



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2008

MARITIME ECONOMICS

Time: 3 hours

Marks: 300

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This paper consists of 15 pages. Please check that your paper is complete.
 2. Answer all questions.
 3. Read the questions carefully before answering.
 4. It is your own interest to write legibly and present your work neatly.
 5. Show all working where calculations are involved.
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QUESTION 1 THE MARITIME WORLD

- 1.1 Before steam engines were used in ships, a vessel trading between Europe and India would have had to rely on two natural sources of power. Name these two sources of power. (2)
- 1.2 Give two ways in which the change to steam propulsion assisted shipping. (2)
- 1.3 Read the article (*Caught on Camera*, from *Lloyd's List*) attached to the Question Paper as Addendum 1, and answer the following questions:
- 1.3.1 What might make some shipping lines publicly acknowledge that one of their ships has lost containers overboard? (2)
- 1.3.2 Apart from your answer to Question 1.3.1, what caused some ship-owners to take action to avoid more losses of containers? (2)
- 1.3.3 Which particular accident might help to clarify the reasons for container losses? (2)
- 1.3.4 List two of the causes given for the loss of containers. (4)
- 1.4 Apart from some steam turbine vessels, steamships in their various forms have been replaced by the so-called motorship, using a large engine. Explain the advantages of this type of engine being used in ships when compared to steam engines. (6)
- 1.5 Study the graph provided as Addendum Two, and answer the questions below. **Note:** The graph shows the freight rates per ton for the movement of iron ore from Brazil to Japan during a period from January 2007 to January 2008. The letters on the x-axis indicate months of the year.
- 1.5.1 What is a Capesized ship? (2)
- 1.5.2 In which month did the **most** serious decline in rates start? (2)
- 1.5.3 What was the highest rate recorded in the year shown on the graph? (2)
- 1.5.4 Is the present trend upwards, downwards, or steady? (2)
- 1.5.5 Late last year, many Capesized ships were at anchor outside Australian coal and iron ore terminals awaiting cargoes. This effectively created a shortage of ships for other trades and increased the charter and freight rates.
- There is always a demand for coal during the northern hemisphere's autumn and winter, and therefore a demand for Capesized ships to take that coal to northern hemisphere ports. This always results in increased charter and freight rates from around September to December.
- Does the graph show increases during these times?
Answer YES or NO. (2)

- 1.6 Look at the table given as Addendum Three and answer the following questions:
- 1.6.1 How many ships called at Port A in 2007? (4)
- 1.6.2 Which port has shown the greatest growth **in the last TWO years**? (2)
- 1.6.3 Which port has more containerships calling? (2)
- 1.6.4 What type of ship would be used for each of the following?
- (a) Carrying the vehicles exported from Port B. (2)
- (b) Carrying the steel exported from Port B. (2)
- 1.6.5 Remembering that fishing vessels require a very important product to enable them to go to sea, what would the tankers bring to Port B? (2)
- 1.6.6 Indicate how each of the following are shown in the numbers of ships calling:
- (a) The oil refinery at Port A has increased its production for export. (2)
- (b) The fishing industry at Port B is in decline.
(TWO parts to your answer) (4)
- (c) The steel industry at Port B is growing. (2)
- 1.6.7 In which year did the new coal mines begin production near Port A? (2)
- 1.6.8 Give a reason for your answer to Question 1.6.7. (2)
- 1.7 Many ship owners prefer to crew their ships with seafarers from other countries. Give two reasons for this practice. (4)

60 marks

QUESTION 2 SHIPPING OPERATIONS

2.1 Here are some details about the bulk carrier *Sunrise Trader*:

She has five holds, a bulbous bow, and her accommodation and engine room are aft.

Length	170 metres
Loaded Draught	11 metres
Freeboard when loaded	5 metres
Owner	Sunrise Shipping, New York
Managers	Patris Ship Management, Cyprus
Charterer	ABC Shipbrokers, New York

She is on a **time charter** for six months during which she is expected to make 3 laden voyages carrying wheat from New Orleans to Durban. She is on her first voyage, and the time on charter can be extended if delays are encountered.

