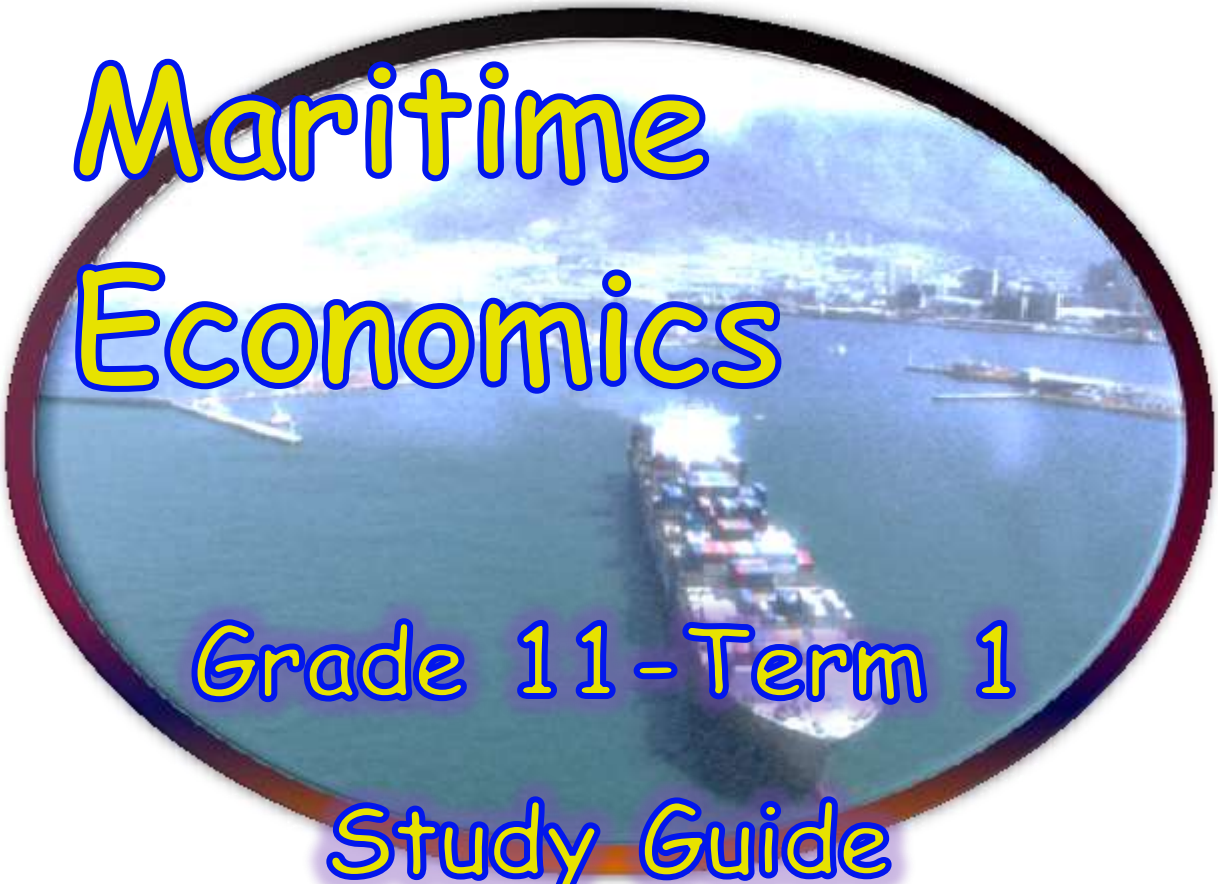
Maritime Economics



Grade 11 - Term 1

Study Guide

Maritime Economics
Grade 11 – Term 1

STUDY GUIDE

Compiled by: Meena Lysko, PhD

Primary resource:
Brian Ingpen, http://maritimesa.org/grade-11/, 2015

CONTENTS

PREFACE

The following icons are used in this study guide:

This is a note or an example.

This is a warning: It tells you about potential pitfalls and how to avoid producing errors.

This is a reference: It provides you with additional information that will help you with the subject under discussion.

This is a Question: Anything appearing in a box of this type is a question based on an application on the subject under discussion.

This is self-assessment: you are required to answer the questions found at these icons, as it will assist you in mastering the content.

This is a task: you as the learner must complete the exercises/tasks/activity/assignments that appear in the learning units.

This is a hint or a tip: It will guide you through the learning opportunity.

This is an experiment: It is an empirical procedure that may be used to test models or hypotheses.

This is a link to an online video: The video is a suggested additional resource on the topic.

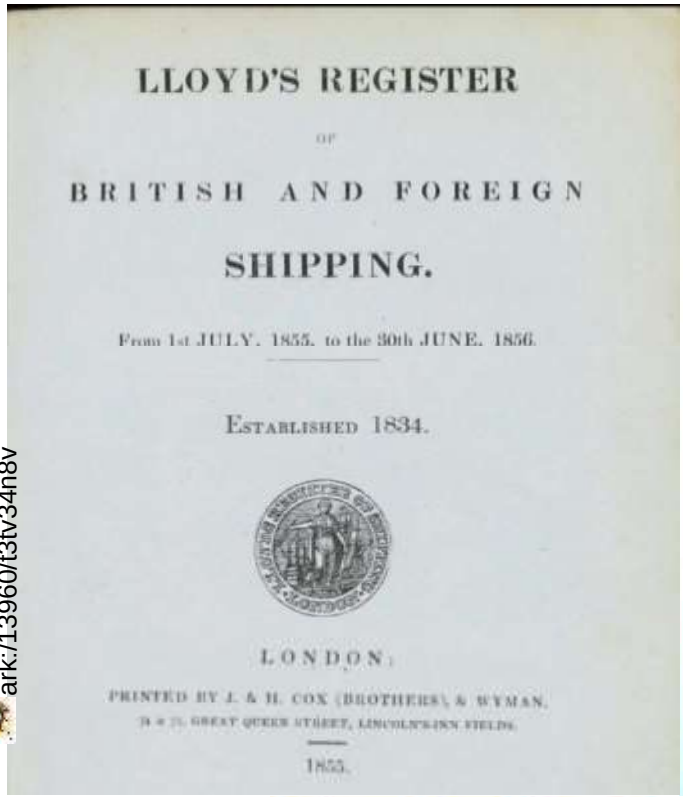
This is a Uniform Resource Locator (URL): The web address is a suggested additional resource on the topic.

This is a new word: Grow your vocabulary to enrich your communication skill.

Learning Outcome 1: Maritime World

By the end of this chapter you will master:

- An extension of your knowledge of the *Maritime World* following on from Grade 10.
- Interpretation and use of information contained in the international Register of Shipping and assess the suitability of ships for particular cargoes and trades.
- Use of maps to interpret trade routes and port location.
- Application of international time zones and the International Date Line to shipping operations.
- Knowledge in the training, education and experience needed to pursue the various maritime related careers.


LLOYD'S REGISTER

OF

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From 1st JULY, 1855, to the 30th JUNE, 1856.

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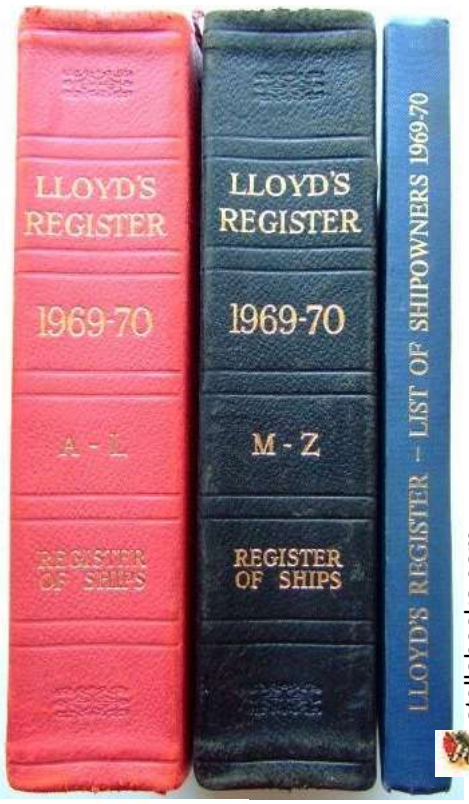


stellabooks.com

INTERNATIONAL MARITIME ORGANIZATION

i0.wp.com

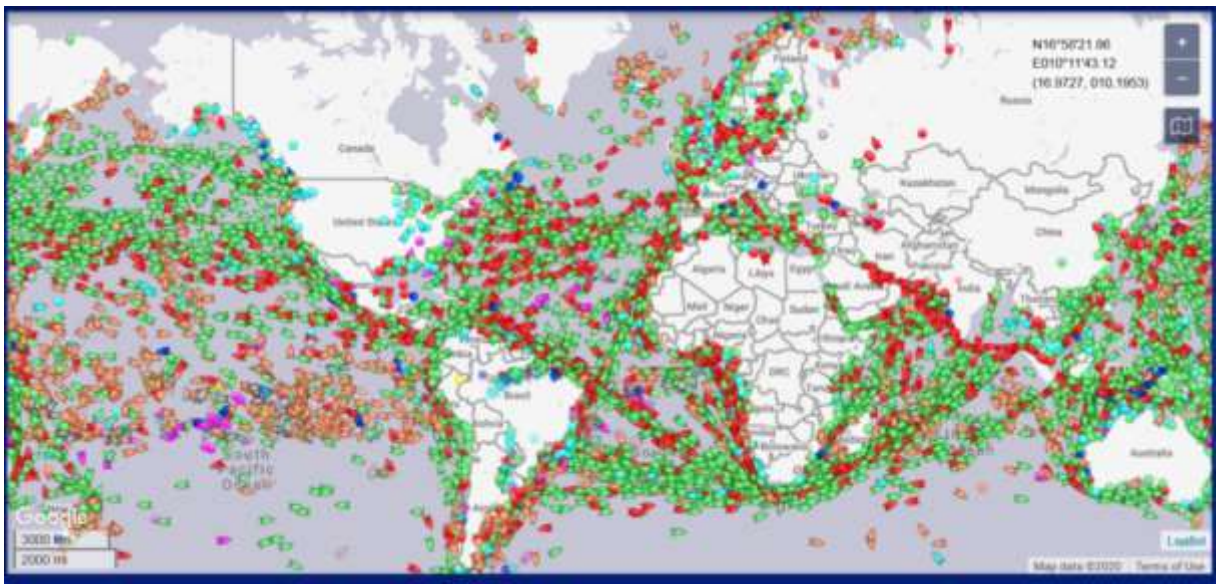
1.1 Recall the Maritime World

Recall from Grade 10

- About 75 % of our world's surface is covered by the salty oceans.
- If we connected all the **navigable** inland waterways of the world, the total length of the waterway will be 2,293,412 km.
- Our continents are separated by the vast oceans.
- We use ships to move large quantities of cargo between continents and between countries.
- The picture below shows the position of vessels around the world, which are either anchored or underway, on 16 November 2020 and at 18H40, local South African time. The map is a vessel density map and vessels are identified with the key below.

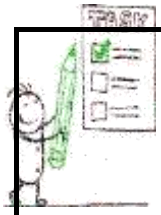
Spot the major fishing grounds, passenger vessels and pleasure crafts.

Spot the trade routes and convergence zones.



Meaning of MARITIME WORLD

We consider the industry which involves any commerce or leisure relating to transport on water as the maritime world. The maritime industry is possible because of the demand for transport by water and the demand for resources in water.



Task 1:

1.1. Visit the website: www.marinetraffic.com

You will find a live map of vessels which are being tracked. There were 205,550 vessels in traffic around the world on 16 November 2020, at 15h00 local Pretoria time. Answer the below questions using the alongside key of vessel-type and the below vessel density map.

1.1.1. Which type of vessel contributes most to the vessel traffic density?

1.1.2. Lookup page 1 of your Grade 10 Maritime Economics Study Guide. There were 180,000 vessels on 23 February 2020 at 13h23 local South African time.

(a) What is the traffic density difference between 23 February 2020 and 16 November 2020?

(b) Provide an explanation for the significant difference in vessel traffic density between the two dates and the impact on international trade.

1.2. Consider that all tanker vessels make up 33% of vessels in the density map and that other vessels, besides cargo vessels, make up 10% of the total vessels. How many cargo vessels are in the density map?

Did you know:

- Marine traffic is all vessels which are at sea and anchored at port.
- Automated Identification System (AIS) data track and trace ship movements.
- The AIS uses transceivers on ships and is used by vessel traffic services (VTS).
- AIS data provide near real-time information on maritime transport.
- The AIS is primarily a maritime safety communication system for vessels.
- The AIS was originally for vessel collision avoidance.
- The AIS was introduced in 2004, by the International Maritime Organization (IMO).

Did you know:

- AIS data also provide near real-time information on trade in motion.
- In 2018, more than10 billion tons of internationally traded goods were loaded at the world's ports.
- By April 2020, the covid-19 pandemic had led to global trade contraction of 27%.

Self Assessment 1:

Like with the licencing of cars and all commercial vehicles, ships are classified and registered. How are ships registered?

In Grade 12 you will learn about ship registration in a country of the owner's choice.

Remember that **flagging** a ship means the same as registering a ship.

1.2 International Register of Shipping

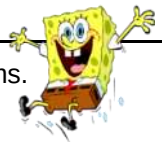
We will now look at the international register of shipping and its history.

All ships are required to be registered.

1.2.1 IMO Ship Identification Number


wikimedia.org

The International Maritime Organisation (IMO) introduced the **IMO ship identification number scheme** in 1987 by adoption of resolution A.600(15). The resolution entry into force was on 1 January 1996.



Adoption of resolution and *entry into force* are legal terms.

- *Resolution* is the expression of opinion.
- *Entry into force* is the time at which an international agreement becomes legally binding for the States that have acceded to the agreement.
- The process leading to a resolution begins with a member making a formal proposal on the opinion. The formal proposal is called a motion.
- At the IMO, a maritime resolution may be brought by any of the 174 Member States.
- Each IMO resolution looks something like this: Z.n1(n2)
  - Z can be:
    - A (for Assembly),
    - C (for Council),
    - MSC (for Maritime Safety Committee),
    - FAL (for Facilitation Committee), or
    - LEG (for Legal Committee)

hakaimagazine.com

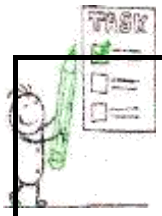
  - n1 - is the resolution number and is allocated in chronological order.
  - n2 (the number in brackets) – shows the session number in which the resolution was adopted by the IMO.
- For IMO resolution A.600(15):
  - Z = A (for Assembly)
  - n1 = resolution number 600
  - n2 = session 15
  - So the **A**ssembly put forward the **resolution 600** which was adopted in **session 15**.
- Member states had 9 years to prepare to enforce the IMO ship identification number scheme.

Did you know:

- South Africa's Ms Nomatemba Tambo was elected to preside over the 31st Session of the IMO Assembly.
- 174 Member States voted
- The Assembly is IMO's highest governing body.
- Regular sessions of the Assembly shall take place once every two years so Ms. Tambo will be President of the IMO Assembly until the next session in 2021.
- Amongst the more than 10 duties of the Assembly are:
  - the task to approve the work programme of the IMO; and
  - to determine the financial arrangements of the IMO.

The website https://www.jus.uio.no/english/services/library/treaties/14/14-01/imo_consolidated.xml

Is on Convention of the IMO and provides information on the structure of the IMO and the duties of the members of the organisation.



Task 2:

Consider the full IMO resolution A.1117(30) given below and answer the questions which follow.

IMO INTERNATIONAL MARITIME ORGANIZATION

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Adopted on 6 December 2017
(Agenda item 9)

IMO SHIP IDENTIFICATION NUMBER SCHEME

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

BELIEVING that the enhancement of maritime safety and pollution prevention and the prevention of maritime fraud could be facilitated if a permanent identification number were assigned to a ship which would remain unchanged upon transfer of its flag and would be inserted on ships' certificates,

RECALLING that, by resolution 1, the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS Convention), held at IMO

Task 2 continued…

Headquarters in May 1994, adopted amendments to the SOLAS Convention, which included the addition of a mandatory regulation on the ship identification number scheme (current SOLAS regulation XI-1/3), which entered into force on 1 January 1996,

RECALLING ALSO that, by resolution MSC.202(81), the Maritime Safety Committee, at its eighty-first session, adopted amendments to the SOLAS Convention with regard to the long-range identification and tracking of ships (SOLAS regulation V/19-1), which entered into force on 1 January 2008,

RECALLING FURTHER that, by resolution A.600(15), it adopted the IMO Ship Identification Number Scheme, and by resolution A.1078(28), the revised IMO Ship Identification Number Scheme, which allows the voluntary application of the Scheme to ships of 100 gross tonnage and above, including fishing vessels,

RECOGNIZING the need for the IMO Ship Identification Number Scheme to be revised to allow its application to ships of 100 gross tonnage and above, including fishing vessels of steel and non-steel hull construction; passenger ships of less than 100 gross tonnage, high-speed passenger craft and mobile offshore drilling units covered by SOLAS regulation V/19-1; and all motorized inboard fishing vessels of less than 100 gross tonnage down to a size limit of 12 metres in length overall (LOA), authorized to operate outside waters under the national jurisdiction of the flag State,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its ninety-eighth session,

1 ADOPTS the IMO Ship Identification Number Scheme, as set out in the annex to the present resolution for implementation on a voluntary basis;

2 INVITES Governments concerned to implement the Scheme as far as is practicable and to inform the Organization of measures taken in this respect;

3 REQUESTS the Maritime Safety Committee to keep the Scheme under review for further improvement as may be necessary;

4 REVOKES resolution A.1078(28).

Annex

IMO SHIP IDENTIFICATION NUMBER SCHEME

Introduction

1 The purpose of the Scheme is to enhance maritime safety and pollution prevention and to facilitate the prevention of maritime fraud. It is not intended to prejudice matters of liability, civil law or other commercial considerations in the operation of a ship. Administrations should apply the Scheme to new and existing ships under their flag engaged in international voyages. Administrations may also wish to assign IMO Ship Identification Numbers (IMO numbers) to ships engaged solely on domestic voyages and to insert the number in the national certificates.

Application

2 The Scheme applies to ships of 100 gross tonnage and above, including fishing vessels of steel and non-steel hull construction; passenger ships of less than 100 gross tonnage, high-speed passenger craft and mobile offshore drilling units engaged on international voyages (SOLAS regulation V/19-1); and to all motorized inboard fishing vessels

Task 2 continued…

of less than 100 gross tonnage down to a size limit of 12 metres in length overall (LOA) authorized to operate outside waters under the national jurisdiction of the flag State, with the exception of the following:

.1 ships without mechanical means of propulsion;

.2 pleasure yachts;

.3 ships engaged on special service;[1]

.4 hopper barges;

.5 floating docks and structures classified in a similar manner;

.6 ships of war and troop ships; and

.7 wooden ships, other than fishing vessels.

Assignment of IMO ship identification number

3 The IMO number is made up of the three letters "IMO" in front of seven digits (e.g. IMO8712345), allocated by Information Handling Services Maritime & Trade (IHSM&T)[2] at the time of build or when a ship is first included in a register. Administrations which have decided to implement the Scheme are invited to assign, or cause to be assigned, IMO numbers to all appropriate ships flying their flags, and to insert those numbers on ships' certificates.

4 For new ships, the assignment of the IMO number should be made when the ship is registered. For existing ships, the assignment of the IMO number should be made at an early convenient date, such as when the renewal survey is completed or new certificates are issued.

5 Administrations implementing the Scheme beyond its mandatory scope are invited to inform the Organization accordingly, for circulation of information to other Governments.

6 Official publications and other information from IHS M&T are sources for referencing the IMO number. If the particulars of a ship do not correspond to those shown in the Register of Ships and its supplement because, for example, the ship has changed its name, or the port State control officer has doubts as to whether the IMO numbers given on the certificates are genuine, further clarification may be sought from IHS M&T, the IMO Secretariat or the flag State.

Certificates on which the IMO number is to be inserted and marking

7 The IMO number should be inserted on a ship's Certificate of Registry which includes the particulars identifying the ship, and on all certificates issued under IMO conventions when and where appropriate. It is recommended that the IMO number also be inserted on other certificates, such as classification certificates, when and where appropriate. The IMO number should preferably be included in the box headed "Distinctive number or letters" in addition to the call sign. The IMO number should also be permanently marked on the hull structure of the ship when and where appropriate.

How to obtain the IMO number

8 To obtain an IMO number for both new and existing ships and to make ad hoc enquiries, please contact the following website http://imonumbers.ihs.com, or requests can be sent to IHS M&T, this being the quickest route for issuance of a number, at the following address:

Task 2 continued…

IHS Maritime & Trade
Sentinel House
163 Brighton Road
Coulsdon, Surrey CR5 2YH
United Kingdom
Email: ship.imo@ihs.com
Tel: +44 (0)1334 328300 (General Contact)
+44 (0) 20 3253 2404 (IMO Ship Team)
Fax: +44 (0)20 3253 2102

New ships (on order and under construction)

9 The IMO number can be obtained by one of the following methods:

.1 Inquiries should be addressed to IHS M&T by telephone, email or facsimile. When making an inquiry, particulars of the ships should be presented.[3]

Based on the above information, IHS M&T will provide the necessary IMO number free of charge. If there is no data in the IHS M&T new construction file on the ship concerned, a new record on that ship will be created and the IHS M&T number will be assigned.

.2 Online access to the new construction file through Sea-web (the IMO Secretariat has access to this system).

.3 Application through IHS M&T, which will provide a service of regular listings of the order book with selected data items, produced for a client's specification.

Existing ships

10 For existing ships, IHS M&T is prepared to answer ad hoc requests free of charge up to a reasonable point of acceptability.

11 IHS M&T is able to both validate and issue IMO numbers to Administrations through regular fleet data exchanges with the Administration, as set out in Circular Letter No.1886/Rev.6, as may be amended.

Fishing vessels of less than 100 gross tonnage

12 In order to issue IMO numbers accurately to new and existing fishing vessels of less than 100 gross tonnage down to a size limit of 12 metres LOA authorized to operate outside waters under the national jurisdiction of the flag State, IHSM&T will need to have prior confirmation by the Administration that the vessels meet the criteria in paragraph 2 of this annex.

Inquiry to the IMO Secretariat

13 Assigned identification numbers are available in the IMO Global Integrated Shipping Information System (GISIS) module on "Ship and Company Particulars" at https://gisis.imo.org/Public/SHIPS/Default.aspx, and may also be obtained free of charge from the IMO Secretariat (IMOnumbers@imo.org), which has access to the Sea-web system, and from IHS M&T directly, at the address given in paragraph 8.

Task 2 continued…

2.1. Was Resolution A.1117(30) brought to the IMO Assembly, Council or Committees? Provide an explanation for your answer.

2.2. What is the resolution number in A.1117(30)?

2.3. In which year was the resolution adopted? (Hint: Use the internet as a resource and the structure of A.1117(30)).

2.4. Which resolution replaced A.600(15)?

2.5. Resolution A.1117(30) replaces A.1078(28). To what vessels A.1117(30) apply?

2.6. According to IMO resolution A.1117(30), are pleasure yachts which operate outside its country of registration required to have an IMO ship identification number?

