But
- the Marine Engineer or Chief Electrician still has to be “a jack of all trades”. It is the
- Engineer or Electrician in charge that has to know all about the mechanical and
- electrical engineering on board. He has got to have the know-how to service the
- engines and keep them running in good condition; when the ship is at sea, any
- breakdown in the power system, machinery, piping, or steel structure will have to be
- repaired as best as can be done without any help from outside.
- A total blackout or propulsion problems can be extremely dangerous for the vessel
- and its crew. If the ship starts drifting in a strong wind, it may lead to listing and in the
- worst case cause the ship to capsize. No wonder the Engine room has been called
- “the heart of the ship”.

MARINE ENGINEER

(MarEng Adv – The Engine Room)

- Anybody who wants to be a Marine Engineer must be ready and prepared to spend a long period in training. Practical training is of crucial importance because the sea environment is very demanding. Sea training is not easy, although it only takes place when a candidate has sufficient knowledge already. A cadet engineer has to learn new skills and put them into practice. For instance, he learns how to do machine repairs like opening up different bearings, tube sleeves, and rusty items like nuts and bolts, as well as cleaning valves and changing filters.
- The successful candidate may be awarded a diploma and will then be able to work on ships as a qualified Marine Engineer class four. Then after some time spent working on ships, he can sit for competency certificates as a class-two Marine Engineer. Again, after some time at sea, he can sit for the class-one certificate of competency, which qualifies him to take up the job of the Chief Engineer on board a ship.
- A marine engineer can be called a ship mechanic, a ship machinist, a ship engine operator, or a ship engine room attendant.

MARINE ENGINEER

(MarEng Adv – The Engine Room)

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WATCH KEEPING (MarEng Adv – The Engine Room)

- The machinery driving a vessel which is underway is usually operated 24 hours a day. All running machinery must be controlled continuously in order to prevent any failure of the equipment. The majority of control systems on modern ships are automatic. A ship may operate for agreed periods with unmanned machinery, called UMS, which stands for Unattended Machinery Spaces.
- The standard system of watches adopted on board is usually a four-hour period on duty followed by eight-hour rest. The word “watch” means both the period and the crew working at that time. The three watches in any 12 hour period are usually: 12 to 4, 4 to 8, 8 to 12. Thus, for instance, an engineer on duty for the 8 to 12 watch works from 8 a.m. to 12 noon and from 8 p.m. to 12 midnight.
- A watch is usually made up of an engineer in charge with an assistant engineer and a rating. Their duties include inspecting the main propulsion plant, auxiliary machinery

- The propulsion plant department can also include some petty officers, such as the donkey man and the storekeeper and, if the ship is a tanker, there may also be the pump man. The first one mentioned attends a donkey, auxiliary boiler, especially when the ship is in port. A storekeeper is in charge of all the spare parts and equipment stored for the engine room. The last one, a pump man, is employed to maintain and operate cargo pumps.
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