Insurers	H&M	Lloyd's
	P&I	West of England
Port of Registry	Limassol (Cyprus)	
Classification Society	Germanischer Lloyd	
Cargo	33 500 tons of wheat	
Cargo distribution	No 1 Hold	5 500 tons
	No 2 Hold	6 000 tons
	No 3 Hold	7 000 tons
	No 4 Hold	7 500 tons
	No 5 Hold	7 500 tons

Each hold has a crane.

Origin of Cargo	Mississippi Grain Merchants, Memphis, Tenn., USA
Loading port	New Orleans, USA
Discharge Port	Durban, for onward movement by railway
Destination of Cargo	Zambian Grain Co-operative, Lusaka, Zambia
Value of Ship	\$56 million
Value of Cargo	\$16 million
Value of Bunkers on board	\$320 000

2.1.1 Referring to the details given, draw a diagram of this ship from bow to stern, showing all available information about the vessel and her cargo. (10)

2.1.2 What type of bulk carrier is *Sunrise Trader*? There are TWO parts to this answer. (4)

2.1.3 Assume the following when the cargo was loaded in New Orleans:

- Loading was done by two chutes (loading pipes) at a rate of 1000 tons an hour **each**.
- Loading began at 10:00 on 11 November.
- Breaks (tea breaks, change of shift, etc.) total 6 hours for the duration of the loading process.
- Because wheat is a weather sensitive cargo, loading time was lost because of rain between the following times:
12:00 to 13:00 on 11 November and 01:00 to 04:00 on 12 November.
- A power failure meant that no loading was done from 17:00 to 19:00 on 11 November.
- Before she can sail, various clearance procedures will take three hours **once cargo-work has been completed**.

- (a) How many hours will it take to complete the loading of the cargo, **including breaks but excluding the other stoppages**? Round off to the NEXT hour e.g. 22.2 becomes 23 hours. (6)
- (b) How many hours will the entire loading process take? **Include breaks and other stoppages**. (6)
- (c) When will the discharge of the cargo be finished? (6)
- (d) Assume that the agreed laytime is 31 hours, including breaks, but excluding other stoppages. Did the loading process take longer than the agreed time? Answer YES or NO. (2)
- (e) Which was payable: demurrage or dispatch? (2)
- (f) Who would be liable for payment? Choose your answer from:
SHIPOWNER or CHARTERER or AGENT (2)
- (g) When will the ship sail from New Orleans? (6)

2.1.4 Assume that the cargo was carried FIO (the INCOTERM for free in and out).

Choosing your answers from either SHIPPER or CONSIGNEE, who pays for the following:

- (a) the costs of loading of the cargo of wheat in New Orleans? (2)
- (b) the ocean freight costs between New Orleans and Durban? (2)
- (c) the costs of discharging the cargo in Durban? (2)

2.2 On her voyage from New Orleans to Durban, *Sunrise Trader* suffers a major engine breakdown in heavy weather off the southern Cape coast on 3 December. Because the ship is off a lee shore and a gale force wind is blowing, the master calls for tug assistance as the ship drifts towards the shore. Two hours after the breakdown, the master orders both anchors to be dropped as the ship is getting close to the shore, but after about an hour at anchor, the anchor chains break, and, after drifting for a further hour, the ship is driven ashore by the gale force wind. She is ashore on a beach to the west of Cape Agulhas.

Two helicopters from the South African Air Force had flown to the scene earlier, prepare to take off the crew, and the Master orders all junior ratings and catering crew to be evacuated from the ship by helicopter. Others remain on board the ship. The master ordered the ship to be ballasted down (taking on as much ballast water as possible) to minimise the ship bumping on the beach.

A SAMSA surveyor boards by helicopter. Operating on a Lloyd's Open Form, the salvage tug *Seefalk* arrives at the scene at 19:30 that evening, manages to put up a towing line, and her master, in consultation with the master of *Sunrise Trader* and the SAMSA surveyor, decides to wait until the high tide before making his first attempt to re-float the ship.

Unless the tug can re-float the ship on the next high tide, Port State Control have ordered that all pumpable oil should be removed from the vessel. Fortunately, on the high tide at 02:30 on 4 December, *Seefalk* re-floats the bulk carrier, and, amidst a very heavy sea running with some swells exceeding 15 metres, the tug, with *Sunrise Trader* in tow, arrives at Cape Town at 06:30 on 5 December.