2.7. How many characters make up the IMO number?

2.8. Google IMO7628136. What do you find?

2.9. Which company allocates the IMO number for a ship at the time of build or for a ship first included in a register?

2.10. Which IMO committee is responsible for keeping the resolution under review for further improvements?

2.11. In which country is HIS Maritime & Trade's headquarters?

2.12. Where on the ship must the IMO number be marked?

2.13. Suppose you own a fishing vessel which requires an IMO number allocation. What information should you provide for the registration? (Hint: use a website such as https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2017/05/the-imo-number-explained)

Task 2 continued…

2.14. In your opinion, how has the resolution for fishing vessels to have IMO numbers contributed to reducing illegal fishing?

1.2.2 Lloyd's Register of Ships

Lloyd's Register of Ships is a list of most ships above 100 gross tons. The register gives details about each of the vessels – owner, previous names, length, beam, draught, cargo capacity, machinery and other details.

Did you know:

- The international register of ships started with a cup of coffee.
- Few maritime people had their own offices so they gathered in coffee houses near the dock areas in London. One of these was the coffee house of Edward Lloyd, in Lombard Street, London.
- The *Society for the Registry of Shipping* was set up in 1760 by customers of Edward Lloyd's Coffee House. The *Register Book* was started in 1764.
- The Society aimed to give merchants and underwriters recorded information on the quality of their vessels to aid insurance and chartering.
- The hulls and equipment of ships had been surveyed and rated (or classed).
- The survey data had been recorded in the *Register Book*.
- Subscriptions generated by the *Register Book* paid for the surveyors to carry out the work.
- Nowadays, the ***Register Book*** is also digital. All books since 1964 are being digitized. You too can access the registers online at:

https://hec.lrfoundation.org.uk/archive-library/lloyds-register-of-ships-online, and

https://www.lr.org/en/lrofships/

maritimecyprus.com

Be a sponge, soak up the words

Before we look at some examples on the Lloyd's Register of Ships, let's consider words and terms that are common on the *Register*.

(*Words an description https://maritimesa.org/grade-11/2016/05/31/lloyds-register-of-ships/*)

- **IMO number**: A unique 7-digit IMO Ship Identification number is assigned to each ship of 100 gross tons and above. It serves to identify ships and is not changed when the ship's owner, country of registry or name changes. This number makes tracking ships, via AIS and other means, over long periods of time practical.

- **Official Number:** The Official Number is separate and different from the IMO number. The Official Number is issued by a flag state when a ship enters its register. The number will remain with the ship unless it changes flag.

  Note: The Official Number cannot be used to replace the IMO number.

- **Ship's Name:** A ship can be renamed anytime. The name of a ship is often changed when the ownership of the vessel changes. In the register, the text next to each of the previous names of a ship indicates the year until which the ship held the name.

  In the example,

  Name: HALIFAX SUN
  North Star – 12
  Storm Petrel – 10

  The ship's current name, and since 2012, is Halifax Sun. It was called North Star between 2010 and 2012, and Storm Petrel up until 2010.

Follow the link https://www.youtube.com/watch?v=m5US2lc6Rpk&feature=emb_logo to watch ship launching methods which is typically accompanied with the ship naming ceremony.

- **Gross Tonnage (GT):** Measure of overall size of a ship.
- **Gross Register Tonnage (GRT):** **was** a measure of the total internal capacity of the ship. Exemptions included: navigational spaces, galleys, stairways, light and air spaces. The total volume in cubic feet was divided by 100. This was the Gross Tonnage entered in the ship's Register.

- **Net Tonnage (NT):** Measure of the useful capacity of a ship.
- **Nett Register Tons (NRT):** **was** a measure of the capacity available for the carriage of cargo and passengers. Deductions from NRT included: Master and crew accommodation, safety and storage spaces, water ballast tanks, allowance for propelling machinery. The resulting volume in cubic feet was divided by 100. This was the Net Tonnage entered in the ship's Register.

Note: NRT and NT relate to all the revenue-earning spaces on a ship, i.e. on a cargo-carrying ship, it includes only the holds or tanks in which cargo can be carried. This value is used to calculate certain tariffs such as the tariff that a ship is charged to pass through the Suez Canal.

Note: Gross Tonnage and Net Tonnage are dimensionless, i.e. there are no physical units of tonnage. Hence the tonnage is expressed as, e.g. the ship has 'Gross Tonnage of 12,345'.

- **Deadweight Tons (dwt):** This value indicates the amount of cargo, fuel, fresh water, ballast water and stores a ship can carry. Deadweight tonnage can be figured by taking the weight of a vessel which is not loaded with cargo and subtracting that figure from the weight of the vessel loaded to the point where it is immersed to the maximum safe depth. This depth is noted with the marking on the ship's hull, the Plimsoll line.

Note: deadweight is a measure of weight; gross and net tonnage are measures of volume.

You can learn more about tonnage measurement of ships online at
https://www.steamshipmutual.com/publications/Articles/Articles/Tonnage.asp

Did you know:

There are also some other forms of tonnage in everyday use, such as –

- 'English or Long Ton' = 2240 lb (1016.05 kg).
- 'American or Short Ton' = 2000 lb (907.18 kg).
- 'Tonne or Metric Ton' = 1000 kg (2204.62 lb).
- 'Measurement or Shipping Ton' = 1 cubic metre.
- 'Bill of Lading or Freight Ton' = 1000 kg or 1 cubic metre of goods, whichever is the greater.

- **Length Overall (LO):** This is the length of the ship from the extreme point on the bow to the extreme point on the stern. This figure is important when deciding whether a ship can enter a particular drydock, lock or can be berthed at a particular berth in a harbour.
- **Length between perpendiculars (Lbp):** This length is the distance between the first bulkhead nearest the bow and the last bulkhead near the stern in the ship. It is important when arrangements are made for drydocking a ship.
- **Beam extreme**: This is the widest point on the ship. It is important when deciding whether a ship can enter a particular harbour, drydock or lock.
- **Beam (moulded):** This is the widest point on the bottom of the ship. It is important when arrangements are made for drydocking of a ship.
- **Depth:** This is the height from the main deck to the bottom of the ship.
- **Draught:** This is the depth of the ship in the water. The more cargo the ship has on board, the lower she will be in the water. A ship with little cargo on board will not be as low in the water. It is important to know the draught of a ship when deciding whether a ship can enter a harbour or a lock or take a particular course. If the draught is greater than the water depth in a harbour at low spring tide, the ship certainly cannot enter the harbour. Allowance must also be made for clearance of the ship from the seabed in the harbour, especially if a swell is running. Therefore a few metres should be added to the draught of the ship to ensure her safe passage into the harbour.
- **Freeboard:** This is the distance from the waterline to the main deck. This figure is not given in the Lloyd's Register, it can be calculated as draught of the ship minus depth of the ship. The more cargo a ship carries, the greater will be the draught and the less will be her freeboard.

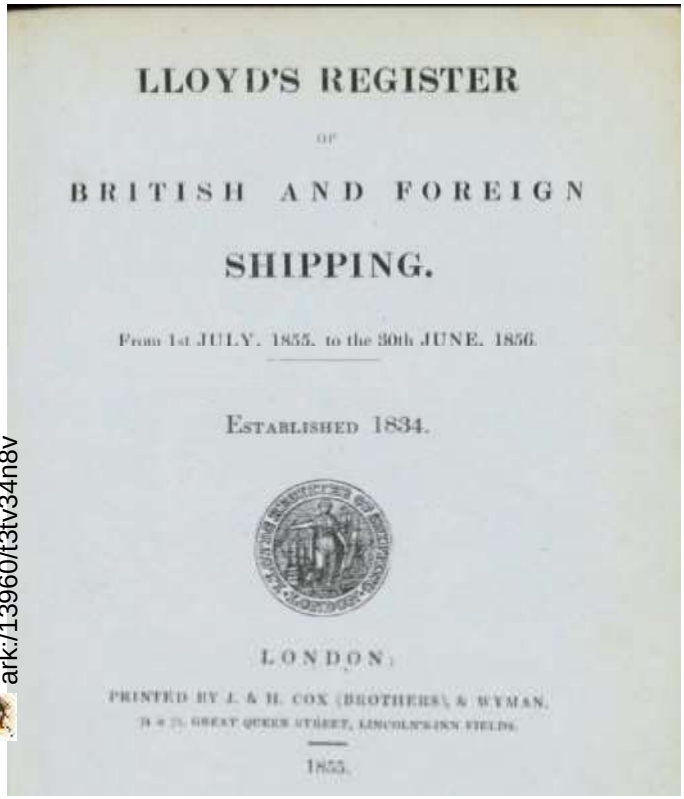
Did you know:

The name of a ship is prefixed according to the type of vessel it is:

CS: Cable Ship/Cable layer	**NS**: Nuclear Ship
MS: Motorship	**RMS**: Royal Mail Ship
MV: Motor/Merchant Vessel	**RRS**: Royal Research Ship
MFV: Motor Fishing Vessel	**SV**: Sailing Vessel (can be sub coded as type of SV)
SS: Steam Ship	**LPG**: Gas carrier transporting liquefied petroleum gas
MT: Motor Tanker or Motor Tug Boat	**LNG**: Gas carrier transporting liquefied natural gas
MSV: Motor Stand-by Vessel	**RV**: Research Vessel
MY: Motor Yacht	

Self Assessment 2:

The picture below suggests that the Lloyd's Register was established in1834, which is not the case. Lloyd's Register Book was started in 1764. Explain the perceived discrepancy.



LLOYD'S REGISTER

OF

BRITISH AND FOREIGN

SHIPPING.

From 1st JULY, 1855, to the 30th JUNE, 1856.

ESTABLISHED 1834.

LONDON:

PRINTED BY J. & H. COX (BROTHERS) & WYMAN,

GREAT QUEEN STREET, LINCOLN'S-INN FIELDS.

1855.

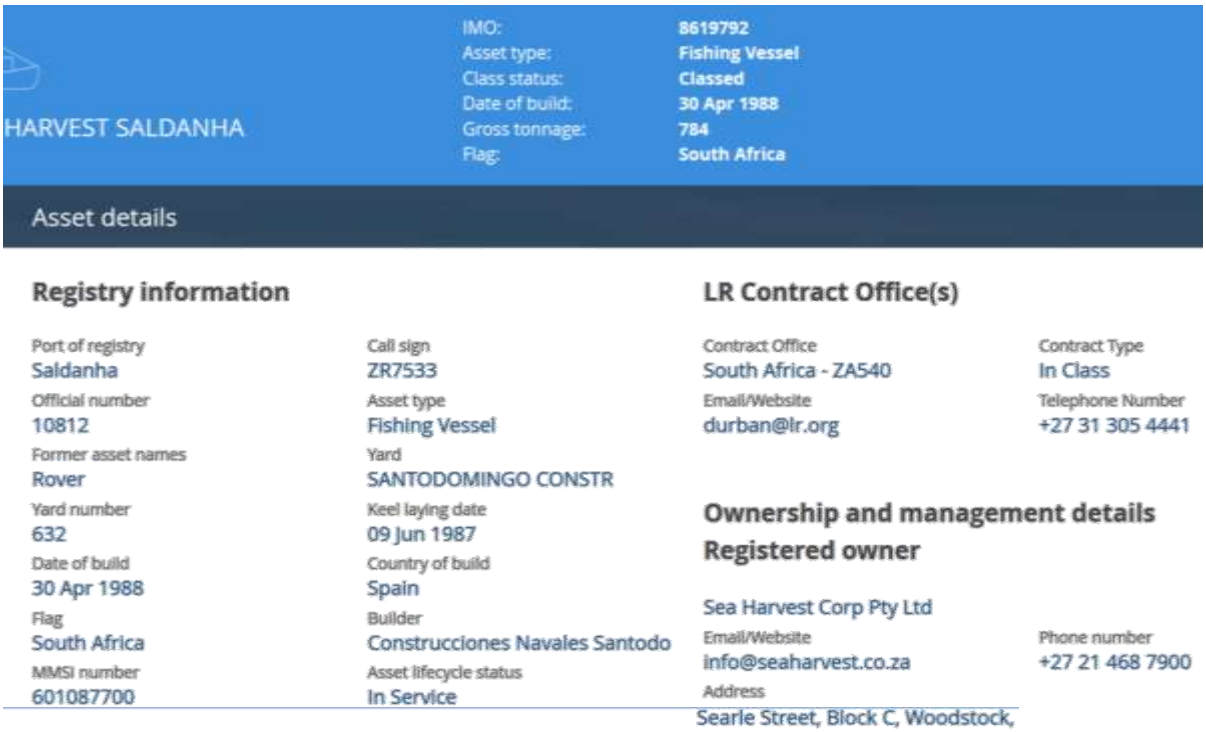
Did you know:

- Sea-going vessels undergo a series of regular and frequent inspections to establish meeting the minimum requirements to continue sailing and transporting trade goods.
- Surveys provide confidence in ship safety and protect seafarers.
- Surveys can be done by the Flag State administration or by a recognized classification society.
- Before undertaking a ship, the marine insurer may want to have an independent survey of the ship to establish if the ship sufficiently meets all requirements of class and operation.

- SOLAS requires that all Merchant vessels must undergo a complete survey of the hull in a dry dock twice within 5 year periods and an intermediate survey within not more than 36 months.
- A surveyor uses the ship's IMO identification number to pull up information on the ship.

Analyse an extract for a vessel on the Lloyd's Register, retrieved from

https://classdirect.lr.org/assets/LRV18216



Example 1:
Interpretation of Llyod's Register

An extract from Llyod's Register for the ship *Halifax Sun* is given in

https://maritimesa.org/grade-11/2016/05/31/lloyds-register-of-ships/

Name:	**HALIFAX SUN**	**Gross Tons:**	**19243 grt**
	North Star – 12	**Deadweight:**	**29431 dwt**
	Storm Petrel – 10	**Net:**	**15467 nrt**
Year Built:	**2009**	**Shipbuilder:**	**Kure Shipyard, Japan**
Length:	**179.0 m**		
Beam Extreme:	**30.2 m**		
Draught	**11.6 m**		

The ship's current name is Halifax Sun (since 2012)
The ship's previous names were:
North Star (from 2010 to 2012) and Storm Petrel (from 2009 to 2010)

The ship's gross register tons is 19243 grt. This is the volume of space within the hull and enclosed space above the deck, which is available for cargo, fuel, passengers and crew. Notice that the entry is gross register tons and **NOT** gross tons in this example.

The ship's net register tons is 15467 nrt. Net tonnage is used in situations where the vessel's earning capacity is important, rather than its mere size. Notice that the entry is net register tons and **NOT** register tons in this example.

The ship's deadweight tons is 29431 dwt. So, if the ship carries about 26700 tons of cargo then it has 2730 tons of fuel, fresh water, ballast water and stores.

Note: The ship's tonnage values are used to calculate the fees such as harbour dues, pilotage dues, light dues, canal dues and miscellaneous (e.g. Agency, Towage, Dry Docking, P&I, Registration and Statutory Surveys).

The ship's draught is 11.6 m and she is loaded to capacity.
Consider the case of a harbour having a water depth of 18 m at Spring Low Tide and suppose that the Halifax Sun has a clearance of 3 m from the sea bed.

Let's find if the ship can enter the harbour without the keel dragging on the floor.

Water Depth at Spring Low Tide	**18 metres**
Draught of ship	11 metres
Clearance from seabed	+ 03 metres
Water Depth required for the ship	**14 metres**

Because the water depth at Spring Low Tide in the harbour (18 metres) is greater than the water depth required for the ship (14 metres), she can enter the harbour.

Example 2:

Lyoyd's Register Extract for the crude oil tanker, Scott Spirit

https://maritimesa.org/grade-11/2016/05/31/lloyds-register-of-ships/

Lloyd's Register Extract : Scott Spirit

Name :	SCOTT SPIRIT	Ship Type :	Shuttle Tanker
IMO Number :	9466142	Gross Tons :	66 563
Year Built :	2011	Deadweight :	109 335
		Net :	29 517
Port of Registry :	Nassau	Flag :	Bahamas
Owner :	Teekay Corporation, Canada	Shipbuilder :	Samsung Heavy Industries, Goeje Yard, Korea
Operator :	Teekay Shipping, Norway	Special Survey :	2016-07-22
Class :	Det Norske Veritas	Length (BP) :	235.0
Length Overall :	248.6 BB	Beam Moulded :	43.8
Beam Extreme :	43.82	Depth :	22.4
Draught :	15.0		
Construction Details :	Double Hull; Bulbous Bow;		

Arrangement :

Structure	Sequence	Type	Position	Material
Tank	01	Cargo Tank	Port	Steel
Tank	02	Cargo Tank	Starboard	Steel
Tank	03	Cargo Tank	Port	Steel
Tank	04	Cargo Tank	Starboard	Steel
Tank	05	Cargo Tank	Port	Steel
Tank	06	Cargo Tank	Starboard	Steel
Tank	07	Cargo Tank	Port	Steel
Tank	08	Cargo Tank	Starboard	Steel
Tank	09	Cargo Tank	Port	Steel
Tank	10	Cargo Tank	Starboard	Steel
Tank	11	Cargo Tank	Port	Steel
Tank	12	Cargo Tank	Starboard	Steel
Tank	13	Slop Tank	Port	Steel
Tank	14	Slop Tank	Starboard	Steel

Manifolds :	Four	Cargo Pumps :	4 at 3000 tons/hour each
Engines :	2 Oil engines MAN-B&W	Total Power :	18 960 kW (25 778 bhp)
Speed :	14 knots	Fuel Capacity :	HFO : 2 830 t MDO 658 t
Fuel Consumption :	HFO : 45 tons/day when loaded; 38 tons per day when in ballast. MDO : 3 tons/day at sea; 5 tons/day when working cargo at offshore facility; 4 tons/day when working cargo alongside a shoreside terminal		

From the above extract of the Lloyd's Register entry for Scott Spirit we have the following:

1. The ship's IMO number is IMO9466142
2. The owner of the vessel is the Canadian Company, Teekay Corporation.
3. The ship is registered in Bahamas (that is, the Flag State is the Bahamas)
4. The ship is registered in the Port Nassau.
5. The deadweight is 109335 metric tonnes (sometimes shown as MTs or mts or MTS)
6. It will not be possible for the vessel to carry **96000 tons of tons** of crude oil.
   96000 tons of tons is 96000000000 tons.

Example 2 continued …

This is 878035 times greater than the deadweight of the ship! The ship does not have the hold capacity for the cargo and if there was hold, the vessel would in any case be overloaded and sink! Ship and cargo will be lost and with significant monetary losses.

Because *Scott Spirit's* deadweight is 109335 metric tonnes, a cargo load of **96000 metric tonnes** of crude oil would mean that the vessel has 209335- 96000 = 113335 metric tonnes tons of fuel, fresh water, ballast water and stores.

The fuel capacity for Heavy Fuel Oil (HFO) is 2830 metric tonnes. So, with the vessel fully bunkered: the fresh water, ballast water and stores will be 113335 – 2830 = 110505 metric tonnes.

7. The ship was built in 2011.

8. The ship was built by the company Samsung Heavy Industries.

9. The ship was built in Goeje Yard, Korea.

10. The ship's usual speed is 14 knots.

11. Let's consider the ship's activity as such: She took a full stem of heavy fuel oil (HFO) at Port X. She steamed for five days in ballast (meaning sailing without any cargo) to reach an offshore facility to load 90000 tons of crude oil. She took six days to load. (She had to run her main engine for that time.) She then steamed 2688 nautical miles to Port Y to discharge her cargo. At Port Y she discharged her cargo alongside using all four manifolds.

From Port X to Port Y:

Main engine was operating for 5+6+8 = 19 days

5 days from Port X to offshore facility for 2

6 days at offshore facility @ 3

8 days from offshore facility to Port Y for 4

Amount of HFO fuel used = 190 + 30 + 360 = 778 tons

5 days x 38 tons/day = 190 tons HFO for 2

6 days x 38 tons/day = 228 tons HFO @ 3

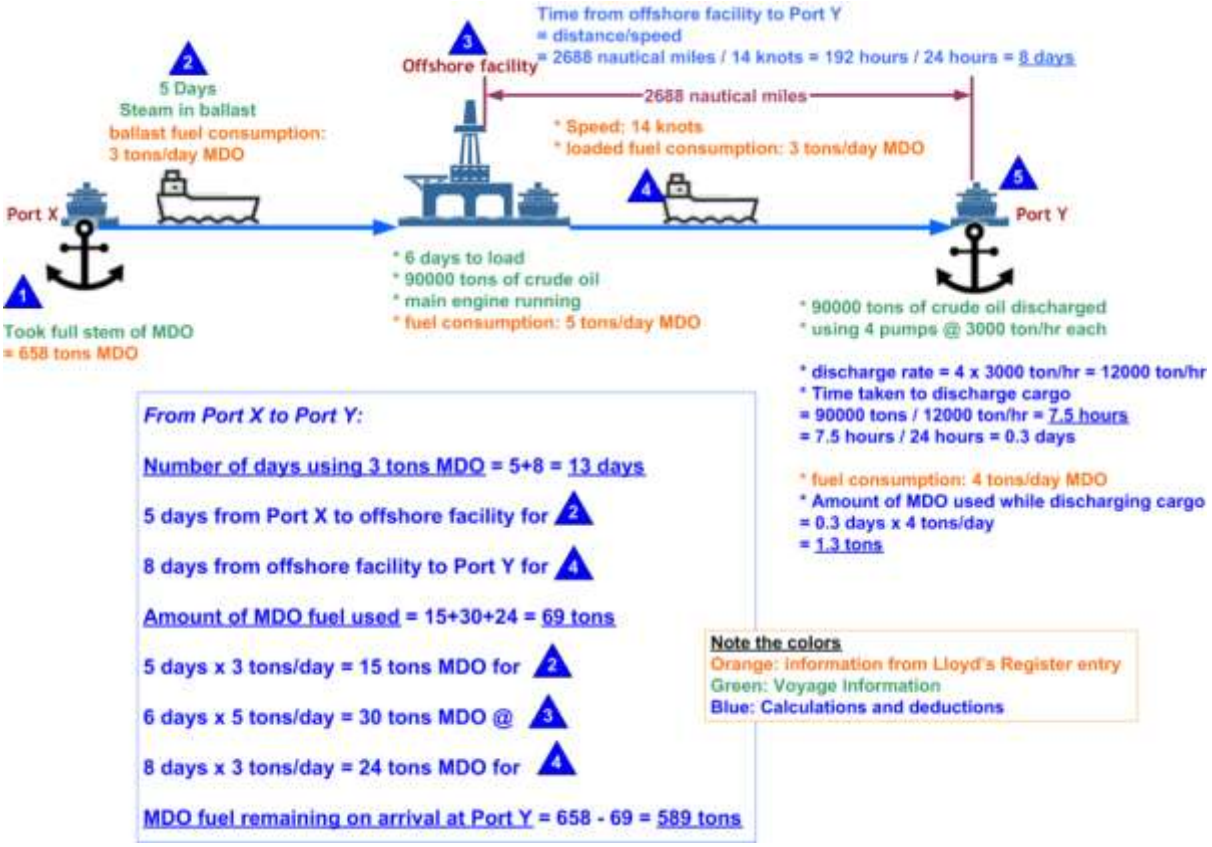
8 days x 45 tons/day = 360 tons HFO for 4

HFO fuel remaining on arrival at Port Y = 2830 - 778 = 2052 tons

Note the colors
Orange: information from Lloyd's Register entry
Green: Voyage Information
Blue: Calculations and deductions

Example 2 continued …

12. Consider that the vessel took a full stem of marine diesel oil (MDO) at Port X:



From the web, you too can find the following with the key search IMO 9466142:

http://www.shipspotting.com/gallery/photo.php?lid=2551510

Example 2 continued …

From the web on 21 November 2020

INFORMATION

The current position of **SCOTT SPIRIT** is at North Sea (coordinates 57.89026 N / 0.76082 E) reported 2 days ago by AIS. The vessel is en route to **ALBA**, sailing at a speed of 1.3 knots and expected to arrive there on **Nov 17, 06:00**.

The vessel **SCOTT SPIRIT** (IMO: 9466142, MMSI 311027400) is a Crude Oil Tanker built in 2011 (9 years old) and currently sailing under the flag of **Bahamas**.

Track on Map | Add Photo | Add to Fleet

PORT CALLS

Current AIS Destination	Estimated Time of Arrival
ALBA	Nov 17, 06:00

Port	Arrival (UTC)	In Port
Tranmere	Nov 13, 08:48	21h 11m
Tranmere	Nov 12, 20:37	1h 18m
Tranmere	Nov 11, 19:48	1h 2m
Scapa Flow	Oct 31, 06:57	3d 13h
Pernis	Oct 24, 05:37	2d 23h

Historical AIS Data

POSITION & VOYAGE DATA

AIS Type	Tanker
Flag	Bahamas
Destination	ALBA
ETA	Nov 17, 06:00
IMO / MMSI	9466142 / 311027400
Callsign	C6YA8
Length / Beam	248 / 44 m
Current draught	9.6 m
Course / Speed	233.3° / 1.3 kn
Coordinates	57.89026 N/0.76082 E
Status	-
Position received	2 days ago

Newer position via Satellite

MAP POSITION & WEATHER

9 °C 48 °F | 15.0 kn 7.7 m/s | N/A

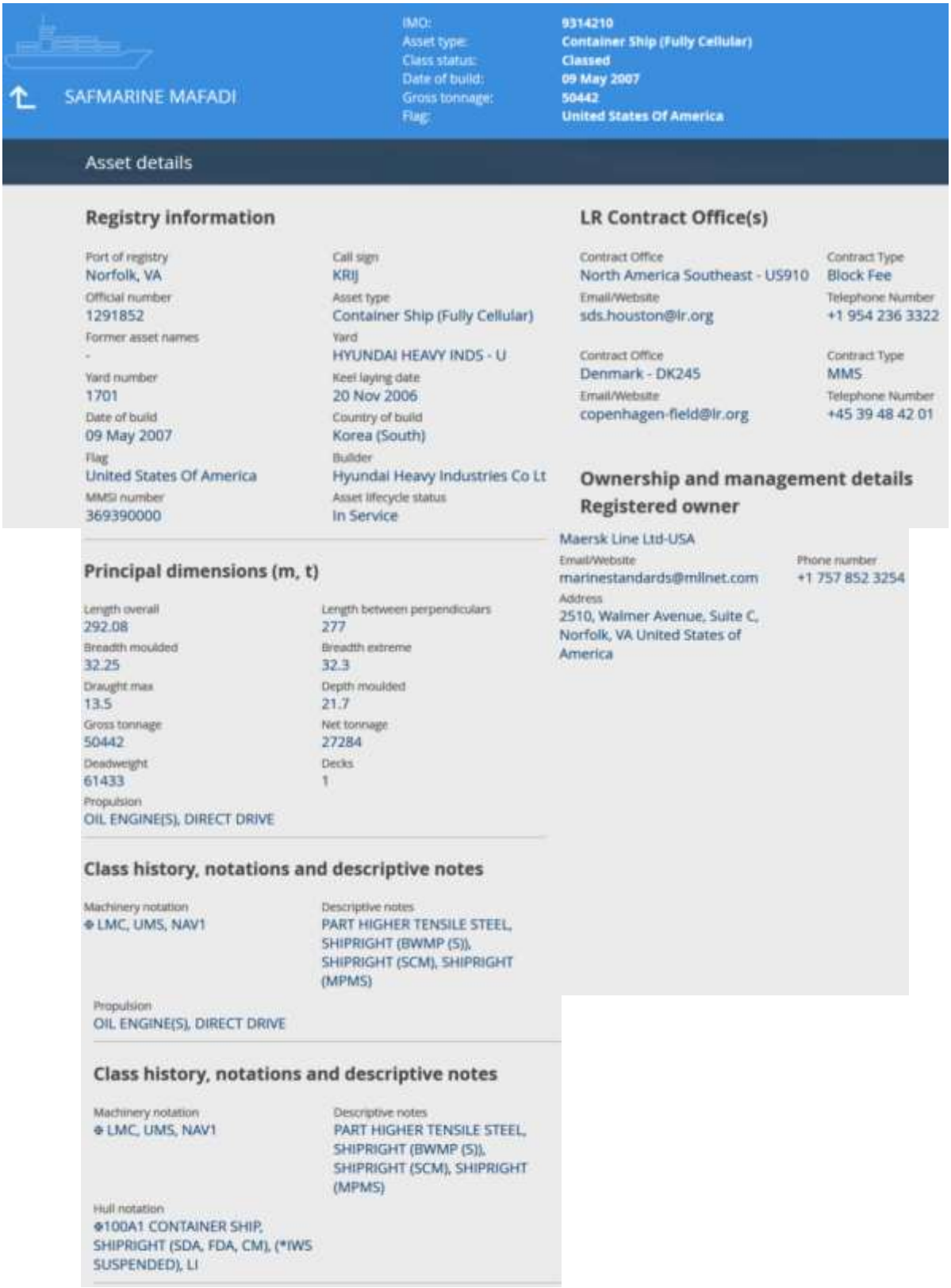
HISTORY

Vessel Name	Registered Owner	Year
SCOTT SPIRIT	Scott Spirit LLC	2011

Example 3:

Lyoyd's Register Extract for the containership, Safmarine Mafadi

https://classdirect.lr.org/assets/LRV29516/details



SAFMARINE MAFADI

IMO: 9314210
Asset type: Container Ship (Fully Cellular)
Class status: Classed
Date of build: 09 May 2007
Gross tonnage: 50442
Flag: United States Of America

Asset details

Registry information

Port of registry: Norfolk, VA
Official number: 1291852
Former asset names: -
Yard number: 1701
Date of build: 09 May 2007
Flag: United States Of America
MMSI number: 369390000
Call sign: KRIJ
Asset type: Container Ship (Fully Cellular)
Yard: HYUNDAI HEAVY INDS - U
Keel laying date: 20 Nov 2006
Country of build: Korea (South)
Builder: Hyundai Heavy Industries Co Lt
Asset lifecycle status: In Service

LR Contract Office(s)

Contract Office: North America Southeast - US910
Email/Website: sds.houston@lr.org
Contract Type: Block Fee
Telephone Number: +1 954 236 3322

Contract Office: Denmark - DK245
Email/Website: copenhagen-field@lr.org
Contract Type: MMS
Telephone Number: +45 39 48 42 01

Ownership and management details

Registered owner

Maersk Line Ltd-USA
Email/Website: marinestandards@mllnet.com
Phone number: +1 757 852 3254
Address: 2510, Walmer Avenue, Suite C, Norfolk, VA United States of America

Principal dimensions (m, t)

Length overall: 292.08
Length between perpendiculars: 277
Breadth moulded: 32.25
Breadth extreme: 32.3
Draught max: 13.5
Depth moulded: 21.7
Gross tonnage: 50442
Net tonnage: 27284
Deadweight: 61433
Decks: 1
Propulsion: OIL ENGINE(S), DIRECT DRIVE

Class history, notations and descriptive notes

Machinery notation: ✠ LMC, UMS, NAV1
Descriptive notes: PART HIGHER TENSILE STEEL, SHIPRIGHT (BWMP (S)), SHIPRIGHT (SCM), SHIPRIGHT (MPMS)
Propulsion: OIL ENGINE(S), DIRECT DRIVE

Class history, notations and descriptive notes

Machinery notation: ✠ LMC, UMS, NAV1
Descriptive notes: PART HIGHER TENSILE STEEL, SHIPRIGHT (BWMP (S)), SHIPRIGHT (SCM), SHIPRIGHT (MPMS)
Hull notation: ✠100A1 CONTAINER SHIP, SHIPRIGHT (SDA, FDA, CM), (*IWS SUSPENDED), LI

Notice that the format in this extract (from classdirect.lr.org) is not the same as in maritimesa.org
The format is not critical as long as the information is registered.

Example 3 continued …

You will notice a change in ownership of the vessel since the extract was put on maritimesa.org. With the change in ownership is also the change in Port of Registry and Flag State. What other changes to the register do you spot?

From the extracts of the Lloyd's Register entries for Safmarine Mafadi we have the following:

1. The ship was built on 9 May 2007.
2. The ship was built in South Korea.
3. The current owner of the vessel is Maersk Line Ltd-USA.
4. Her length overall is 292.08 m.
5. Her draught when loaded is 13.5 m.
6. Her depth is 21.7 m.
7. Freeboard = Depth – Draught = 21.7 m – 13.5 m = 8.2 m
8. Her beam extreme is 32.3 m.
9. Using the register extract from maritimesa:

TEU Capacity:	4 154 TEU; Holds : 1948 TEU; Deck : 2206 TEU incl. 700 reefer

   The container capacity is 4154 TEU.

   The vessel can carry 700 reefers.

10. Let's explore if the vessel can carry a maximum of 1700 40-foot (FEU) containers plus 420 FEU reefer containers.

    The standard FEU is double the TEU. So 1700 FEU is equivalent to 1700 x 2 = 3400 TEU.

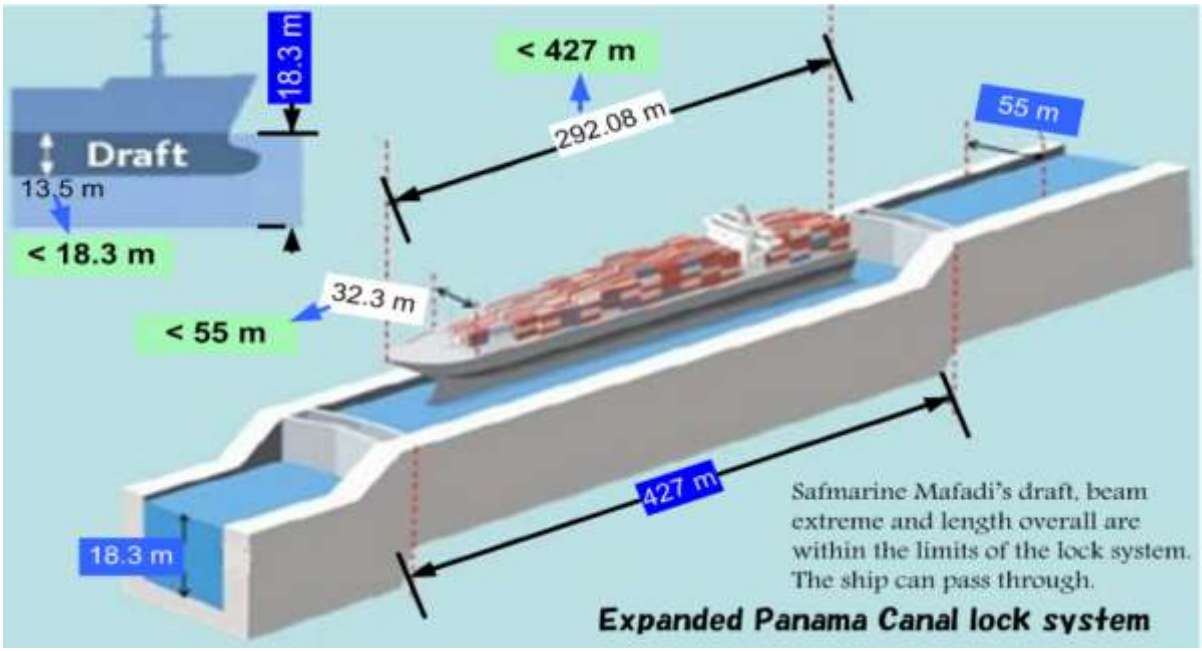
    We now consider the 420 FEU reefer containers. This is equivalent to 420 x 2 = 840 TEU.

    So the total twenty foot equivalent containers = 3400 + 840 = 4240 TEU, which is greater than the registered container capacity of 4154 TEU.

    The vessel cannot carry the required cargo.

11. The expanded Panama Canal **lock system** can accommodate vessels up to 400 metres long and up to 50 metres wide.

    Let's consider if the *Safmarine Mafadi* can pass through the expanded canal?



Example 3 continued …

A vessel similar to the *Safmarine Mafadi* passing through a Panama Canal lock

Did you know:

The typical total cost for a Panamax 4154 TEU container vessel to transit the Panama Canal is US$437,394, with the breakdown of toll as follows:

• Tolls	USD$373,860
• Tug Assistance	US$13,005
• Linehandlers	US$5,825
• Locomotive Wires	US$4,800
• Canal Inspection	US$118
• Security Surcharge	US$1,000
• AIS Rental	US$161
• Launch Hire	US$525
• PC Oil Pollution Prevention Fee	US$525
• ADCS Charge (Input / Transfer / Upload)	US$250
• Bank Commission	US$1,090
• Fumigation (Compulsory)	US$385
• Vessel Communication	US$250
• Auto Hire	US$100
• Petties & Incidentals	US$125
• Transit Booking Fee (Optional)	US$35,000
Grand Total	**US$437,394**

Try out the online Panama Toll Calculator

https://www.wilhelmsen.com/tollcalculators/panama-toll-calculator/CalculatePanama?PcUms=4154&LockType=Panamax&VesselType=FullContainerShips&ShipStatus=Laden&Loa=292.08&Beam=32.3&Teu=4154

Example 3 continued …

12. Let us consider that the *Safmarine Mafadi* is due to berth in Durban, South Africa, at 08H00 on 5 March. One hour later, she will start discharging 660 containers, and will load 840 containers. Two gantry cranes have been allocated to her. Each will handle 15 containers an hour. Breaks will total 5 hours.

In this case the vessel will work cargo for a total of 4 days and 4 hours (as calculated below):

$$\text{Total time to work cargo} = \frac{660\ \cancel{\text{containers}}}{15\ \frac{\cancel{\text{containers}}}{1\ \text{hour}}} + \frac{840\ \cancel{\text{containers}}}{15\ \frac{\cancel{\text{containers}}}{1\ \text{hour}}} = \underline{100\ \text{hours}}$$

$$100\ \text{hours} = \frac{100\ \text{hours}}{24\ \text{hours}} = 4.17\ \text{days}$$ (**4 full days** and 0.17 days)

$$0.17\ \text{days} = 0.17\ \cancel{\text{days}} \times 24\ \frac{\text{hours}}{1\ \cancel{\text{day}}} = \textbf{4 hours}$$


So the total time that cargo is worked is 4 days and 4 hours.

Overall costs can be cut if the port could handle cargo faster. Using 4 gantries instead of 2 can reduce the time to 2 days and 2 hours!

Given that the discharge of cargo will start at 09h00 on 5 March, the vessel will **finish handling cargo** with the two gantries at **18H00 on 9 March**, as shown below:

total time to work cargo + total breaks = 4 days + 4 hours + 5 hours = 4 days and 9 hours.
(5 March + 4 days = 9 March and 09H00 + 9 hours = 18H00).

It the ship sails one hour after completing cargowork, then the estimated time of departure (ETD) from the Port of Durban will be 19H00 on 9 March.

Before ETD from Port of Durban:

- The ship will be able to get supplies from shore;
- The ship can bunker (fill fuel);
- Onshore marine engineers can carry any repairs and maintenance;
- Crew can have shore leave and experience Durban hospitality;
- The change in the physical environment that comes with shore leave is positive for the well-being of sailors.

Example 4:

Interpretation of Llyod's Register

An extract from Llyod's Register for the Supramax Bulker *IVS Gleneagles* is given in

https://maritimesa.org/grade-11/2016/05/31/lloyds-register-of-ships/

Lloyd's Register Extract : IVS Gleneagles

Name :	**IVS GLENEAGLES**	Ship Type :	**Bulk Carrier**
IMO Number :	**9736066**	Gross Tons :	**32 726**
Year Built :	**2016**	Deadweight :	**58 071**
		Net :	**19 100**
Port of Registry :	**Singapore**	Flag :	**Singapore**
Owner :	**Grindrod Shipping, South Africa**	Shipbuilder :	**Shin Kurushima Toyohashi, Japan**
Operator :	**Grindrod Shipping, Singapore**	Special Survey :	**2021-03-21**
Class :	**Nippon Kiji Kyokai, Japan**	Length (BP) :	**185.5**
P&I Club :	**UK P&I Club**		
Length Overall :	**189.9 BB**	Beam Moulded :	**32.2**
Beam Extreme :	**33.3**	Depth :	**18.4**
Draught :	**13.0**		
Construction Details :	**Bulbous Bow; Geared; Strengthened for heavy cargoes**		

Arrangement :

Structure	Sequence	Type	Position	Material
Compartment	01	Dry cargo hold	Centre	Steel
Compartment	02	Dry cargo hold	Centre`	Steel
Compartment	03	Dry cargo hold	Centre	Steel
Compartment	04	Dry cargo hold	Centre	Steel
Compartment	05	Dry cargo hold	Centre	Steel

Cargo :	**Grain 73 142; Bale 70 184**	Cranes :	**4 Cranes 30 tons SWL.**
Engines :	**1 Oil engine MAN-B&W**	Total Power :	**8 100 kW (11 031 bhp)**
Speed :	**15 knots**	Fuel Capacity :	**HFO : 2 830 t MDO 658 t**
Fuel Consumption :	**HFO : 30 tons/day MDO : 3 tons/day; 4 tons/day when working cargo with own cranes**		

From the extract of the Lloyd's Register entry for IVS Gleneagles we have the following:

1. The ship is a bulk carrier.
2. The ship is under consideration for a charter from Port A to Port B. Both ports do not have shoreside discharge facilities.The charter is for the carry of:
   - 2500 tons of granite (each block of granite weighs 10 tons),
   - 16800 tons of pig iron (considered to be a bulk cargo),
   - 7800 tons of steel bars, and
   - 5400 tons of ferrochrome (a mineral bulk cargo).

Total cargo weight to be carried = 2500 tons+16800tons+7800 tons+5400 tons = 32500 tons

According to the Lloyd's Register entry, the ship's deadweight is 58071 tons. The ship therefore has sufficient room for fuel, fresh water, ballast water and stores if she carries 32500 tons of cargo.

Fuel+fresh water+ballast water+stores can be up to 58071 tons - 32500 tons = 25571 tons.

Example 4 continued …

Let's suppose that the charterer and the ship agree that the cargo should be stored in the ship's holds as follos:

Hold	Cargo	Tonnage	Loading Rate	Time to load (3.2.3.3)
Hold 1	Granite	2500 tons	5 blocks/hr	50 hours
Hold 2	Pig Iron	8000 tons	400 tons/hr	20 hours
Hold 3	Pig Iron	8800 tons	400 tons/hr	22 hours
Hold 4	Steel Bars	7800 tons	600 tons/hr	13 hours
Hold 5	Ferrochrome	5400 tons	300 tons/hr	18 hours

3.1. The Register shows that the ship has 4 cranes 30 tons SWL. This means that the ship does not have to depend on shoreside discharge facilities at the ports.

The acroynm SWL stands for "Safe Working Load". This is the load that each complete crane assembly is approved to lift on the cargo hook.

3.2.1. Let's assume that Port A has a water depth of 11 m at Spring Low Tide and a lock 212 m long and 42 m wide. The *IVS Gleneagles* can definitely enter the lock. This is because her length overall is 189.9 m (less than 212 m long port lock) and her beam extreme is 33.3 m (less than the 42 m width of the port lock).

3.2.2. The ship's draught is 13 m whilst the Port A water depth at Spring Low Tide is 11 m. The draft is 2 m greater than the water depth at Spring Low Tide. The ship therefore CANNOT sail from Port A loaded to her full loaded draft.

3.2.3.1. If there is no deadline to finish loading then all of the granite blocks will be loaded. The load is to include 2500 tons of granite blocks.

Since each granite block weighs 10 tons, the total number of granite blocks is:

$$\frac{2500 \text{ tons}}{10 \text{ tons/block}} = 250 \text{ granite blocks}.$$

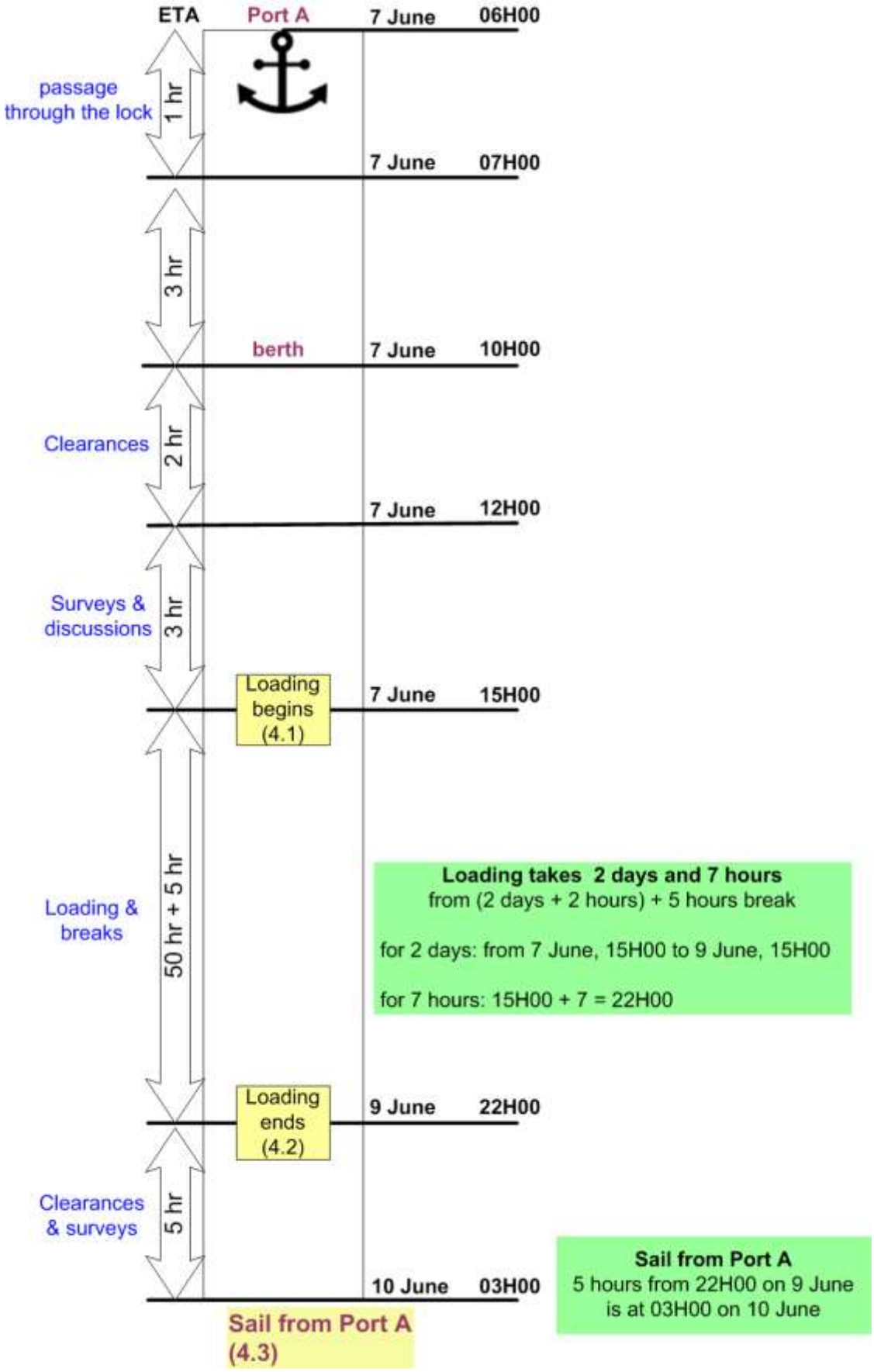
3.2.3.2. The loading rate for the granite blocks is 5 blocks/hour. So 250 blocks will be loaded in:

$$\frac{250 \text{ blocks}}{5 \text{ blocks/hr}} = 50 \text{ hours} = 2 \text{ days and } 2 \text{ hours}$$

3.2.3.3. Hold 1 with the granite blocks will take the longest to load.

Example 4 continued …

4. Consider the events on the diagram below when the ship is at Port A.



Example 4 continued …

5. The deadweight of 58071 tons is the amount of cargo, fuel, fresh water, ballast water and stores that the ship can carry.