Before she is permitted to enter the harbour, divers do an underwater inspection. They establish that the propeller and rudder have been damaged, there are two small gashes, one in a deep tank on the starboard side, and one through which water has leaked into number three hold where 3500 tons of wheat has been contaminated by seawater. Her keel has been dented in several places.

As there is no danger that she will sink and no danger of pollution, she is allowed to enter the harbour. The pilot boards at 15:00 and she berths in Cape Town harbour at 16:10. A thorough survey begins.

Her cargo is discharged and railed to Zambia from Cape Town, apart from the contaminated cargo that is declared unfit for use. Once discharge has been completed, the ship is dry docked for repairs.

After six weeks in port, *Sunrise Trader* is ready to resume trading.

A marine court of inquiry found that no one was to blame for the accident.

- 2.2.1 Before *Sunrise Trader* would have been allowed to enter Cape Town harbour, she would have been inspected by surveyors representing three organisations. Which organisations are these? (6)
- 2.2.2 Which two of these three organisations would have to approve her return to trading? (4)
- 2.2.3 Who would pay for the damage to the ship? (2)
- 2.2.4 Who would pay for the damage to part of the cargo? (2)
- 2.2.5 Why was only part of the cargo in No 3 hold damaged by seawater? (4)
- 2.2.6 How much cargo was saved from No 3 Hold? (4)

- 2.2.7 Assume that General Average was declared and costs of salvage, etc. were \$3.2 million.
- (a) Define briefly the term General Average. (6)
 - (b) Who declares General Average? Choose your answer from: SHIP'S MASTER or SHIPOWNER or CHARTERER or SHIPPER. (2)
 - (c) Calculate the share of the salvage costs that would have to be paid by the cargo owners in terms of General Average. (6)
- 2.2.8 What is meant by the term Lloyd's Open Form? (4)
- 2.2.9 Is the tug owner entitled to claim salvage for this operation? Answer YES or NO. (2)
- 2.2.10 Give a reason for your answer to Question 2.2.9. (2)
- 2.2.11 Which country would have to organise the marine court of inquiry in respect of this accident? Choose your answer from: SOUTH AFRICA or CYPRUS or GERMANY or HONG KONG or USA (2)
- 2.2.12 You are the master of *Sunrise Trader*. Write an outline in point form that will be the basis of your report on the grounding of the ship. The outline should be in the following format:
- 3 December 2008*
- 12:02 Engine room alarms sounded.*
- 12:25 Chief Engineer informed me that a major problem has arisen in the engine room. (He believed a crankcase explosion had occurred, that the ship had been immobilised, and that his engineers would not be able to fix the problem without shore side assistance.) Fortunately, no one had been injured in the explosion.*
- 12:27 Because we were off a lee shore and a gale force wind was blowing, I called for tug assistance...*
- Now continue in this format giving details of when the anchors were dropped, when the anchor chains broke, and other important events given in the text. Continue right up to the time your ship berthed in Cape Town. Ensure that you use the dates and times given in the text and remember to include reference to the weather conditions. (16)
- 2.2.13 What happened to the ship's cargo in Cape Town? (2)
- 2.2.14 Look at the details relating to the charter in Question 2.1.
- (a) For which port would she head when she sails from Cape Town? (2)
 - (b) What cargo would she load at that port? (2)
 - (c) How many more voyages must she make in terms of her present charter? (2)

120 marks

QUESTION 3 INTERNATIONAL TRADE

3.1 The sea route between Europe and the East via the Cape lost much of its importance when the Suez Canal opened in 1869. Ships could take the much shorter route via the canal. However, the Cape sea route became important again during three periods last century when the canal closed.

One of those periods was during World War 2 when, although the canal was not physically closed, many ships were diverted to the Cape route to avoid passing through the Mediterranean Sea which was a major war zone.

3.1.1 When were the other two occasions when the canal was closed?

Choose your **two** answers from the following sets of dates:

1926 – 1927 or 1934 – 1936 or 1956 – 1957 or 1959 – 1960
or 1965 – 1970 or 1967 – 1975 or 1980 – 1983 (4)

3.1.2 List four important cargoes that are carried via the Suez Canal now. (8)

3.1.3 What is the main advantage for ships using the Suez Canal for voyages between Europe and the Far East? (2)

3.1.4 Between which two seas is the Suez Canal? (4)

3.2 The Panama Canal provides a shorter route for ships trading between the west coast of North America and the east coast of North America.