6. Some of the clearances that is done just after the ship has berthed include:
   - Customs admittance (includes fuel, ship's stores, crew baggage)
   - Vessel manifest listing all cargo and passengers on-board
   - Vessel manifest on cargo and passengers for discharge and boarding
   - Vessel manifest on "through" cargo and passengers which will remain onboard and/or depart with the vessel.
   - Customs authorities in some countries may require to see documents on compliance with local laws and financial responsibility for penalities and other enforcement measures.
   - Certicate of Readiness once the loading/unloading plan and relevant procedures have been agreed.
   - Survey for any strutural damages. Any damage must be reported to the respective classification soeciety and cargo operations should notbe undertaken.
   - Survey of working condition bilge and ballast systems.
   - State of cargo prior to loading is in compliance with regulations.
   - One Ships Store List
   - List of Narcotics
   - Load line/Safety Radio/Equipment Cert
   - Vaccinations List
   - Crew List
   - Maritime Declaration of Health
   - Ship's Register
   - International Tonnage Certificate
   - International Safety Management Certificate

7. Surveyors that board the ship before loading commences will represent the maritme safety authority, and the port authority.

8. The ship is particularly suited to carry dense cargoes like steel, pig iron, and granite since:
   - the ship has been strengthened for heavy cargoes (as shown by the entry in the Lloyd's Register)
   - the ship has cargo gear for handling of heavy cargo (4 cranes) which makes it possible to handle cargo at ports without handling facilities.
   - The cargo hold openings are sufficiently large.

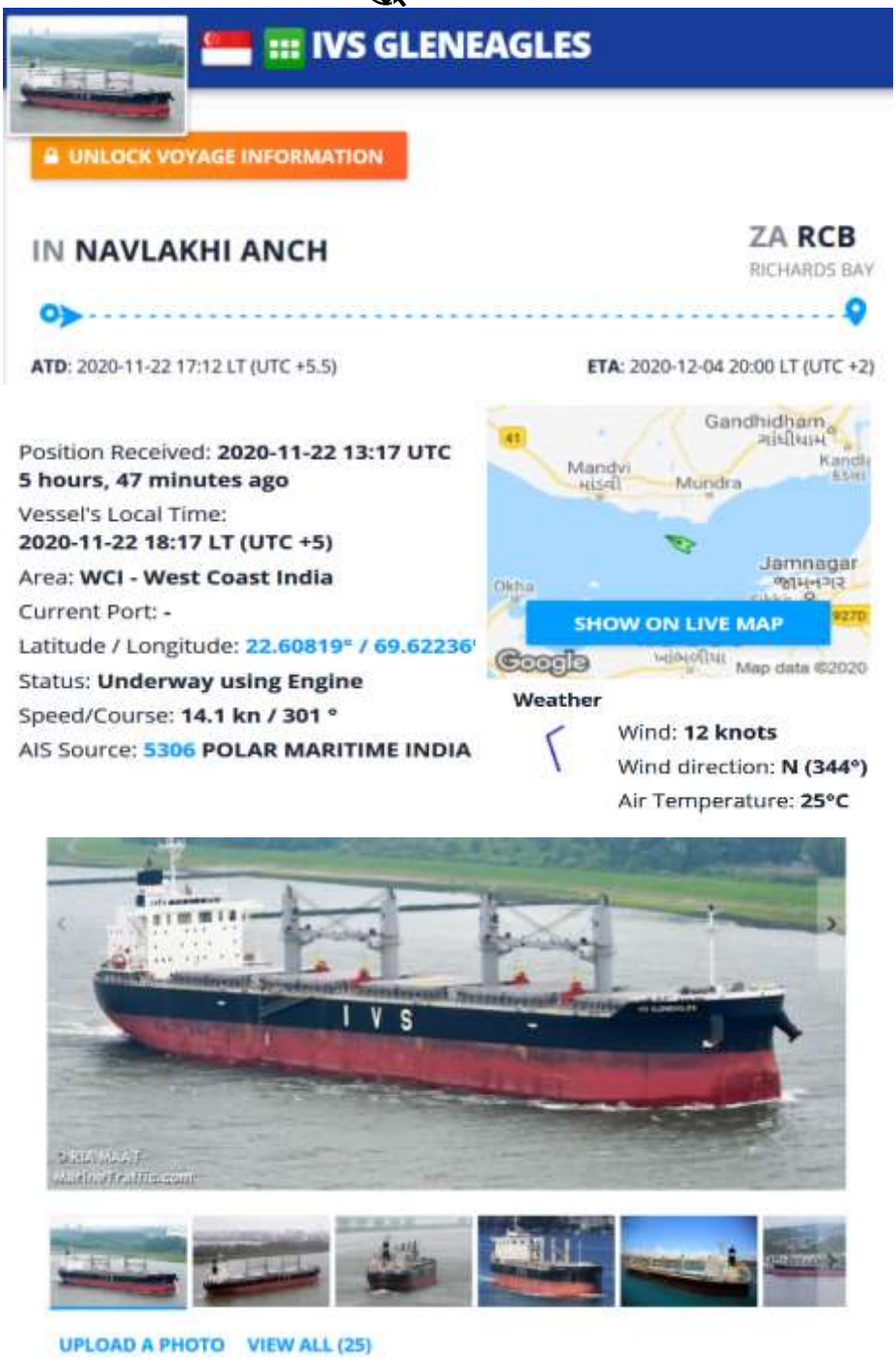
9. Cargoes suchas steel and granite are termed Neo bulk cargo.

10. The ship is registered in the Port of Singapore.

11. As of 22 November 2020, *IVS Gleneagle*s' next special survey is due by 21 March 2021.

Task 3:

Consider the below sample of live information for the bulk carrier *IVS Gleneagle*, as provided at marinetraffic.com



3.1. Which port did the ship depart from on 22 November 2020?

3.2. What is the vessel's current speed and how far off is the current speed from the speed which is entered in the Lloyd's Register.

Task 3 continued…

3.3. Which Port is the vessel heading to?

3.4. On which date is the vessel expected at the destination port?

3.5. What is the current wind speed and direction for the vessel?

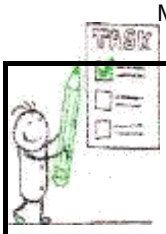
3.6. What is the AIS source for the present data?

3.7. Suppose that the vessel maintains an average speed of 14 knots. How much of fuel would she consume for the entire trip if she is sailing on HFO?

3.8. How much fuel will the vessel have remaining on entering Richards Bay?

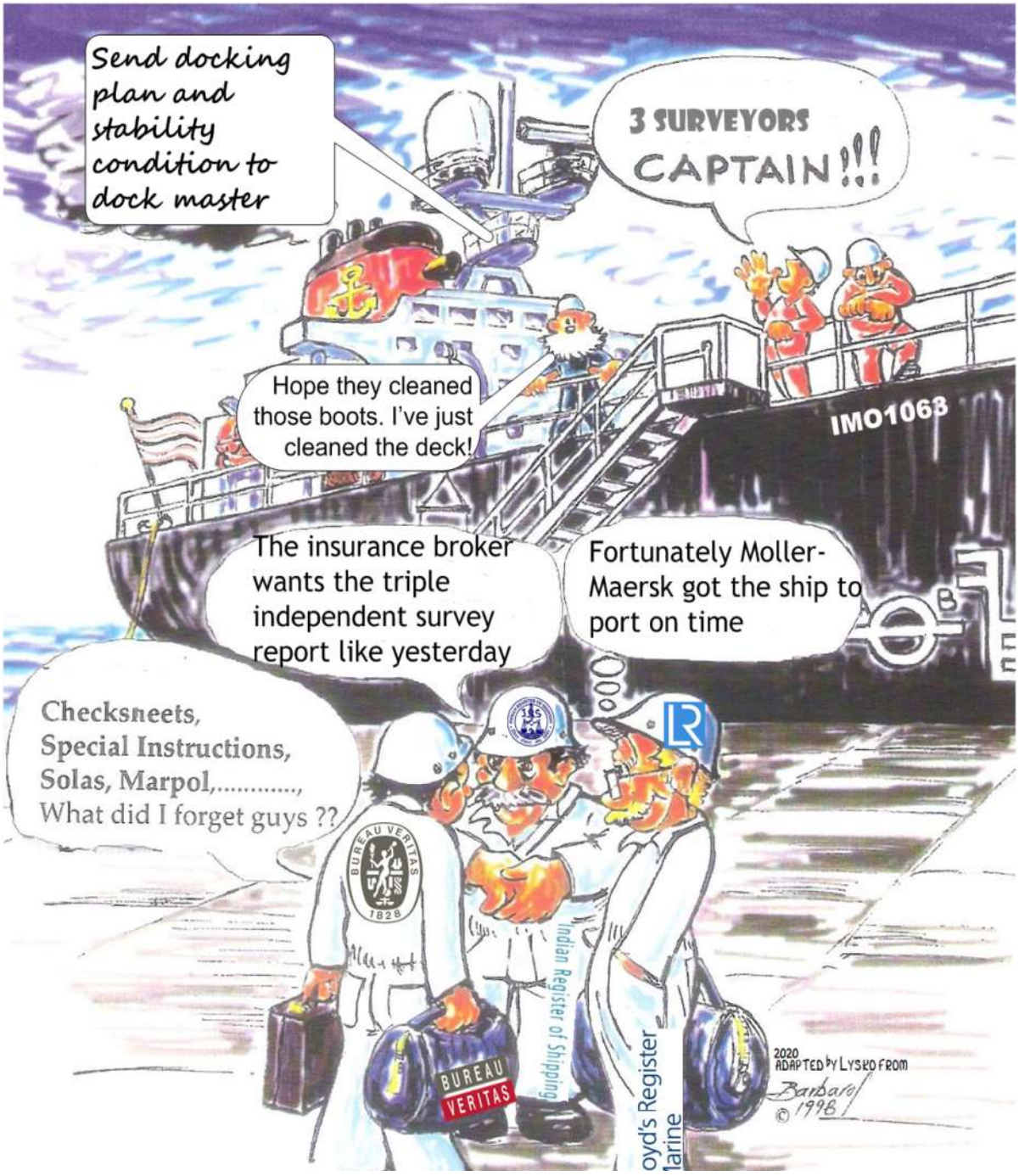
3.9. Assume that the ship's carbon emission, as she sails with Heavy Fuel Oil, is 3.1 grams CO_2 per gram of fuel. What is the total emission for the vessel's trip to Richards Bay from Navlakhi Anch, India?

3.10. Suppose the International Monetary Fund (IMF) proposes a carbon tax of US$30 per tonne CO_2 emission. What would be the carbon tax for the *IVS Gleneagle* trip from India to South Africa?



Task 4:

Explore the below cartoon and answer the questions which follow.



4.1. From which classification societies are the three surveyors?

4.2. What are some of the regulation tools for ship surveyors?

Task 4 continued…

4.3. Pick out a glaring IMO resolution non-compliance on the ship?

4.4. Why does the Captain instruct his crew to send the docking plan and stability condition to the dock master?

4.5. Was the ship call to port within schedule?

4.6. Who or what is a marine insurance broker?

4.7. Suppose the unfortunate event of one of the surveyor's unknowingly boarding the ship with oil on his shoe and he slips on the deck and severely injures himself. Will the ship owner be held liable for the incident?

Did you know:

- **Class societies** such as the Lloyd's Register need to abide the standards of the IMO.
- There are over 132 classification societies in the shipping industry.
- Some of these societies are: American Bureau of Shipping (ABS), Bureau Veritas (BV), China Classification Society (CCS), Croatian Register of Shipping (CRS), DNV GL, Indian Register of Shipping, Korean Register (KR), Lloyd's Register (LR), Nippon Kaiji Kyokai (NK), Polish Register of Shipping (PRS), Russian Maritime Register of Shipping (RS).

1.3 Port Locations

Revise section 1.3 in your Grade 10, Term 2 Study Guide

Recall from Grade 10 that-

- A **port** is a maritime facility and a multimodal distribution hub. It primarily comprises one or more wharves where ships may dock to load and discharge passengers and cargo.
- Ports have an important economic role, both within its surrounds and globally.
- Ports provide:
  - Maritime access;
  - Maritime interface;
  - Infrastructures and equipment; and
  - Land access.

Knowing the location of ports relative to trade routes and location of local supply and demand is important in the maritime industry to plan transport routes that are most expedient, reliable and cost saving.

1.3.1 Southern African Ports

9 Countries in Southern Africa have ports. These countries are:

1	Angola	6	Namibia
2	Democratic Republic of Congo	7	Reunion
3	Madagascar	8	South Africa
4	Mauritius	9	St. Helena
5	Mozambique		

The ports of southern Africa are important for the economies of the respective countries as well as for the neighbouring landlocked countries.

Large-scale investments in the ports' infrastructure lead to more efficient cargo handling procedures and improved service.

Did you know:

- The Southern African Development Community (**SADC**) Protocol for Free Trade was achieved in August 2008.
- The free trade between SADC countries is meant to:
  - increase domestic production,
  - provide greater business opportunities,
  - increase regional imports and exports,
  - lead to less expensive consumer goods,
  - create employment opportunities, and
  - trigger foreign direct investment and joint ventures

[8]

Task 5: LET'S HAVE A HEALTHY DEBATE

Consider the debate resolution:

"Countries with free trade between themselves have mutual benefits".

Divide your class into two teams, Team Lion and Team Shark.

Team Lion should support (affirm) the resolution.
Team Shark should oppose (negate) the resolution.

Both teams should formulate, research, and deliver persuasive arguments and must include the following factors: economic growth, job outsourcing, government spending, working conditions, technology transfer and natural resources.

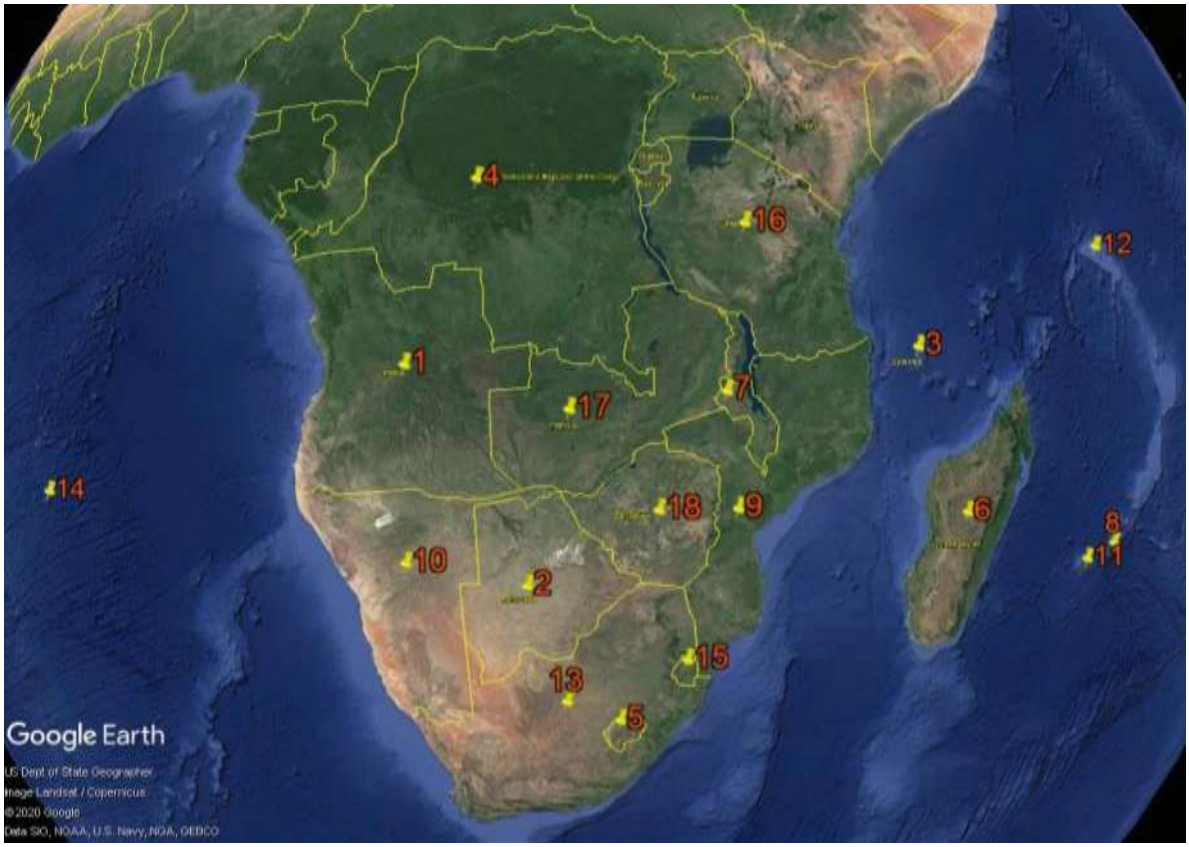
Use the classic debate format and time limits

1. Research and Preparation before the debate should be at least 1 week.
2. Apply the guidelines in the below table for the debate.
3. Your teacher will assign the judges for the debate.

Affirmative Constructive	6 Minutes	In this prepared speech, the affirmative presents their arguments in favor of the resolution. The speech should be pre-written.
Cross-Examination	3 Minutes	The 1st Negative Speaker cross-examines the 1st Affirmative Speaker
Negative Constructive	6 Minutes	In this prepared speech, the negative presents their arguments in opposition to the resolution. The speech should be pre-written and is not expected to directly address the arguments made during the affirmative constructive.
Cross-Examination	3 Minutes	The 2nd Affirmative Speaker cross-examines the 1st Negative Speaker
1st Negative Rebuttal	5 Minutes	The purpose of this speech is for the 2nd Negative Speaker to refute the arguments presented in the affirmative constructive.
Cross-Examination	3 Minutes	The1st Affirmative Speaker cross-examines the 2nd Negative Speaker
Preparation Time	2 Minutes	
1st Affirmative Rebuttal	7 Minutes	The 2nd Affirmative Speaker should first refute the arguments presented in the negative constructive. Then, the speaker should answer the attacks made during the 1st negative rebuttal.
Cross-Examination	3 Minutes	The 2nd Negative Speaker cross-examines the 2nd Affirmative Speaker
Preparation Time	2 Minutes	
2nd Negative Rebuttal	6 Minutes	The 1st Negative Speaker should divide this speech between the negative and affirmative cases. The debater must both rebuild the negative attacks on the affirmative constructive and then rebuild his or her own case.
Preparation Time	2 Minutes	
2nd Affirmative Rebuttal	4 Minutes	The 1st Affirmative Speaker should divide this speech between the negative and affirmative cases. The debater must both rebuild the affirmative attacks on the negative constructive and then rebuild his or her own case.
Preparation Time	2 Minutes	
Negative Summary	3 Minutes	The 2nd Negative Speaker presents their closing argument. This speech should summarize the primary reasons for the judge to reject the resolution based on the arguments made and evidence presented throughout the debate.
Preparation Time	2 Minutes	
Affirmative Summary	3 Minutes	The 2nd Affirmative Speaker presents their closing argument. This speech should summarize the primary reasons for the judge to affirm the resolution based on the arguments made and evidence presented throughout the debate.

Self Assessment 3:

Refer to the map with Southern African countries. Write out the country names in the table and indicate which of the countries have significant merchant vessel service ports.



1		10	
2		11	
3		12	
4		13	
5		14	
6		15	
7		16	
8		17	
9		18	

1.3.1.1 Port of Richards Bay

- Development on The Port of Richards Bay started in the 1970s.
- The choice of Richards Bay for port was based on several factors, including:
  - the large lagoon;
  - the ease of dredging;
  - direct link with the national rail network;
  - ample fresh water; and
  - the vicinity of Empangeni, to stimulate initial development.

- The Port of Richards Bay can accommodate a maximum draught of 19 m. This makes it one of the deepest seaports in the world.
- The Port of Richards Bay has an offshore pipeline.

- The Port of Richards Bay is the leading bulk port in Africa
- The Port of Richards Bay is South Africa's largest port in terms of volume handled.
- Cargo handling at the Port of Richards Bay represents 55% of South Africa's seaborne cargo.

MAJOR EXPORTS THROUGH THE PORT OF RICHARDS BAY ARE:

- Steam Coal (which is used in electric power plants to generate steam to create electricity)
- Woodchip (for making paper, tissue, packaging paper, food packages. fuel)
- Ferro-chrome (Used in the production of stainless steel, ball-bearing steels, & tool steels)
- Mineral Sands (Used as whitening pigments in paints; manufacture of titanium metal)
- Steel
- Aluminum
- Forest Products

MAJOR IMPORTS THROUGH THE PORT OF RICHARDS BAY ARE:

- Coking Coal (for the steel industry)
- Petroleum Products (eg. Kerosene, oil, diesel, gasoline)
- Alumina (used in production of aluminum, a substitute for industrial diamond)
- Project Cargoes (such as large, complex, or high-value pieces of equipment)
- Liquid Pitch (eg. Binder for electrodes for steel arc furnaces, in roofing)
- Grain

Did you know:

The Port of Richards Bay is setting itself to be a Liquefied natural gas (LNG) hub.

Deck Cargo Ship bringing in Storage Bullets to the Port of Richard Bay

The vessel had sailed 7,463 nautical miles to make delivery.

1.3.1.2 Port of Durban

- The Port of Durban is 87 nautical miles (=160 km) south west of Richards Bay.
- The common name for the Port of Durban is *Durban Harbour*.
- Durban Harbour is the largest and busiest shipping terminal in sub-Saharan Africa.
- Durban Harbour handles over 30 million tons of cargo each year.
- The depth within the harbour is 16 m.
- The harbour entrance is widened to 220 m.
- The harbour depth and entrance width is maintained to for safe navigation.

Discover more about the Durban Harbour at https://africaports.co.za/durban/

MAJOR EXPORTS THROUGH THE PORT OF DURBAN ARE:

- Containers
- Petroleum Products
- Woodchip (for making paper, tissue, packaging paper, food packages. fuel)
- Ferro-chrome (Used in the production of stainless steel, ball-bearing steels, & tool steels)
- Steel
- Graded Coal
- Fruit
- Household detergents
- Sugar (bulk and bagged)
- Forest Products (eg, paper)
- Vehicles

MAJOR IMPORTS THROUGH THE PORT OF DURBAN ARE:

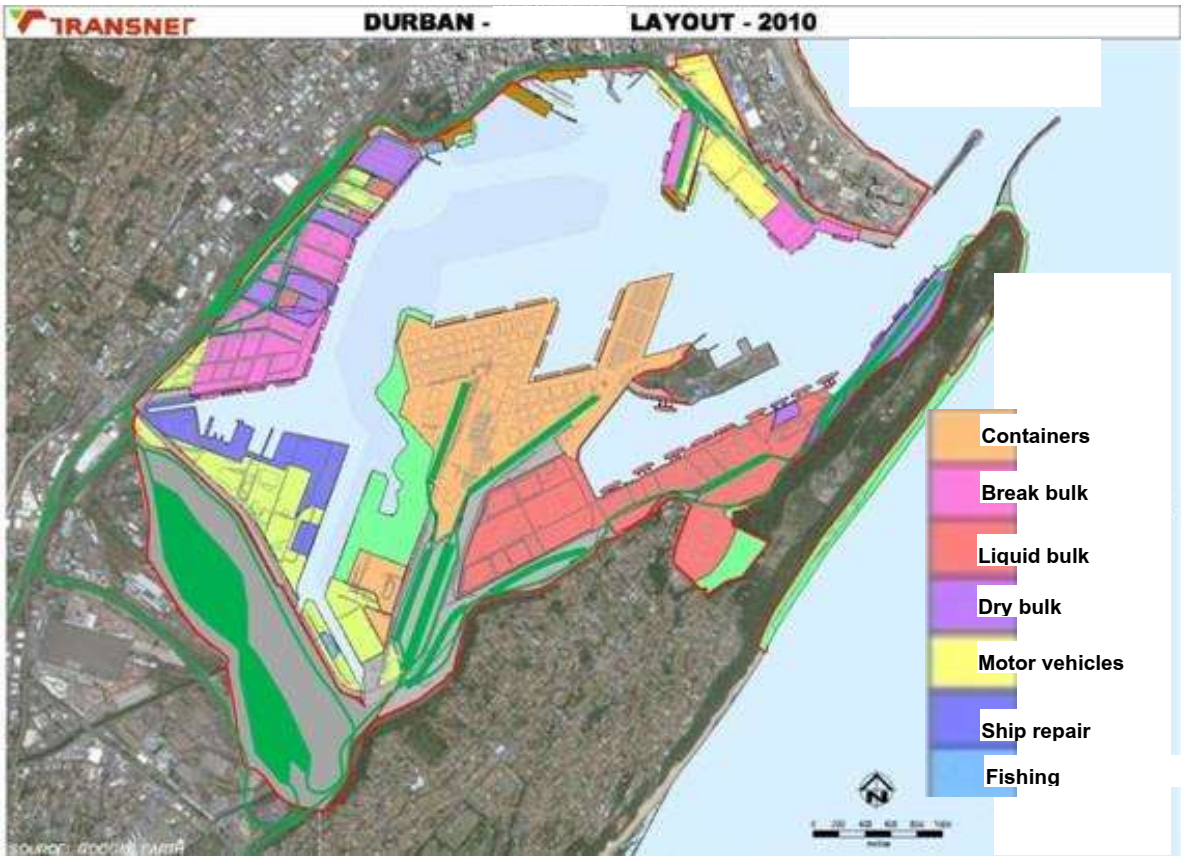
- Crude oil (via offshore buoy)
- Chemicals
- Project Cargoes (such as large, complex, or high-value pieces of equipment)
- Grain
- Containers (including containerized vehicle parts)

Did you know:

- Container vessels such as the MSC Sola cannot enter the Durban Harbour with capacity cargo.
- The MSC Sola has a draught of 15.5 when loaded to capacity and this gives a dangerous 0.5 m clearance with the harbour floor.
- The Durban Harbour needs deeper berths in order to attract post panama ships.

Task 6:

You are given the below layout and zoning of the Durban Harbour. Circle the container, break bulk, liquid bulk, dry bulk, motor vehicles, ship repair and fishing terminals in the aerial view map of Durban Harbour.



1.3.1.3 Port of East London

- The Port of East London is 244 nautical miles (= 452 km) south west of Durban.
- The Port is at the mouth of the Buffalo River.
- This port is South Africa's only *river port*.

- The maximum draft at berths is between 8.5 m and 10.5 m.
- The port can handle ships with a length overall up to 245 m.
- East London Port consists of:
  - a Ro-Ro terminal
  - containerised cargo facilities
  - grain silo
  - break-bulk facilities

Discover more about the Port of East London at

ports.co.za/east-london.php and www.transnetportterminals.net/Ports/Pages/EastLondon_Multi.aspx

Did you know: The Buffalo River is the only navigable river in South Africa.

MAJOR EXPORTS THROUGH THE PORT OF EAST LONDON ARE:

- Containers (ship own gear is used since the port does not have gantry cranes)
- Vehicles (throughput of ~50,000 units a year)
- Grain (such as maize) (the port has the largest grain elevator in South Africa)

MAJOR IMPORTS THROUGH THE PORT OF DURBAN BAY ARE:

- Containers (including containerized vehicle parts)
- Oil Products (eg. Petrol, diesel)
- Grain (such as rice, wheat)
- Automotive components

Did you know:

Hinterland are regions which serve a port, for both import and export.

Self Assessment 4:

Use google search, google maps and Google Earth as your interactive tool to discover:

4.1. The Port of East London and the surrounding towns.

Self-Assessment 4 continued…

4.2. The location of East London's historic clock tower buildings (which are to accommodate a planned maritime training college)

4.3. The shortest distance, by road, from the National Sea Rescue Institution Station 7 to the East London Yatch Club.

Self-Assessment 4 continued…

4.4. The largest grain elevator in South Africa. Hint: The grain elevator is at 33.031119°S latitude and 27.913597°E longitude.

4.5. Let's consider the hinterland. The biggest grain silos in the Southern Hemisphere! These silos are the *silos of Senwes*, in the Free State. Hint: The silos of Senwes are in the small town of Wesselsbron, 27.839541°S latitude and 26.363105°E longitude.

4.6. The railway link between silo Senwes and the Grain Elevator.

Self-Assessment 4 continued…

4.7. From the perspective of the Port Terminals Manager, what would be the most expedient and cost effective transport mode for the grain from silo Senwes to the Grain Elevator? Would it be air, road or rail? Discuss the answer with your classmates.

1.3.1.4 Port Ngqura

- The Port of Ngqura is 11 nautical miles (= 20 km) northeast of Port Elizabeth.
- The Port of Ngqura is 402 nautical miles (= 744 km) south west of Durban Harbour.
- The Port of Ngqura is South Africa's newest port and started operations in 2009.
- It took 7 years to construct the port.
- This port is a deepwater port.

- The entrance channel **Port Chart Datum** depth is 18 m.
- The port has 3 general cargo berths, 4 container berths.
- There are plans to build a dedicated manganese terminal to accommodate the export of 16 million tonne per annum (MTpa).
- A 1,003 m rail corridor will connect Port Ngqura with hinterland manganese mines in the Northern Cape.

Did you know:

- South Africa is the world's largest producer of manganese.
- South Africa currently produces about 14 Mtpa and exports 90% of the resource.
- Manganese export earnings was R43.7 billion in 2018.
- The planned 16 Mtpa manganese infrastructure for the Northern Cape-Ngqura corridor is projected to cost R26.7 billion.
- South Africa could benefit from exporting manganese and local manufacturing of steel and related products.
- In 2019, China exported 62.0 million metric tons of steel; produced from ~33% manganese import from South Africa.
- China generated USD$48.4 billion (R733.8 billion !) from steel export in 2019.

MAJOR EXPORTS AND EXPORTS THROUGH THE PORT OF NGQURA ARE:

- Containers

Gale force winds at Ngqura can impact port operations and set back import/export schedules. Ngqura is particularly vulnerable and engineering solutions are needed.

1.3.1.5 Port Elizabeth

- Port Elizabeth is 384 nautical miles (= 715 km), southwest from Durban Harbour.
- The port is also 423 nautical miles (= 785 km) east (bearing 93^{o}) from the Port of Cape Town.
- Port Elizabeth draught limitations on vessels are 11 m for passenger and dry cargo vessels, 11.2 m for container ships, 12.1 m for ore carriers and 9.6 m for tankers.

Did you know:

- Up until the 1920s, mooring for ship-to-shore access was limited because of a short jetty. Goods and passengers at Port Elizabeth had to load onto lighters.
- The lighters conveyed the cargo between a short jetty and the vessel.

- The Charl Malan quay was built by 1934 and larger ships could berth alongside.

The cruiser, HMS Dorsetshire was the first vessel to moor in the Charl Malan quay

MAJOR EXPORTS THROUGH PORT ELIZABETH ARE:

- Vehicles
- Containers (including wool and fruit)
- Fruit
- Manganese

MAJOR IMPORTS THROUGH PORT ELIZABETH ARE:

- Containers
- Oil Products (eg. petrol, diesel, liquid chemicals)
- Rubber (such as conveyor belts, hoses, automotive parts)
- Carbon Black (from incomplete combustion of heavy petroleum products such as coal tar. Used as ink for printers and as a colour pigment for car fenders etc.)

Did you know:

- Volkswagen vehicles are assembled at a plant in Uitenhage.
- Ford, Isuzu and Chevrolet are assembled in Port Elizabeth.
- The vehicle assembly plants need parts and accessories from local suppliers and abroad.
- The stimulation for the industry includes tyre manufacturing, paint factories, and battery factories.
- The vehicle assembly industry therefore creates the demand for import of related supplies from Europe and Japan.
- The import is mainly by large volumes of containers through Port Elizabeth.
- South African assembled vehicles are exported to 155 markets.

motorpress (wheels24)

africaports.co.za/port-elizabeth/

Record 4500 units loaded onto ro-ro, *Glovis Supreme*, for export from Port Elizabeth in 2019.

africaports.co.za)

- Much of Port Elizabeth's containerized traffic is now diverted to her sister port, Ngqura.
- Port Elizabeth's manganese terminal has limitations on expansion and water depth. The terminal is limited for up to Panamax bulk carriers.
- The terminal also poses risk of manganese dust on the city.
- The long-term plan is to move the manganese terminal to Port Ngqura.

What do you think is the future of the Port of Port Elizabeth?

Did you know:

- Port Elizabeth exports deciduous fruit (apples, pears, plums) from the Langkloof area (to the west of Port Elizabeth) and citrus fruit (oranges, lemons, grapefruit and naartjies) from the Great Fish, Kat and Gamtoos River valleys.

MV Lady Rosebud in Port Elizabeth in September 2020 – Discharging 45 empty reefer containers and loading 215 pallets of citrus fruit, 46 full containers with citrus fruit and 37 empty reefer containers. The cargo is destined for Lisbon, Rotterdam and St Petersburg

Self Assessment 5:

Why would the sea routes be preferred over the road routes?

Task 7:

Consider the provided present day aerial view of Port Elizabeth, the present day port layout, and the layout which includes facilities in the mid 1970s.

On the aerial view, indicate with an arrow or circle:

7.1. The manganese terminal

7.2. Charl Malan quay

7.3. The container terminal

7.4. The dry bulk terminal

7.5. The fishing terminal

7.6. The automotive terminal

7.7. The liquid bulk terminal

7.8. The break bulk terminal

7.9. The Dom Pedro Quay

7.10. South Jetty

7.11. SA Navy naval station

7.12. Rail link to break bulk terminal

7.13. Rail link to manganese terminal

7.14. Algoa Bay

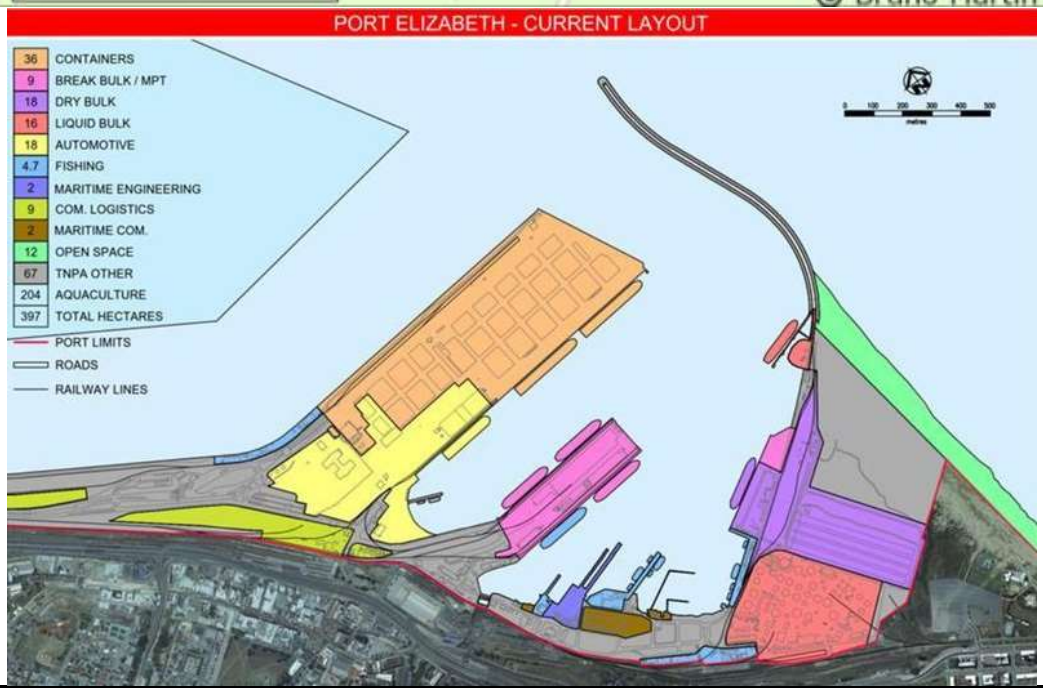
7.15. Automotive terminal

7.16. Multi-purpose terminal

7.17. The fruit terminal

Task 7 continued…

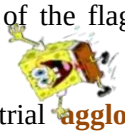
[10]



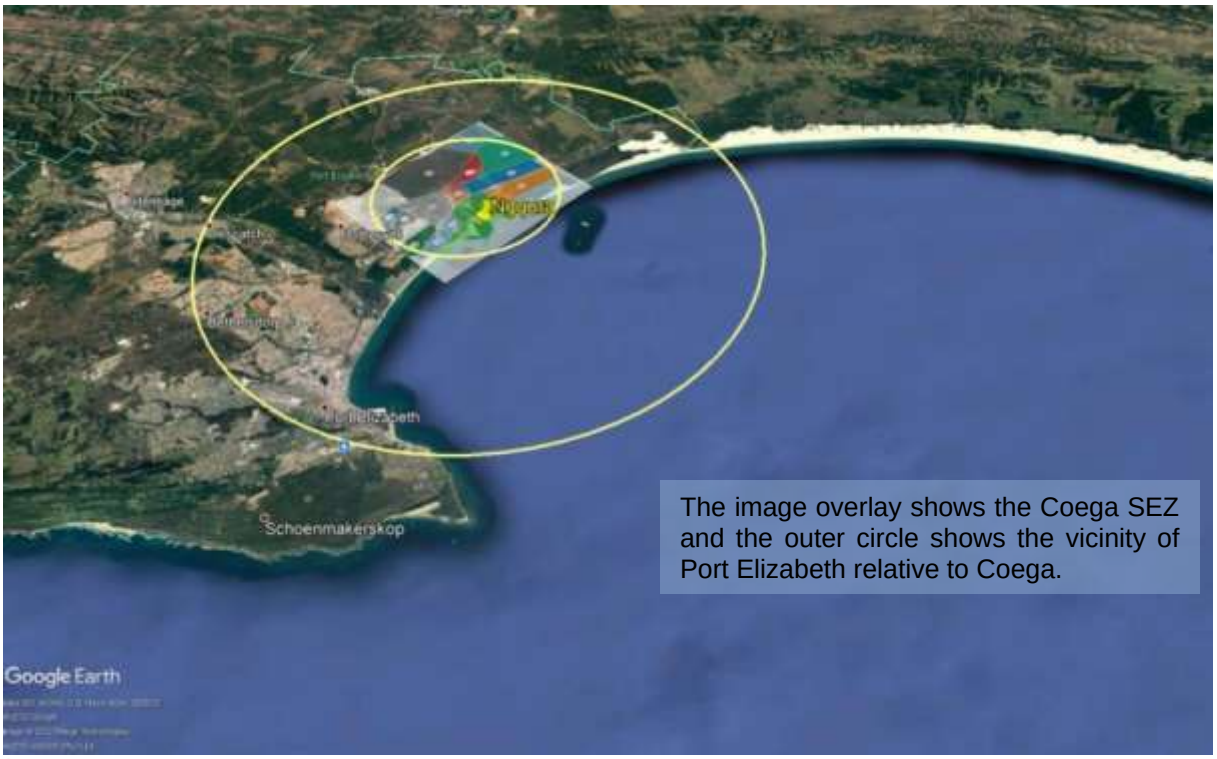
[10]

Did you know:

- The Coega Special Economic Zone (SEZ) is one of the flagships of the South African SEZs under Act No. 16 of 2014.



- The SEZ Programme is a tool to promote industrial **agglomeration** and to build the required infrastructure. This is through coordinated planning amongst key government agencies and the private sector.
- The Coega SEZ was hailed as the "most successful SEZ on the African continent" in 2017.
- In the 2018/19 financial year, the Coega SEZ reported 45 operational investors worth a combined investment value of R11.6 billion.
- Investment attactors are tax incentives, rebates and customs controlled areas.
- Port of Ngqura is within the SEZ and set as a global transhipment hub.
- Within just 20 km from the Coega SEZ, the port of Port Elizabeth benefits.



The image overlay shows the Coega SEZ and the outer circle shows the vicinity of Port Elizabeth relative to Coega.

Agglomerate means to collect into a cluster.

Urban agglomeration is the spatial concentration of economic activity.

In the case of the SEZs the agglomeration is of industry clusters within the zone.

The agglomeration results in an agglomeration economy.

1.3.1.6 Mossel Bay

- Mossel Bay is about midway from Cape Town and Port Elizabeth (400 km either side).
- It's geographic coordinate is 22º 08' E longitude and 34º 08' S latitude.

Self Assessment 6:

Convert the sexagesimal degree 22º 08' E longitude and 34º 08' S latitude to decimal degrees. Use the coordinates to find Mossel Bay on a map of South Africa.

Recall that

$$\text{decimal degrees} = \text{degrees} + \frac{\text{minutes}}{60\ \text{minutes}} + \frac{\text{seconds}}{3600\ \text{seconds}},$$

So

$$22º\ 08'\ \text{E longitude} = 22^{o} + \frac{8\ \text{minutes}}{60\ \text{minutes}} + \frac{0\ \text{seconds}}{3600\ \text{seconds}} = \underline{22.13^{o}\text{E longitude}}, \text{ and}$$

$$34º\ 08'\ \text{S longitude} = 34^{o} + \frac{8\ \text{minutes}}{60\ \text{minutes}} + \frac{0\ \text{seconds}}{3600\ \text{seconds}} = \underline{34.13^{o}\text{E latitude}}.$$

- Mossel Bay was predominantly a small harbour serving farming and fishing.
- The discovery of natural offshore gas fields in 1969 led to the development of a gas-to-liquids refinery in Mossel Bay. The refinery was commissioned as *Mossgas* in 1987.
- There are two off-shore mooring buoys within limits of the Port of Mossel Bay.
- The port functions predominantly as an import/export hub for petroleum products.

- The port also serves the local fishing industry (see in the below current layout).
- The port also accommodates for breakbulk cargo (see in the layout).

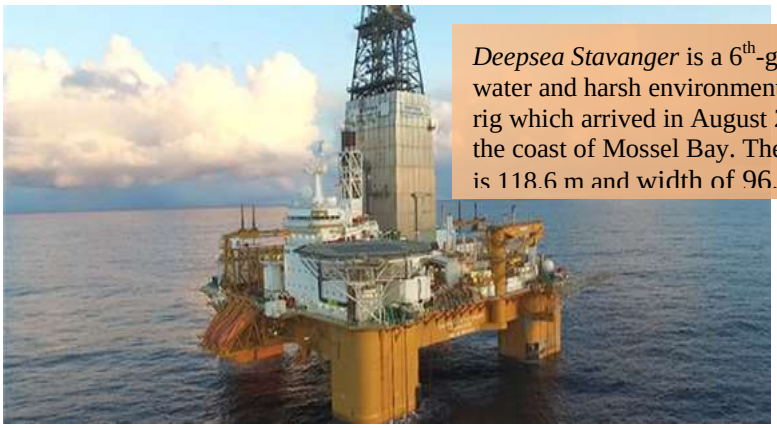
- The port proposes a container feeder service, and opportunities for aquaculture, hull cleaning offshore supply logistics and warehousing.

- The harbour entrance channel is 8 m deep. The maximum permissible draft within the harbour is 6.5 m.

adapted from [12]

Did you know:

- An increasing number of ships for the emerging oil industry call at Mossel Bay.
- The emerging oil industry includes several oil rigs which operate off Mossel Bay.



Lowvelder.co.za .co.za

Deepsea Stavanger is a 6th-generation deep water and harsh environment semi-submersible rig which arrived in August 2020 to operate off the coast of Mossel Bay. The rig overall length is 118.6 m and width of 96.7 m.

- Supply vessels make use of Mossel Bay's two mooring buoys.

riverlakesolutions.com

http://maritimereview.co.za

The 48,045 dwt *FS Sincerity* became the 2000th tanker to be moored to the Single Point Mooring at Mossel Bay in May 2019. The vessel

Watch a video on a Single Point Mooring Operation https://youtu.be/3-BZWM3eDJ8

- Mossel Bay uses diving services for underwater and offshore inspection, hull cleaning, salvage etc.

aquatiqdiving.com

oscmarine.com

MAJOR IMPORTS AND EXPORTS THROUGH MOSSEL BAY ARE:

- Export: condensates
- Import: oil products (petrol, diesel etc. via the offshore buoy), tourism

Task 8:

Consider the major new offshore oil and gas discovery in the Block 11B/12B in the Outeniqua Basin. The find is about 175 km off Mossel Bay.