3.2.1 Name one major port on the east coast of North America. (2)

3.2.2 Name one major port on the west coast of North America. (2)

3.2.3 Describe the route a ship would have taken when steaming from the west coast of North America to the east coast of North America before the Panama Canal was opened. (4)

3.2.4 The present limits to the size of ships that can pass through the Panama Canal are as follows :

Length	Beam	Draught
274.3 m	32.3 m	11.28 m

(a) Consult the extracts from *Lloyd's Register* provided as Addendum 4 and give the names of the ship/s that can pass through the Panama Canal fully laden. (4)

(b) Give three reasons for their being able to pass through the canal. (6)

(c) What term is given to a ship that can pass through the Panama Canal fully laden? (2)

3.2.5 The Panamanian government has begun to build new sets of locks that will allow larger ships to pass through the Canal. How will this help the worldwide shipping industry? In your answer, refer to some of the types of ships that will be able to pass through the canal, to the types of cargoes that those ships will carry, and to some of the countries that will gain from the enlarged canal. (10)

- 3.3 The international community is particularly keen that the Straits of Hormuz should be kept open for international shipping.
- 3.3.1 In about 100 words, explain why the Straits of Hormuz are so important to international shipping. Among other aspects, mention the major cargoes that pass through these straits, and the destination of some of these cargoes. (12)
- 3.3.2 A ship passes through the Straits of Hormuz from east to west. Which gulf will she enter? Choose your answer from ARABIAN GULF or GULF OF OMAN or GULF OF ADEN. (2)
- 3.4
- 3.4.1 List FOUR functions of a Port State Control organisation such as the United States Coastguard. (8)
- 3.4.2 Which organisation is the South African port state control? (2)
- 3.4.3 The British port state control organisation (MCA) finds that a Panamanian ship is overloaded before she sails from Liverpool (UK).
- (a) How would they know that the ship is overloaded? (4)
- (b) What would MCA do about this problem?
(THREE parts to the answer) (6)
- 3.4.4 Which organisation ...
- (a) is the international controlling body for shipping? (2)
- (b) would act against a ship that is deliberately causing oil pollution off the South African coast? (2)
- (c) is responsible for the registration of South African ships? (2)
- (d) places ships in class? (2)

90 marks

QUESTION 4 MARINE ENVIRONMENTAL CHALLENGES

4.1 Study the map that is Addendum 5. Position **X** is the position of a tanker that, during heavy weather, has developed a crack in the side-plating of number five tank (starboard side) and has spilled about 5 000 tons of her cargo of 152 000 tons of crude oil. The prevailing wind is from the north-east.

Answer the following questions:

- 4.1.1 Is this tanker single-skinned or double-skinned? (2)
- 4.1.2 Give a reason for your answer to Question 4.1.1. (2)
- 4.1.3 Which beach(es) is/ are most likely to be affected by the oil slick? (2)
- 4.1.4 Give two reasons for your answer to Question 4.1.3. (4)
- 4.1.5 Judging **ONLY** from information on the map, which economic activities are likely to be affected negatively by this accident? (6)
- 4.1.6 What decision has been taken by the IMO with regard to single-skinned tankers? (2)
- 4.2 A mid-latitude cyclone (depression) will move through the area of the oil spill during the next 24 hours.
- 4.2.1 How will the weather change during this time? (Refer to temperature changes, changes in wind strength and direction, and any rain that might accompany such a weather system.) (8)
- 4.2.2 How will this hamper (disrupt) clean-up operations ashore? (4)

30 marks

Total: 300 marks

ADDENDUM ONE – QUESTION 1.3

Caught on camera

NO ONE knows how many containers have been washed into the sea over the years. Many incidents go largely unnoticed. Often it is only when a sharp-eyed photographer spots a ship arriving in port with a crushed stack, or containers hanging over the side, that the lines confess what has occurred.

But when several hundred containers were lost overboard from a number of ships in European waters in the winter of 2005 the industry could no longer ignore the problem. Even then not a great deal seemed to happen until a few months ago when ocean carriers had another wake-up call.

An investigation by Britain's Marine Accident Investigation Branch into a little publicised accident a year ago, when a stack on a small feeder collapsed, was highly critical of industry practices. The MAIB made a number of recommendations and called for a code of best practise.