Setup 4 teams in your class and explore the benefits of this recent find for South Africa.

Team Law - should research the current legislation for offshore licencing and the regulations in the Minerals, Resources and Petroleum Development Act. The team is welcome to include additional legal guidelines which can support the other teams.

Team Drill - should consider the companies that are directly involved in the offshore find and companies which provide services. Are the companies registered in South Africa? How do local and global companies benefit?

Team Equip – should explore if Mossel Bay and surrounds have the necessary skills and tools for the offshore industry.

Team Sustain – should look at the economic value and environment challenges derived from the offshore industry. Focus your work on the region around Mossel Bay.

Team Law, Team Drill, Team Equip and Team Sustain should then work together to put together a powerpoint presentation on their research and findings.

Did you know:

- Mossel Bay hold the record for the world's longest zipline over the ocean.
- The zipline is 1,100 m long, 90 m above sea level and reaches speeds up to 80 km/h.

Watch a video of the world's longest zipline over the ocean https://youtu.be/IQdy95ieCes

1.3.1.7 Port of Cape Town

Revisit sections 1.3.2 and 1.36 in your Grade 10, Term 2 Study Guide.

- The Port of Cape Town's geographic coordinate is 33°54'18.25"S, 18°26'11.10"E.
- Like all the ports along the South African coast, the Port of Cape Town is situated along one of the world's busiest trade routes.
- The distance, bearing and ETA (@10 knots) from the Port of Cape Town and some of the major ports (shown in the below map) are:

#	Port, Country	Distance	Bearing	Sailing Time
1	Walvis Bay, Namibia	706 nm	Northwest	02 days 23 hours
2	Mombasa, Kenya	2,509 nm	Northeast	10 days 11 hours
3	Lagos, Nigeria	2,566 nm	Northwest	10 days 17 hours
4	Suez, Egypt	5,259 nm	Northeast	21 days 22 hours
5	Balboa, Panama	13,780 nm	Northwest	57 days 10 hours
5	Balboa, Panama (via Panama Canal)	6,523 nm	Northwest	27 days 04 hours
6	Shanghai, China	7,699 nm	Northeast	32 days 02 hours
7	Rotterdam, Netherlands	6,163 nm	North	25 days 16 hours
8	Novorossiysk, Russia	6,588 nm	Northeast	27 days 11 hours
8	Novorossiysk, Russia (via Strait of Gibraltar)	7,346 nm	Northeast	30 days 15 hours
9	Los Angeles, USA	12,988 nm	Northwest	54 days 03 hours
9	Los Angeles, USA (via Panama Canal)	9,435 nm	Northwest	39 days 08 hours

- The Port of Cape Town has 34 berths. The draft for some of the terminals are:
  - Container: 14.2 m
  - Dry-bulk: 12.2 m
  - Break-bulk: 9.1 m
  - Liquid-bulk: 13.7 m
  - Fabrication site: 6 m
  - Sturrock dry dock: 14 m
- Presently the container terminal's 6 deep-water berths are equipped with post-Panamax gantry cranes. There are plans to expand the Cape Town Container Terminal to accommodate larger vessels and allow for an increase in annual throughput. This involves resurfacing work, the creation of a truck staging area, and development of the back-of-port commercial logistics area.

Did you know:

- The Port of Cape Town is seen as a Gateway to the Antarctic.
- Captain James Cook's vessel was in the Port of Cape Town from October to December 1772, and again from January to March 1775. The British polar explorer Ernest Shackleton visited the Port in 1901. Captain Robert Scott also called at the Port during his attempt to get to the South Pole in 1910. The *Coldest Journey on Earth Expedition*, led by Sir Ranulph Fiennes, sailed off from the port in January 2013. The picture alongside is the front cover of a book on the expedition to cross the Antarctic in winter.

- South Africa's icebreaking polar and research vessel, *SA Agulhas II*, makes relief voyages to the Antarctic. The vessel departed from the Port of Cape Town, on her 41st voyage, on 11 December 2019.

- The typical manifest for the *SA Agulhas II* on her relief voyages include: heavy duty Caterpillar vehicles, light vehicles, fuel oil for the ship, hundreds of drums of JET A2 fuel for helicopter flights, large containers, small containers, research submarines, researchers, scientific equipment, passengers and a helicopter. Cargo operations can take several days.

- The Port of Cape Town has been identified to host an Antarctic Centre. This centre will provide a single point of contact for all Antarctica-related business enquiries; including offering related connections to private businesses, educational institutions, research bodies, and government agencies.

Learn about the South African National Antarctic Programme https://www.sanap.ac.za/

MAJOR EXPORTS THROUGH THE PORT OF CAPE TOWN ARE:

- Containers (eg. reefer containers with fruit and fish)
- Fruit (bulk in reefer ships)
- Oil Products
- Fish (frozen, canned fish meal)
- Tourism (V&A Waterfront, cruise liners)

MAJOR IMPORTS THROUGH THE PORT OF CAPE TOWN ARE:

- Containers
- Grain
- Machinery
- Oil Products

Task 9:

Read the below 2 articles and answer the questions which follow.

30 June 2020

Western Cape government calls on Gordhan to rescue Cape Town Port from Covid-19 carnage

fin24

Khulekani Magubane

The Western Cape Provincial Minister of Finance and Economic Opportunities, David Maynier, has called for Minister of Public Enterprises Pravin Gordhan to urgently provide resources to resolve the current operational challenges at the port of Cape Town.

Maynier said in a statement that in recent months a number of restrictions had been placed on business operations and port activity, Some vessels were now waiting outside the port for weeks at a time before getting an opportunity to berth.

The statement comes after multiple shipping lines either cancelled their calls to Cape Town or planned on imposing a Cape Town congestion surcharge from July, he said.

Maynier said he has written a letter to the minister of public enterprises, requesting a meeting with him and Transnet management team that oversees the port.

“We urgently need national government to address the operational inefficiencies which are leading to significant delays, further increasing the number of teams operating to get all cranes working in the port, and to address the structural challenges, providing a sufficient fleet over the short to medium-term to get the service level required to meet importer needs,” Maynier said.

Large volumes of citrus exports are being redirected to Eastern Cape ports to ensure continuity in supply to markets, he said.

“The challenges at the port of Cape Town are well-documented, but with the further impact of Covid-19 infections, service levels have further deteriorated since the beginning of April – two weeks ago the service level was only 42% of the average for last year in terms of containers moved”, Maynier said.

In April, Transnet Port Terminals has said its various port utilities were only half as busy as during the coronoavirus lockdown, as various logistics sub-sectors experienced a drop in demand for their services.

Transnet, in a statement on Tuesday, said it would be getting more staff for the port.

“Despite all the challenges, we have been able to reduce the number of vessels waiting at anchorage from 11 vessels to 5 vessels today. We have managed to increase the number of gangs from four to five and now are receiving additional staff to help with shifts,” said Velile Dube, acting chief operations officer at the Transnet Port Terminals.

Dube said 20 employees from the Durban Container Terminal had volunteered to be deployed to the container and the multi-purpose terminals at the Port of Cape Town.

Task 9 continued…

3 August 2020

Port of Cape Town on track to reduce shipping backlogs due to Covid-19

Cape ArgusNews

By Mwangi Githathu

Cape Town - Sustained improvements in the running of the Port of Cape Town mean that main shipping lines could possibly reinstall calls to Cape Town by the second week of August, Finance and Economic Opportunities MEC David Maynier has said.

"Through ongoing engagements between ourselves and the Transnet Port Terminals (TPT) management, we have in recent weeks seen some welcome developments since Velile Dube was appointed as the new CEO of TPT," said Maynier.

"If this performance is sustained during next week and beyond, it would mean that the main shipping lines could possibly reinstall calls to Cape Town by the second week of August.

"I look forward to engaging with Public Enterprises Minister Pravin Gordhan and the Transnet management team to implement the permanent structural changes needed to make the Port of Cape Town a globally competitive port."

Cape Town Port manager Mpumi Dweba-Kwetana said the port now had all of its marine crew back on duty and continued to ramp up operations and reduce shipping backlogs caused by the impact of Covid-19.

"By July 30, volumes had increased, container terminal performance had improved and only one container vessel was at outer anchorage, reduced from nine vessels just two days earlier. The average waiting time at anchorage for container vessels had been reduced to four days by July 28, and by July 30 there was only one vessel at anchorage and one on the horizon. The operators from Durban returned to KZN on July 29 and the terminal will maintain the six-gang operation now that Cape Town employees are back at work.

Preparations to introduce a seventh gang in time for the reefer season are under way," said Kwetana.

David McCallum of shipping agency DAL said he appreciated the reduction in vessels waiting at anchorage.

9.1. What are the dates of the 2 articles? And what, in your opinion is significant about the dates.

9.2. What has been the main problem with service at the Port of Cape Town in June 2020?

9.3. What was shipping lines reactions to the service problem?

9.4. In your opinion, why was 20 employees deployed from the Durban Container Terminal when the Port of Cape Town has its dedicated resources?

9.5. What was the status of Port operations by 30 July 2020?

1.3.1.8 Saldanha Bay

- The Port of Saldanha Bay's geographic coordinate is 33°1'10.51"S latitude, 17°58'32.76"E longitude.
- The port is about 60 nautical miles (111 km) northwest of Port of Cape Town.
- The Port of Saldanha Bay is the largest and deepest natural port in the Southern hemisphere.
- The Port of Saldanha Bay has 6 berths:
  - 3 multi-purpose berths
  - 2 iron ore berths
  - 1 crude oil berth
- The port has a purpose-built rail link which is directly connected to a jetty bulk loading facility for iron ore.
- The Port of Saldanha Bay can accommodate vessels with a draft of up to 21.5 m.

Did you know:

- The Port of Saldanha Bay has the largest iron ore export facility in Africa.
- Iron ore is loaded on an average of 25 vessels each month.
- The iron ore mines are in the Northern Cape, about 861 km from Saldanha Bay.

MAJOR EXPORTS THROUGH SALDANHA BAY ARE:

- Iron Ore
- Pig Iron
- Concentrates (lead, zinc, copper)
- Manganese
- Granite
- Mineral Sands
- Steel

MAJOR IMPORTS THROUGH SALDANHA BAY ARE:

- Crude Oil (to Cape Town via pipeline)
- Steel Pellets
- Project cargoes (eg. Wind turbines)

Did you know:

- South Africa has about 50 small harbours.
- The South African government has established a National programme to develop small harbours and state coastal properties.
- Port Nolloth, which is an Atantic port, primarily serves fishing vessels and diamond prospectors.
- The port in Simons Town is the main base of the South African Navy. The port serves frigates and submarines.

Nuclear powered Royal Navy submarine, *HMS Talent*, in port at the SA Navy's main base, Simon's Town

1.3.1.9 Other Southern African Ports

Port of Walvis Bay (Namport):

- Is located at Latitude 22° 51' 03.4"S and Longitude 014° 26'01"E
- Is Namibia's largest commercial port
- Is on the path for principal shipping/trading routes
- Handles container imports, exports and transhipments
- Handles bulk and break-bulk
- Serves industries such as petroleum, salt, mining, and fishing.
- Has a growing ship repair sector. Currently has 3 floating drydocks.
- The Trans-Kalahari corridor between Walvis Bay and Gauteng can bypass sea routing to Cape Town and Durban. This reduces transit timebyat least 7 days.
- There is a new container terminal development project to expand on container operations.
- The project also makes provision for a dedicated cruise vessel berth to accommodate passenger vessels up to 300 m over length and 11 m draught.

Port of Maputo (Mozambique):

- Is located at Longitude 32° 34′ E and Latitude 25° 58′ S.
- Is a natural port on the east coast of Southern Africa.
- Is a trade gateway to South Africa, and other southern and central African countries such as Botswana, Eswatini, and Zimbabwe.
- Is the closest port and deep water port to Gauteng, Mpumalanga, and Limpopo.
- Has rail and road connections with the southern African hinterland for mining and agriculture.
- Handles trade for citrus, sugar, container, ferro-chrome and scraps, bulk minerals, petroleum, aluminium and grain.

Task 10:

(from https://maritimesa.org/grade-11/2016/08/15/south-african-ports/

Refer to the below map showing southern African ports and answer the questions which follow.

1. Which port/s lie/s

1.1. between Port Elizabeth and Cape Town?

1.2. between East London and Richards Bay?

1.3. on the northern coast of Namibia?

1.4. closest to the South African province of Mpumalanga?

1.5. closest to Durban?

1.6. between East London and Mossel Bay?

2. A ship is steaming from Saldanha Bay to Richards Bay. List the ports (in order) she will pass during this voyage.

3. Calculate the number of days a ship will be at sea on each of the following voyages. (Round off your answer to the next half day.)

3.1. Walvis Bay to Durban, distance 705 nautical miles, at a speed of 15 knots.

3.2. Richards Bay to Saldanha Bay, distance 990 nautical miles, at a speed of 14 knots.

Task 10 continued…

3.3. Richards Bay to Cape Town, distance of 918 nm, at a speed of 13 knots

4. Between which two neighbouring ports in South Africa is the distance

4.1. the greatest?

4.2. the least?

Task 11:

(from https://maritimesa.org/grade-11/2016/08/22/test-yourself-southern-african-ports/)

1. Use your notes to complete the below table of imports and exports.

Port	Export Cargo	Import Cargo
Richards Bay		
Durban		
East London		
Ngqura		
Port Elizabeth		
Mossel Bay		
Cape Town		
Saldanha Bay		

Task 11 continued…

2. Through which port(s) is/are

2.1 crude oil imported?

2.2 fruit exported?

2.3 iron ore exported ?

2.4 coal exported?

2.5 motor vehicles exported?

2.6 manganese exported?

2.7 grain imported?

2.8 oil products exported?

3. Which ports have a specialised container terminal?

4. What type of ships carry most of the export fruit?

5. Why are Port Elizabeth and Ngqura major wool export ports? (Think of the area inland from these ports.)

6. What is the link between ports that have an oil refinery and the export of oil products such as petrol, diesel, liquid chemicals?

7. Richards Bay exports about 70 million tons of steam coal per year.

7.1 Where does most of this coal come from?

7.3 How is it brought to Richards Bay?

Task 11 continued…

8. Alumina is imported, mostly from Australia.

8.1 What is alumina?

8.2 Through which port is alumina imported?

8.3 What is alumina used for?

8.4 What type of ship brings alumina to that port?

9. Frozen fish is exported from Cape Town, mainly in containers.

9.1 What kinds of vessel will bring the fish to Cape Town?

9.2 What type of container is used for the export of frozen fish?

1.3.2 Other African Ports

The below map (from maritimesa.org) shows ports on the African continent.

Countries: B – Benin; C – Cabinda (Angola); D – Djibouti; E – Eritrea; LI – Liberia; L – Lesotho; M – Malawi; S – Senegal; SL – Sierra Leone; SW – Swaziland; T – Togo; TU – Tunisia; U – Uganda **Ports:** AB – Abidjan; AL – Alexandria; BE – Beira; BO – Boma; DA – Dakar; DB – Dar El Beida (Formerly Casablanca); DS – Dar Es Salaam; DU – Duoala; FR – Freetown; LO – Lobito; LU – Luanda; MA – Maputo; MM – Mombasa; MO – Monrovia; MT – Matadi; NA – Nacala; PH – Port Harcourt; PN – Pointe Noire; PS – Port Said; QU – Quelimane; SA – Safi; TE – Tema **Features:** SC – Suez Canal.

Task 12:

(from https://maritimesa.org/grade-11/2016/08/22/test-yourself-african-ports/)

Refer to the map of ports on the African continent (from the previous page).

1. Which port is the major port for….

1.1. Cote d'Vor (Ivory Coast)

1.2. Mozambique

1.3. Tanzania

1.4..Kenya

1.5. Egypt

1.6. Morocco

1.7. Senegal

1.8. Liberia

2. In which country is each of the following ports?

2.1. Port Harcourt

2.2. Dakar

2.3. Tema

2.4. Douala

2.5. Beira

2.6. Lobito

2.7. Boma

2.8. Matadi

2.9. Quelimane

Task 12 continued…

2.10. Nacala

3. Which country in Africa has the second biggest shipping register in the world?

4. Which port would appear on the stern of a ship flying that country's flag?

5. Through which port/s will each of the following countries export cargoes?

5.1. Malawi

5.2. Zambia

5.3. Zimbabwe

5.4. Uganda

5.5. Botswana

5.6. Ghana

6. A ship sails from Safi (Morocco) and heads for Cape Town via Port Harcourt. List the coastal countries that she will pass (in the order in which she will pass them).

7. A ship sails from Port Said, passes through the Suez Canal and heads for Durban. List the coastal countries that she will pass (in the order in which she will pass them).

8. On which of the two voyages (Question 6 or Question 7) will the ship pass each of the following ports :

8.1. Pointe Noire

8.2. Monrovia

8.3. Mombasa

Task 12 continued…

8.4. Tema

8.5. Nacala

8.6. Freetown

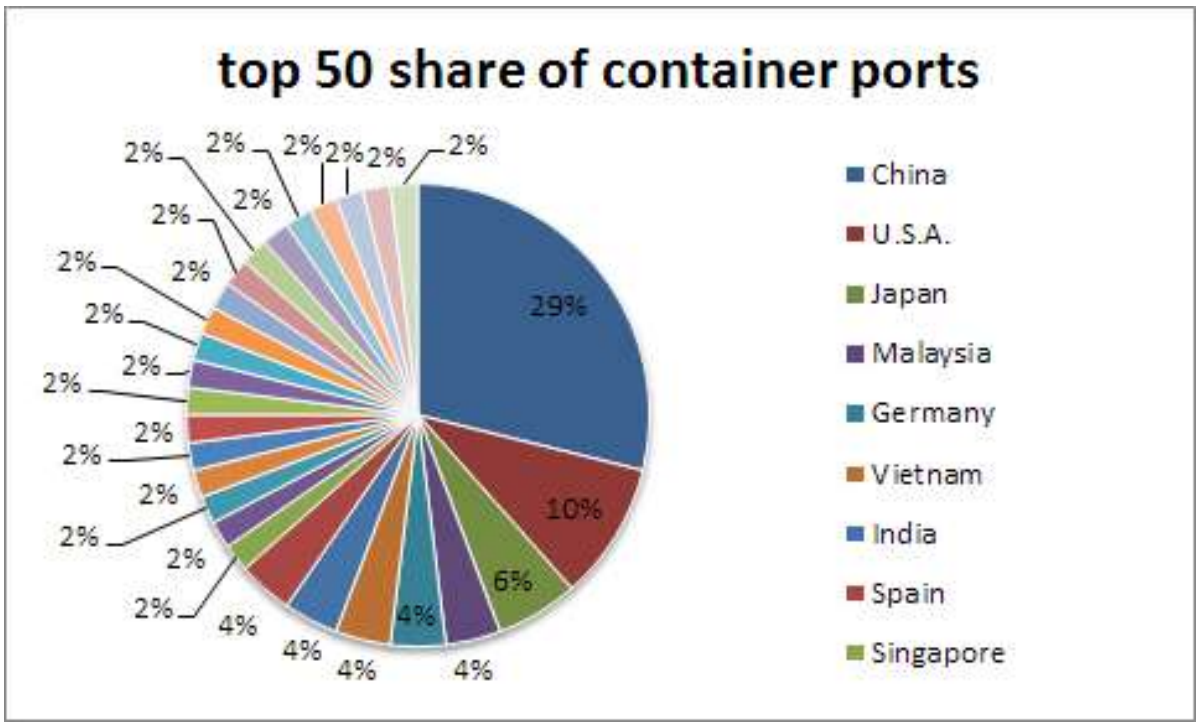
8.7. Dakar

8.8. Beira

1.3.3 Examples of other Major World Ports

The below pie chart shows the countries which have container ports that are amongst the top 50 world container ports, based on volume handled in 2018.

- China has 15 (29%) of the 50 major container ports in the world.
- The USA has 5 (10%) of the 50 major container ports in the world.
- Japan has 3 (6%) of the 50 major container ports in the world.
- Malaysia, Germany, Vietnam, India, and Spain each have 2 (4%) of the those ports.



- China's Port of Shanghai handled the most containers in 2018. This was 42.01 million TEU.
- The port of Singapore, handled the 2nd largest volume of containers, 36.6 million TEU in 2018.
- The Port of Jebel Ali, in the UAE, handled the 10th largest volume of containers, 14.95 million TEU in 2018.
- The Port of Rotterdam, in the Netherlands, Europe handled the 11th largest volume of containers, 14.51 million TEU in 2018.
- The Port of Los Angeles, USA was the busiest by volume in the USA and 17th in the world, with 9.46 million TEU.

Spot all some of the highest container volume ports in the world in the below maps.


Felixstowe
Antwerp
Hamburg
Rotterdam
Barcelona
Algeciras
Tanger
Marsaxlokk
Piraeus
Google Earth


Google Earth


Vancouver
Seattle
Los Angeles
Savannah
Google Earth

Task 13:

Use the above Google Earth generated maps to identify the ports in the below map. Write your answers on table provided.

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21 *
21	22	23
24	25	26
27	28	29
30	31	32
33	34	35
36	37	38
38 *	39	40
41	42	43
44	45	46
47	48	

Task 14:

(from https://maritimesa.org/grade-11/2016/08/31/test-yourself-world-ports/)

Study the table below that shows the throughput of containers via major Chinese ports for the period 2013 to 2015. The figures for TEU are shown in millions of TEU, e.g., the Dalian figures represent 9.301 million TEU, 10.128 million TEU and 9.912 million TEU. The map of China will show the position of most of these ports.

Port	Share %	+ or -2015/2014 %	2015 TEU	2014 TEU	2013 TEU
Dalian	5	-8	9,301	10,128	9,912
Dandong	1	9	1,830	1,672	1,560
Dongguan	2	19	3,363	2,836	1,893
Fuzhou	1	23	2,430	1,978	1,977
Guangzhou	9	9	17,570	16,160	15,309
Haikou	1	-6	1,266	1,347	1,224
Lianyungang	3	0	5,009	5,005	5,488
Nanjing	2	6	2,920	2,760	2,670
Ningbo	11	6	20,626	19,450	17,327
Qingdao	9	5	17,505	16,624	15,520
Quanzhou	1	6	2,000	1,885	1,706
Rizhao	1	16	2,810	2,420	2,027
Shanghai	19	4	36,540	35,285	33,617
Shantou	1	-10	1,075	1,199	1,128
Shenzhen	12	1	24,204	24,037	23,278
Suzhou	3	18	5,238	4,450	5,340
Tangshan	1	37	1,519	1,109	728
Tianjin	7	3	14,500	14,050	13,001
Xiamen	5	7	9,183	8,572	8,008
Yantai	1	4	2,452	2,361	2,150
Yingkou	3	3	5,922	5,768	5,301
Zhuhai	1	3	1,210	1,177	881
Total	**139**	**5**	**194,559**	**185,904**	**175,188**

Task 14 continued…

Now answer the questions set below.

1. Which of the ports is the most northerly in China?

2. Which Chinese port is the leading container port in terms of container throughput?

3. How many ports have shown growth in throughput from 2014?

4. How many ports have shown a decline (-) in throughput from 2014?

5. Which port has shown the greatest growth in throughput from 2014?

6. Which port has shown the greatest decline (-) in throughput from 2014?

7. Based on the figures given, near which port is most Chinese industry located? Explain your answer to this question.

8. Does the overall trend in container throughput reflect a positive situation for ship operators who have services to China? Explain your answer to this question.

1.3.4 Trade Routes

Definition:

A trade route is a logistical network of pathways and stoppages that is used for the commercial transport of cargo.

In maritime terms, an international trade route is the transport route taken from an exporting country to an importing country.

Seaports are crucial stop over and connection points between sea and land transport in commercial trade.

In the previous section, you studied major seaports in southern Africa, Africa and worldwide.

In Grade 10, you had been introduced to international trade, the history of maritime trade, and how it influenced trade routes.

The **choice of a trade route** depends on a number of factors:

- Confidence in ship supplies and ship repair/maintenance services along the route
- The efficiency of ports. Inefficient ports will be avoided to save on costs.
- Climate and weather. This refers to both the availability of cargo along a route and to safety of a vessel along its route. As an example, droughts (which will affects agricultural goods) will impact on availability of cargo and determine the choice of trade route. Harsh weather can be a risk for vessels and could force a vessel to use alternate ports.
- Natural disasters can reduce or cut the supply of goods for trade and alternate trade routes will be considered to meet demand.
- Political instability and war impacts on trade in and out of a country as well as the safety of vessels along trade routes. This will impact trade flows and also force alternate trade routes.
- International economic cycles also affect trade routes. An economic downturn or upturn in a country will impact on volume of trade flows to and from the country.
- Pandemics, such as the Covid-19 pandemic. Countries which went into lockdown also meant limited demand for imports and exports.

In the sections to follow:

will be used to denote exporting countries

will be used to denote importing countries

1.3.4.1 Ship Repair and Maintenance Facilities

Ship repair and maintenance services can shorten trade route distance and number of stoppages.

Singapore, which is a preferred trade node, dominates the world with quality and cost-effective ship repair and maintenance services. Indonesia, Vietnam and the Philippine's look to create fierce competition to attract vessels.

Locally, Cape Town, East London, Durban and Simon's Town offer ship repair and maintenance services and in this way strengthen the attraction of the ports as preferred trade route nodes.

Walvis Bay's 3 floating drydocks, with a fourth on order, and the possible construction of a large drydock – has taken a significant amount of repair work from Cape Town, and is affecting choice of trade nodes.

The map below shows some of dockyards in the world. Notice that theses shipyards are located along major trade routes.

1.3.4.2 Iron Ore

Iron ore is used in the production of steel. The primary trade routes for iron ore is shown below.

A : Seven Islands (Canada) **B :** Ponto do Madeira (Brazil) **C :** Tubarao (Brazil) **D :** Saldanha Bay (South Africa) **E :** Port Hedland (Australia)(Dampier, to the south west of Port Hedland, is also a major iron ore export port)

Since 1980, the focus of iron ore trade shifted from Europe and North America markets towards Asian and South American markets.

Brazil, north-western Australia and South Africa are among the major producers of iron ore. Brazil replaced Canada as a major exporter.

China, Japan, Korea, Europe and numerous other industrialised countries import the resource. China has replaced Japan as the major importer of iron ore in Asia.

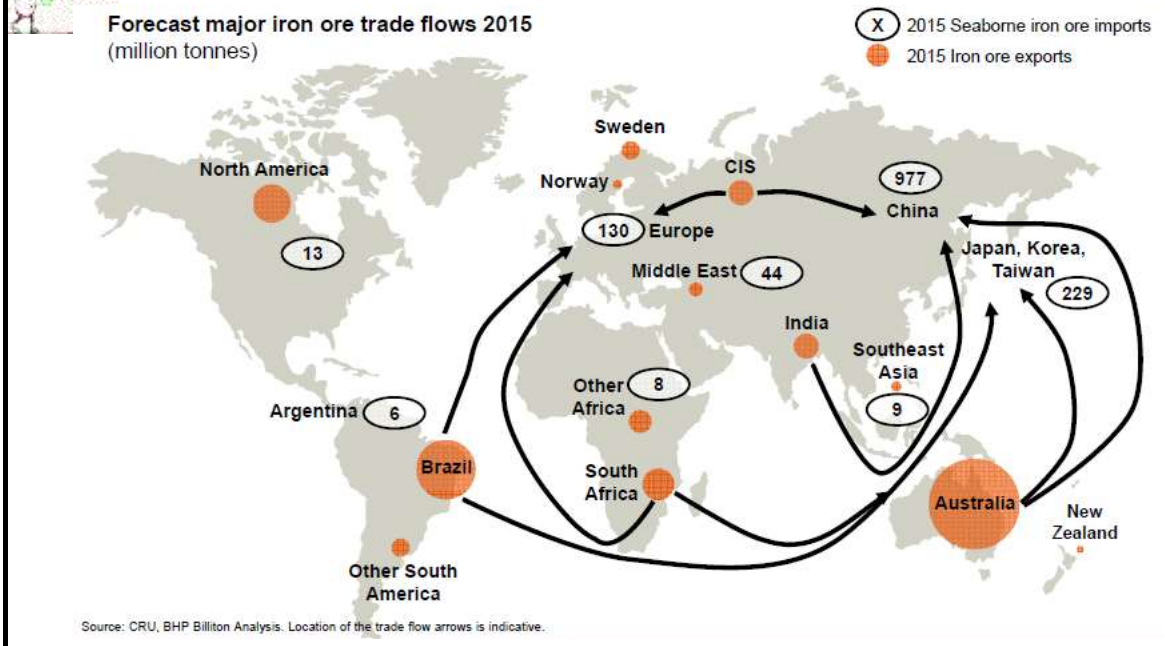
Did you know:

High volumes of the dry bulk cargo are moved in Capesize ships. From 2001 to 2008, a surge in Chinese steel production brought a wave of iron ore imports that demanded extensive use of Capesize ships. This demand increased the daily charter rate of many of the vessels to around US$200 000 per day, creating a boom time for shipowners.

Once the Chinese economy had slowed down, the demand for iron ore declined, as did the demand for ships. The charter rate in the first quarter of 2016 had averaged US$9 000 per day.

Task 15:

Consider the below global trade route map for iron ore.



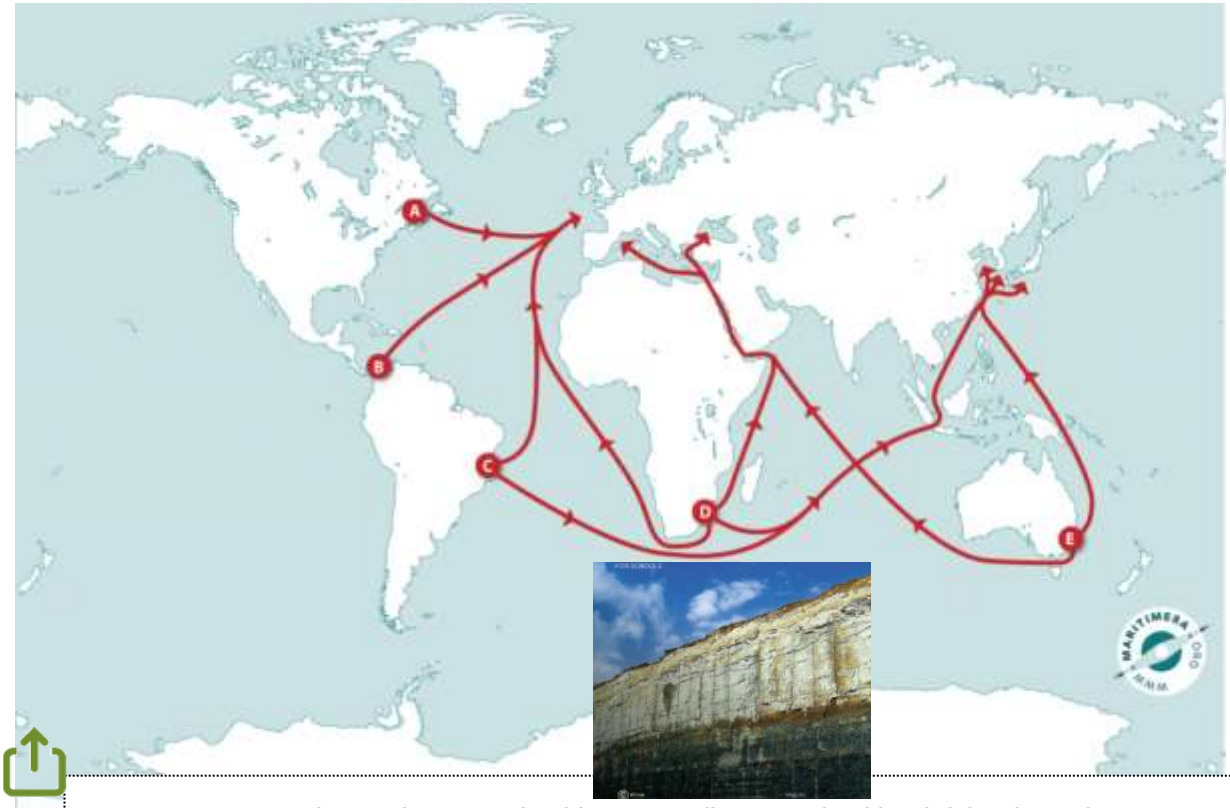
1. Which country had the biggest export of iron ore.

2. List Australia's iron ore trade partners.

3. What was the total seaborne import of iron ore into China in 2015?

1.3.4.3 Coal

Steam coal is used for power stations, while higher quality coal is used mainly in the steel industry.



A : East Coast North America **B :** Colombia **C :** Brazil **D :** South Africa (Richards Bay)

E : Australia (Newcastle)

South Africa's largest importing countries are: India, Pakistan, South Korea, China, Taiwan, Bangladesh, Vietnam, Thailand, Philippines, Malaysia, Japan, Netherlands and Spain, Egypt, and Kenya.

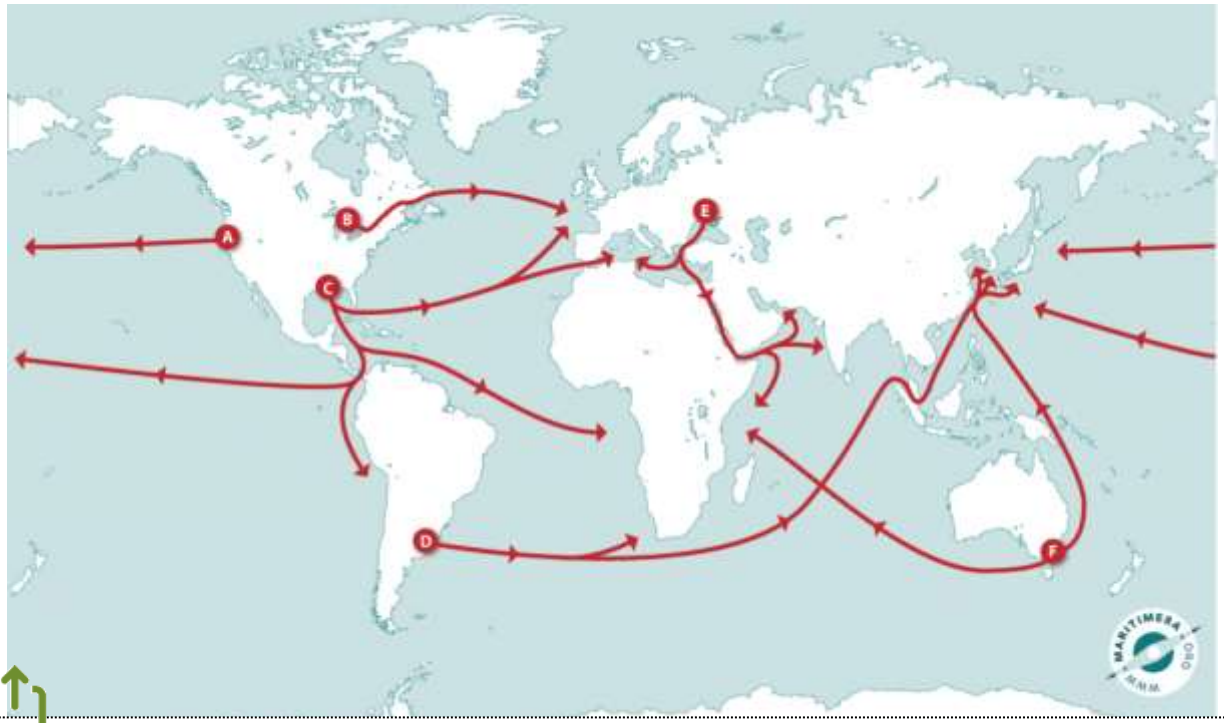
Did you know:

An annual increase in demand for steam coal occurs from September to February to meet the need for greater electricity generation during the northern hemisphere's cold and dark winter months. This in turn, increases the demand for ships (especially Capesize and Panamax vessels) to move the coal from Richards Bay (South Africa), Brazil, south-eastern Australia, Columbia and other coal-producing regions to European ports. This increases the charter rate for these ships around that time.

The coal terminal at Richards Bay is the largest in the world and exports about 70 Mta.

The coal trade boomed during the Chinese economic growth from 2001 to 2008, and declined once that country's economy had flattened out.

1.3.4.4 Grain



A : Vancouver (Canada), Seattle (USA) Portland (USA) Tacoma (USA) **B :** Great Lakes & St Lawrence Seaway Ports (Canada & USA) **C :** New Orleans, Mississippi & US Gulf ports (USA) **D :** Rio de la Plata (Argentina, Uruguay & Paraguay) **E :** Ukraine **F :** Australia

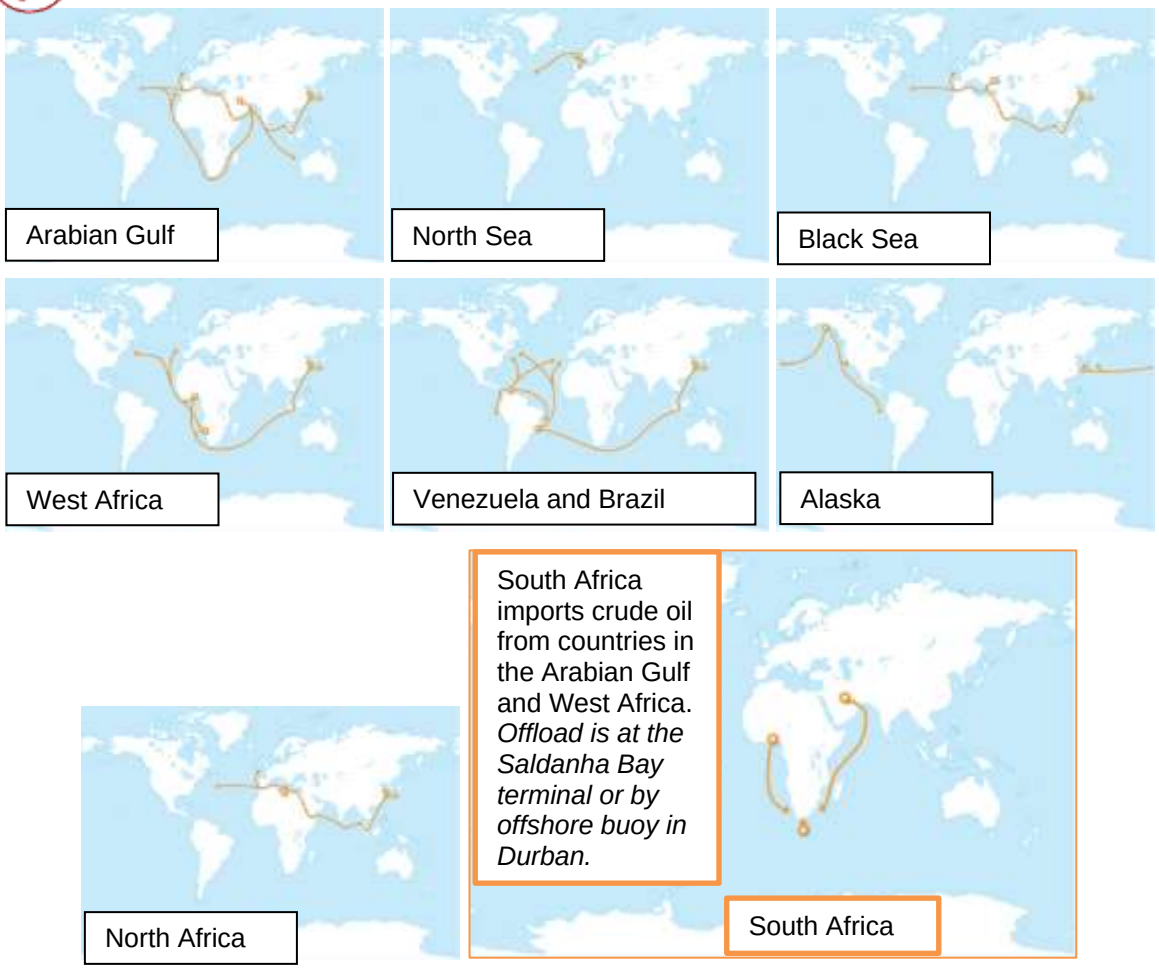
Note: Grain is exported from several Australian ports. China, some South-east Asian countries and India also export grain, mainly rice, to the rest of the world.

Did you know:

Whenever a drought occurs, additional grain needs to be imported. The drought in South Africa during the 2015-2016 summer grain growing season resulted in the country needing about 4 million tons of additional grain, most of which was imported from Argentina. This increased the demand for handysize bulkers (especially the Supramaxes) in the Atlantic Ocean region, and their freight rate increased.

1.3.4.5 Oil

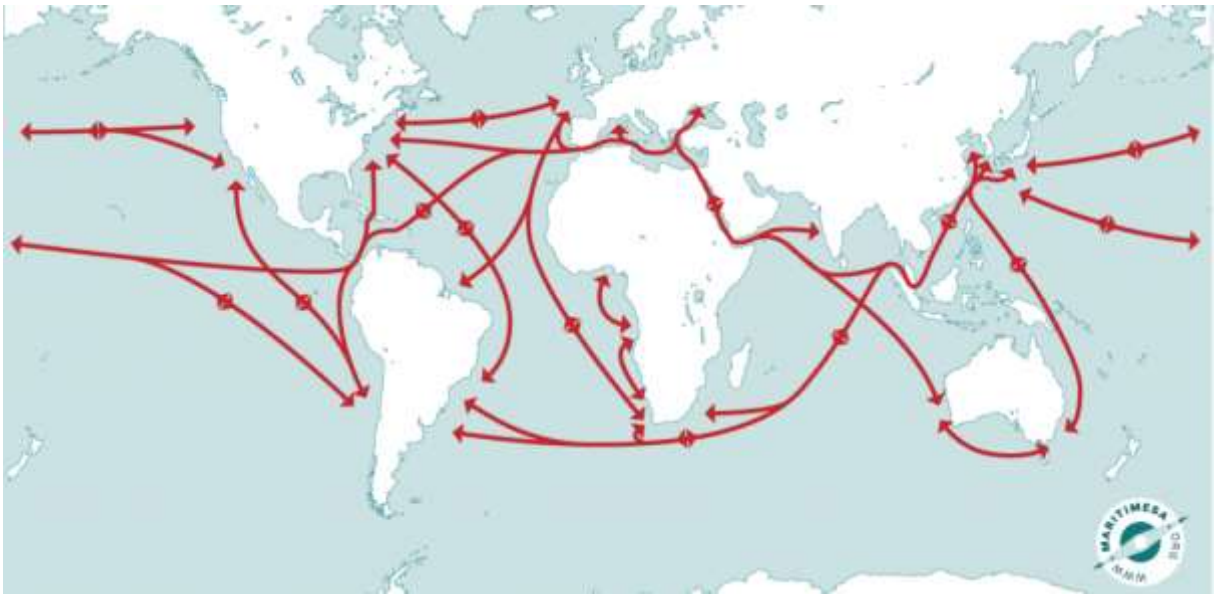
Follow the link http://maritimesa.org/grade-10/crude-oil-tankers/ to find the major crude oil shipping routes in 2015.



- Crude oil from the **Arabian Gulf** is shipped to Europe (via Suez or Cape), North America (via Suez or Cape), Japan, Korea, China, India and Singapore.
- Crude oil the **North Sea** is shipped to Europe and North America.
- Crude oil from the **Black Sea** is shipped to Europe, North America and Asia (via Suez).
- The main crude oil exporting countries in **West Africa** are Angola and Nigeria. Crude oil from West Africa is shipped to Africa, Europe, North America and Asia.
- Crude oil from **Venezuela** is shipped to Europe, North America, and South America.
- Crude oil from **Brazil** is shipped to Europe, North America, Asia.
- Crude oil from **Alaska** is shipped to western coast of North America and South America, and Asia.
- Crude oil from **North Africa** is shipped to North America, Europe, and Asia (via Suez).

1.3.4.6 Containers

The below map shows the major container routes.



You can use the below table and the above trade route map to identify the primary trade routes.

Top Trade Routes (TEU shipped) 2017

Route	West Bound	East Bound	North Bound	South Bound	Total
Asia-North America	7,490,000	19,482,000			26,572,000
Asia-North Europe	9,924,000	5,139,000			15,063,000
Asia-Mediterranean	5,504,000	2,409,000			7,913,000
Asia-Middle East	3,340,000	1,400,000			
North Europe-North America	3,284,000	2,120,000			5,404,000
Asia-East Coast South America			730,000	1,344,000	2,074,000
North Europe/Mediterranean-East Coast South America			830,000	850,000	1,680,000
North America-East Coast South America			794,000	474,000	1,268,000

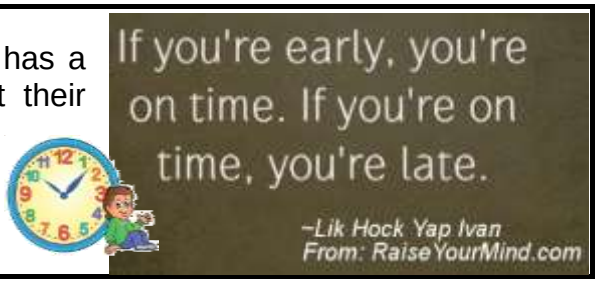
Serving the Trade Routes

There are about 500 liner shipping services providing regularly scheduled service (usually weekly) that enable goods to move between ports along the many trade routes of the world.

1.4 International Time Zones and Date Line

Let's revisit the Grade 10 work on International Time Zones and Date Line.

A time zone is an area on Earth that has a specific time that all citizens can set their clocks to.



- For every 15˚ of longitude, the sun time changes by 1 hour.
- Port A (to the east of Port B) will be ahead of Port B in time.
- Port C (to the west of Port D) will be behind Port D in time.
- A ship crossing the International Date Line from east to west (e.g. from the Pacific coast of Canada to China) will advance her clock 24 hours of time.
- A ship crossing the International Date Line from west to east (e.g. from New Zealand to Panama Canal) will subtract (miss) 24 hours of time.