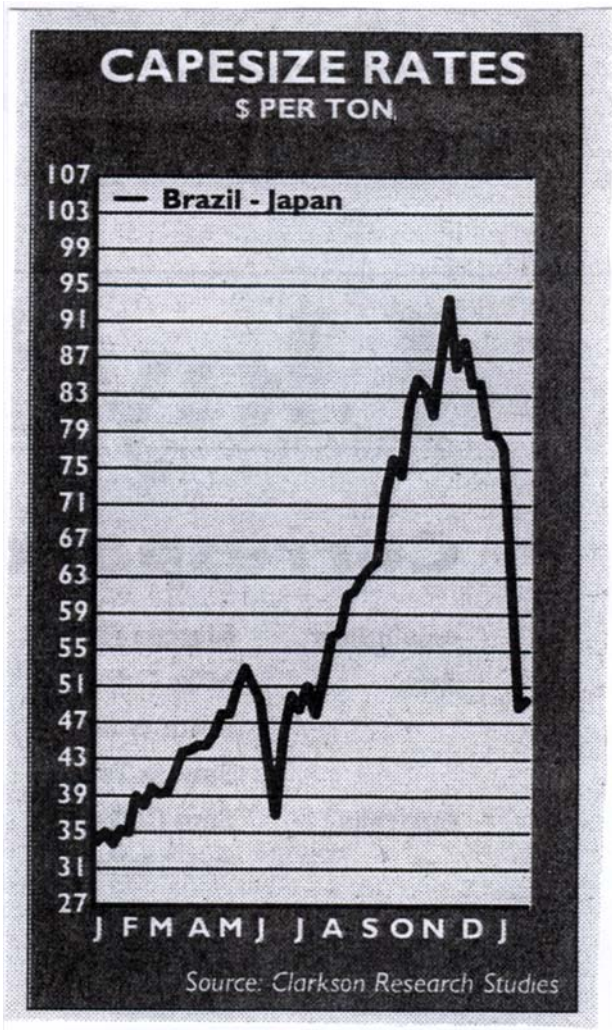
Finally the message has hit home and numerous initiatives are under way to tackle the problem.

What is clear is that there is no single solution. Some accidents may be caused by faulty twistlocks, others by overweight or badly packed containers. Weather is always an issue, with ships' officers needing more training on how to handle parametric rolling.

The findings from the *MSC Napoli* casualty, due out in the next few weeks, may also give food for thought.

But container shipping must act fast to address this issue if it wants to avoid mandatory rules by regulators as ships get bigger and the risks correspondingly greater.

ADDENDUM TWO – QUESTION 1.5



ADDENDUM THREE – QUESTION 1.6

Number of Ships Calling to work Cargo

	2004	2005	2006	2007	2008 Est.	2009 Est.	2010 Est.
PORT A							
<i>Containerships</i>	550	593	610	622	630	650	670
<i>Tankers</i>	160	214	265	340	360	380	380
<i>Bulk Carriers</i>	132	167	274	298	302	310	320
<i>Others</i>	102	094	110	121	130	135	145
PORT B							
<i>Containerships</i>	284	252	209	195	195	210	220
<i>Tankers</i>	096	089	065	051	050	050	050
<i>Bulk Carriers</i>	104	119	184	221	230	250	270
<i>Others</i>	290	223	211	198	200	200	200

Note the following :

- Est. = Estimated numbers of ships calling.
- Port A has an oil refinery that refines oil brought by pipeline from a nearby source. There is an export facility for oil products (e.g. petrol, diesel, jet fuel) and, as new coalmines have opened recently, it exports large volumes of coal (usually in Capesize ships). A large range of minerals is also exported via the port.
- Port B has an export facility for large numbers of vehicles that are built in two factories close to the harbour. Most of the parts for these vehicles are imported in containers. In the sea off Port B was a very productive fishing ground but over fishing has reduced the volume of fish caught in recent years. A steel mill in the area has increased production, especially in steel for export.