1.4.1 Practice Examples: Expected Time of Arrival (ETA) of a ship

These examples are from *https://maritimesa.org/grade-11/2016/08/31/international-time-zones-and-the-international-date-line/*

Example A: What is the ETA of the ship in Port Y at Port Y's time?

Given facts :
Port of Departure Port X (15˚W)
Time of Departure 10:00 on 3 June
Port of Destination Port Y (135˚E)
Distance to be steamed 5040 Nautical Miles
Average Speed 15 knots

$$\text{Days on voyage} = \frac{5040 \text{ Nautical miles}}{15 \text{ knots}} = \frac{336 \text{ hours}}{24 \text{ hours}} = 14 \text{ Days}$$

ETA at Port Y = Departure Time + 14 Days
= 10:00 on 3 June + 14 Days
= 10:00 on 17 June

But this time of arrival at Port Y is 10:00 on 17 June **at Port X's time.**

We need to convert this to ETA the local time at Port Y.

Difference in Longitude between Port X and Port Y

= 15˚W + 135˚E

= 150˚

Difference in Time between Port X and Port Y

= 150˚ / 15˚

= 10:00 on 17 June + 10 hours

= **20:00 on 17 June**

Example B: What is the ETA of the ship in Port Q at Port Q's time?

Given facts :

Port of Departure	Port P (45˚E)
Time of Departure	07:00 on 15 August
Port of Destination	Port Q (120˚W)
Distance to be steamed	5184 Nautical Miles
Average Speed	18 knots

Days on voyage = 5184 Nautical miles / 18 knots

= 288 hours / 24 hours

= 12 Days

ETA at Port Q = Departure Time + 12 Days

= 07:00 on 15 August + 12 Days

= 07:00 on 27 August

But this time of arrival at Port Q is 07:00 on 27 August **at Port P's time.**

We need to convert this ETA to the local time at Port Q.

Difference in Longitude between Port P and Port Q

= 45˚E + 120˚W

= 165˚

Difference in Time between Port P and Port Q

= 165˚ / 15˚

= 07:00 on 27 August - 11 hours

= **20:00 on 26 August**

Example C:

This is an interesting example because it includes actual ports, actual distance and a ship crossing of the International Date Line while steaming between those ports.

Given facts :
Port of Departure Valparaiso, Chile (Takes its time from 60oW)
Time of Departure 09:30 on 25 May
Port of Destination Sydney, Australia (Takes its time from 150oE)
Distance to be steamed 6281 Nautical Miles
Average Speed 20 knots

Let's go to www.**sea–distances**.org and follow the steps below.

Click **Voyage Calculator.**

Click **Add Port**.

Go to the box, select **Chile** and then select **Valparaiso.**

Click **Add Port**.

Go to the box, select **Australia** and then select **Sydney**.

Also enter the speed (20 knots).

Now change the ETD from Valparaiso to 0930 on 25 May.

A calculation will be done automatically.

Now note how many days it will take to steam from Valparaiso to Sydney.

Note also the ETA at Sydney.

BUT the calculation has not taken into account the fact that the ship has crossed the International Date Line from east to west. This means that we need to advance the time by 24 hours, i.e. add 24 hours to the given ETA at Sydney.

1.5 Maritime Related Careers

In this term, let's zoom into seafaring professions and do a case study on two maritime related careers:

- ☑ *Navigating officer; and*
- ☑ *Engineering officer.*

There are 4 types of "departments" in a ship's crew. These are:

1. Deck Department
2. Engine Department
3. Electro-technical Department
4. Steward's Department

1.5.1 Shipmaster

The ***captain***, also called ***master***, is the ship's highest ranking officer.

As a ***master*** of a ship, you will be responsible for the safe and efficient operation of the ship. This is done by ensuring that all departments perform their required duties.

As ***master*** of a ship, you will be the leader of the crew and the heads of all four departments report to you.

As ***master*** of a ship, you will hold ultimate command and responsibility of the merchant vessel.

As ***master*** of a ship, you will need to vast knowledge and experience on seaworthiness, safety and security, cargo operations, navigation, crew management and legal compliance.

The duties of the **Captain (Master)** on a ship at sea include:

- ☑ Responsible for the overall efficient and safe operation of the ship,
- ☑ Overall command of the ship,
- ☑ The owner's representative and liaison with the owner on all matters,
- ☑ Leadership and management of the officers and crew on board,
- ☑ Training of all on board,
- ☑ Responsible for ensuring that the ship complies with all regulations,
- ☑ Usually the liaison person on board for shoreside officials (owners, charterers, immigration, customs, port health, surveyors, ship's agents, classification society, ship chandlers).

1.5.2 Deck Department

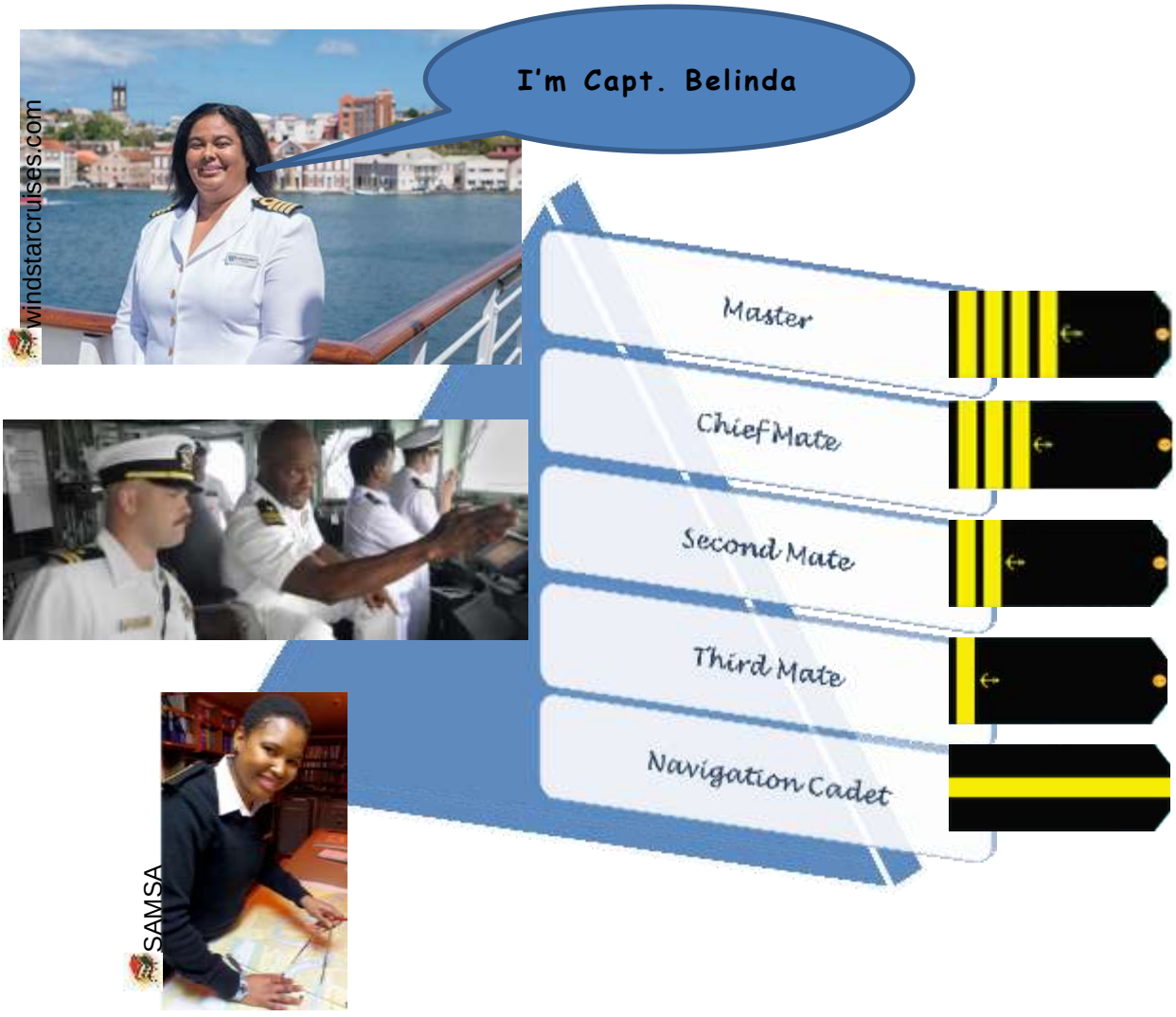
Crew in the deck department are navigation officers and have ranks according to their qualifications and experience.

Definition:

A navigation officer is a **licenced** mariner who is responsible for the navigation and safe passage of the ship.

A navigation officer is also known as a ***deck officer***.

The rank structure among navigating officers on a merchant ship (containership, bulker, tanker, etc.) is navigation (also called deck) officer, 3rd mate/officer, 2nd mate (officer), chief mate (officer), master.



DECK RATINGS are deck crew and need a navigational watch rating certificate STCW II/4. Deck Ratings include boatswain, able seaman and ordinary seaman.

The **BOATSWAIN** is the highest ranking unlicensed (rating) in the deck department. The boatswain generally carries out the tasks instructed by the chief mate, directing the able seaman and ordinary seaman. The boatswain generally does not stand a navigational watch.

An **ABLE SEAMAN (AB)** works under the boatswain, completing tasks such as working mooring lines, operating deck gear, standing anchor details, and working cargo. An able seaman also stands a navigational watch, generally as a lookout or helmsman.

An **ORDINARY SEAMAN (OS)** generally helps out with work that able seamen do. Other tasks include standing lookout, and generally cleaning duties

The duties of the **Third Navigating Officer (Third Mate)** on a ship at sea include:

- ☑ On Bridge Watches at sea from 08:00 to 12:00 and 20:00 to Midnight,
- ☑ On cargo watches in port as arranged (usually six hours on; twelve off),
- ☑ In charge of the Stern Party when the ship is entering or leaving port or going to anchor,
- ☑ Ensure all life-saving and fire-fighting equipment is operational, and
- ☑ Other duties as assigned by the senior officers on board the ship.

The duties of the **Second Navigating Officer (Third Mate)** on a ship at sea include:

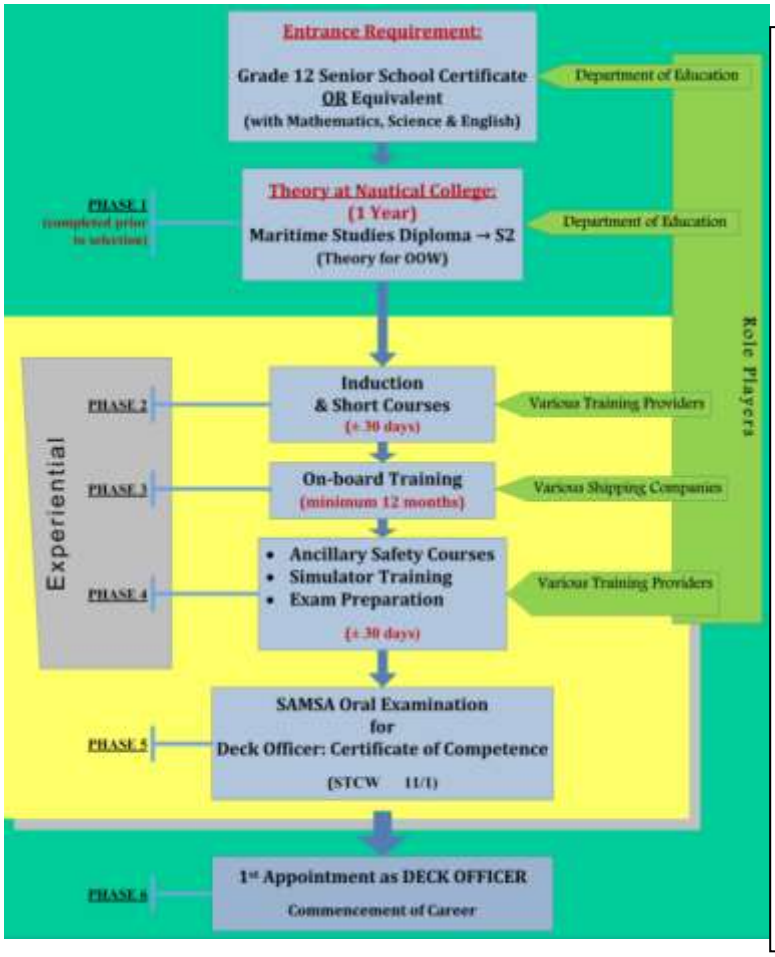
- ☑ On Bridge Watches at sea from midnight to 04:00 and noon to 16:00,
- ☑ On cargo watches in port as arranged (usually six hours on; twelve off),
- ☑ Usually in charge of the Fo'c'sle Party when the ship is entering or leaving port or going to anchor,
- ☑ Compiles the ship's passage plan to the next port for approval by the Master,
- ☑ Ensures all navigation equipment is operational and that all charts are updated, and
- ☑ Is usually the medical officer on board (unless a doctor is carried).

The duties of the **Chief Navigating Officer (Chief Mate)** on a ship at sea include:

- ☑ On Bridge Watches from 04:00 to 08:00 and from 16:00 to 20:00,
- ☑ On cargo watches in port as arranged (usually six hours on; twelve off),
- ☑ Usually on the bridge when the ship enters of leaves port,
- ☑ Responsible for the ship's maintenance programme,
- ☑ Responsible for the cargo stowage and ballasting,
- ☑ In charge of the deck ratings, and
- ☑ In charge of training of all subordinates, especially navigating cadets on board.

The average salary for a Navigating Officer is US$35,194
(≡ R537,288 with 1US$ = R15.3 on 28 November 2020)

The career path from a Grade 12 learner to **the** *Master* of a large ship starts with your achievement of a National Senior Certificate. You can then enter the post-school programmes.



- *Grade 12 (with English, mathematics and physical science, with minimum 55% in each)*
- *One year at Cape Peninsula University of Technology (CPUT) or Durban University of Technology (DUT) for a level S1 and S2 Maritime Studies Diploma.*
- *Navigation Cadet on a ship at sea for a total of 18 Months at sea, interspersed with leave. This is a training period where the cadet starts with menial tasks and gradually is given more complex tasks and more responsibilities. The cadet can be appointed as a 3rd Mate.*
- *Oral examinations conducted by the South African Maritime Safety Authority. If the cadet passes that oral examination, he/she will gain his/her Second Mate's Certificate of Competency (STCW II/1).*

With your STCW II/1 Certificate of Competence and:

- *after spending 24 months at sea, interspersed with leave, and*
- *plus any other pre-requisite short courses,*
- *plus a year's course at a technical university for an S3 and S4 in Maritime Studies, and*

you can proceed to the next level of oral examination, the Chief Mate's Certificate of Competency, (STCW II/2).

After a significant experience at sea you can proceed for the Master qualification.

1.5.3 Engine Department

Crew in the engine department are engineers.

Definition:

An engineering officer is a **licenced** mariner who is responsible for keeping the ship and machinery operational.

Responsibilities include the engine, propulsion system, electrical power supply, devices for loading and discharging, garbage incineration and fresh water generators.

The rank structure among engineering officers on a merchant ship (containership, bulker, tanker, etc.) is engineer cadet, 4th engineering officer, 3rd engineering officer, 2nd engineering office, and chief marine engineering officer (CMEO).

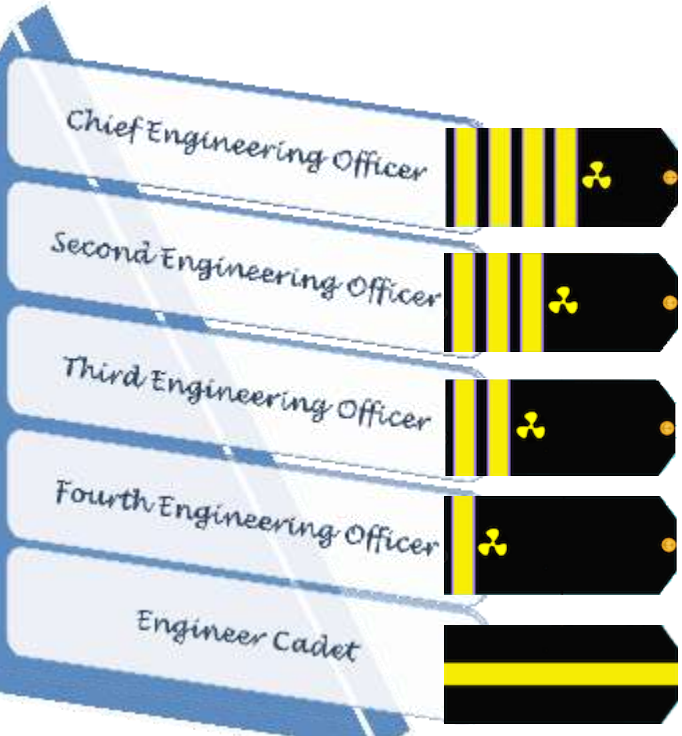
qetnews.co.za

I'm Chief Engineering Officer Khayakazi


SAMSA


SAMSA


SAMSA



ENGINE RATINGS are engine department crew and need an engine room watch rating certificates. Engine Ratings include motorman, oiler, and wiper.

A qualified **MOTORMAN** needs a Able Seafarer Engine Certificate STCW A-III/5.

A qualified **OILER** must also have the Able Seafarer Engine Certificate STCW A-III/5.

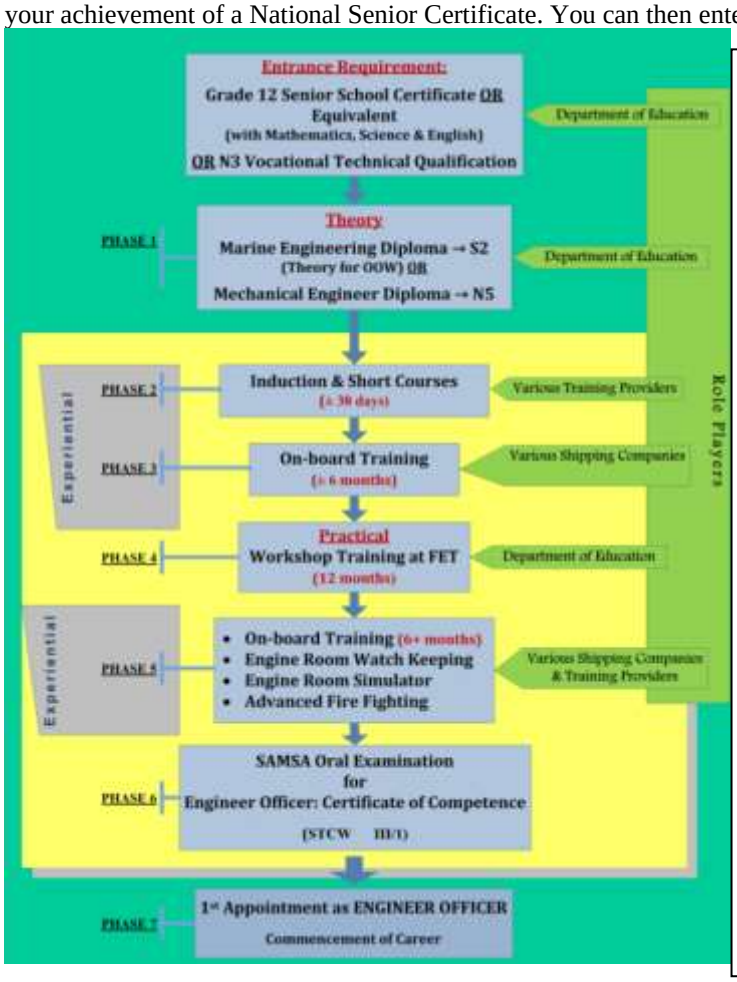
A qualified **WIPER** needs the Engine Room Watch Rating (ERWR) Certificate STCW A-III/4.

The main responsibilities of a **Chief Engineering Officer** on a large ship include:

- ☑ Inspection, servicing, maintenance and repair, replacement or renewal of machinery and equipment in accordance with Ship-owner's preventative maintenance programs, maker's guidelines and classification society requirements.
- ☑ Condition-monitoring, fault-finding, diagnosis of faults and correction of problems on machinery and systems to avoid breakdowns costly in terms of money, time and safety risk.
- ☑ Maintenance of Records, both statutory and operational. Such records would also include staff hours of work and rest periods; testing and re-certification of engine room lifting equipment; disposal of oily- and solid waste; switching between fuel types; servicing records and running hours of machinery; condition analysis of fuel- and lubricating oils; analysis and treatment of boiler water; performance of main engine and generator engines; fuel consumption statistics; etc.
- ☑ Compliance with applicable Company, International and Local Regulations. The Chief Engineering Officer must be thoroughly familiar with all relevant regulations for the ship and operation, and familiarise the staff with their objectives.
- ☑ Preparedness for Operational Emergencies. The diligent Chief Engineering Officer will regularly practise drills with the engineering staff in reaction to emergency scenarios conceived in preparing to "expect the unexpected". This is to ensure that if and when the real thing happens, reaction will be swift and appropriate.
- ☑ Maintain inventory of stock of service-ready overhauled and new spare parts, repair materials, consumables, etc. The Classification Society dictates the minimum number and type of spare machinery parts to be carried, however the conscientious ship-owner normally stipulates a greater variety and quantity of spares and general stock based on operational experience and recommendations.
- ☑ Organising and Supervision of Repairs by ship's own staff or by shore contractors as required. The Chief Engineer has to ensure that such repairs or major servicing work is done correctly and thoroughly, and in accordance with the requirements and standards of the Classification Society or equipment maker, as appropriate. The Chief Engineer is responsible for "signing-off" on all such work as being fit for purpose and safe for sea.
- ☑ Bunkering and record-keeping with regard to bunker consumption and slops.
- ☑ Team-building, mentoring and training Cadets and Junior Engineering Officers, and encouraging on-going professional development of the engineering staff.

A Chief Engineer with 10 to 19 years of experience earns about R1,004,286.

The career path from a Grade 12 learner to **the *Chief Engineering Officer*** of a large ship starts with your achievement of a National Senior Certificate. You can then enter the post-school programmes.



- *Grade 12 (with English, mathematics and physical science, with minimum 55% in each)*
- *Study for an S2 Marine Engineering Diploma or N5 Mechanical Engineer Diploma at Cape Peninsula University of Technology (CPUT) or Durban University of Technology (DUT).*
- *Engineer Cadet on a ship at sea for a total of 18 Months at sea, interspersed with leave. This is a training period where the cadet starts with menial tasks and gradually is given more complex tasks and more responsibilities.*

- *Oral examinations conducted SAMSA. If the cadet passes that oral examination, he/she will have an Engineering Watchkeeping Certificate of Competency (STCW III/1).*

With your STCW III/1 Certificate of Competence and:

- *after spending 24 months at sea, interspersed with leave, and*
- *plus any other pre-requisite short courses,*
- *plus a year's course at a technical university for an S3 and S4 in Maritime Studies, and*

you can proceed to the next level of oral examination, the 2nd Engineer Officer Certificate of Competency, (STCW III/2).

After the 2nd Engineer STCW III/2, the marine engineer needs a requisite service time at sea before taking the exam for the Chief Engineer Officer qualification.

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