ADDENDUM FOUR – QUESTION 3.2.4

2 SHIP'S NAME		3 TONNAGE		4 CLASSIFICATION		5 HULL		6 SHIP TYPE/CARGO FACILITIES		7 MACHINERY		
Former names	Owners	Gross Net	*Deadwt	Hull	Special Survey	Date of build	Shipbuilders - Plans of build	Propulsion	Ship type	Shelter deck	Design	Designation
Managers	Port of Registry	Gross Net	*Deadwt	Machinery	Refrigerated cargo installation	Length overall (m)	Breadth extreme (m)	Ro-Po facilities	Holds & lengths (m)	Passengers	No. & Type of engines	Bore x stroke (mm)
SatCom Id	Flag	Gross Net	*Deadwt	Equipment Letter	Fee Numerical	Length B.P. (m)	Breadth moulded (m)	Grain/Liquid	Bale Insulated spaces (m ²)	Heating coils	Enginbuilders	Where manufactured
		*Tonnes	T/cm			Superstructures (m)	Decks	Containers & lengths (ft)	Heating coils	Aux. electrical generating plant & output	Pressures	Furnaces
						Filletted/Welded	Rise of floor (mm)	Hatchways & sizes (m)	Winches	Special propellers	Aux. electrical generating plant & output	
						Additional tanker dimensions	Conversions	Cargo discharge pumps	Fuel bunkers (tonnes)	Speed		
ELBE ex Maninia-89 ex Urania Coulouthros-89 Avac Ltd. OMI Corp. Monrovia SatCom: 1240642/ELBE	Liberia	38 529 18 166 66 800	8-100A1 oil tanker ELBE	SS 7/89	1984-6 Mitsui Eng. & SB. Co. Ltd.—Tamano	230,51 (BB) 222,00 F 17,7 r 13	32,24 32,20 1 dk Bow/CM 111 Diam. 0,350	M Tanker COW IGS(LR) PL(LR) SBT(LR) pl higher tensile steel L 11 Ta ER L(oil) 72 325	HeClis. C	71,67G/B/E	BAW Oil 2SA 7Cy. 670 X 1700 15 228bhp (11 201kW) Mitsui Eng. & SB. Co. Ltd. AuxB (o.l.) 18kgf/cm ² (17,7bar) e(ex.g) 24kgf/cm ² (23,6bar) Gen 3 X 560kW 450V 60Hz a.c. Fuel 244,51 (d.o.) 3 591,51 (hvf)-43,0pd	Tamano
ELBE I Partredet for m.s. Elbe Chr. Jensen, Soeborg og Benthin's Erf. A/S (CJ Shipping) Saaby Denmark (DIS)		T.Mk 999 856 2 660			1974 J. J. Steias G.m.b.H. & Co. K.G. Schiffsw. —Hamburg	93,20 80,22 F 8,0 2 dks	14,56 14,53 4,860 7,95	M General Cargo Ice strengthened 1 Ho 52,6 ER G.5.841 B.5.482 TEU 204 C. 204/20' 1 Ha (sil) (51,3 X 10,3) ER	Deutz Oil 4SA 8Cy. 370 X 400 3 600bhp (2 648kW) Kloescker Humboldt Deutz	15kn	REBVM540	
ELBE MARU Sanko Kisen K.K. & Zuiko Kaun K.K. Tokyo Japan SatCom: 1200636/TRUJ		87 533 82 470 158 570 T/cm 112,1			1975 Kawasaki Heavy Ind. Ltd.—Kobe NK 275,01 F 19,2 1 dk Bow/CM 151 Diam. 0,550 MH 0,9	289,98 (BB) 44,05 44,00 24,19	17,982 24,19	M Ore Carrier COW IGS DB G.86 355 L(oil) 194 675 HeClis. BplC 10 Ha (sil) (15,3 13,8 13,8 13,8 13,8 13,8 13,8 13,8 13,8 13,8 X 12,0)	MAN Oil 2SA 8Cy. 1050 X 1800 32 000bhp (23 538kW) Kawasaki Heavy Ind. Ltd. Gen 3 X 800kW 450V 60Hz a.c. Fuel 598,01 (d.o.) 8 545,01 (hvf)-105,5pd	15,75kn	K8SZ105/180	
ELBE ORE ex Bretagne-76 Blue Whale Shipping Corp. Montrovia Liberia SatCom: 1241253/ELBE		77 249 59 979 160 565 T/cm 117,4			1972 Chantiers de France-Dunkerque—Dunkerque AB (BV) 299,27 (BB) 263,40 F 15,9 1 dk r 699 Bow/CM 143 Diam. 0,610 MH 2,1	43,85 43,79 23,75	17,601 23,75	M Ore/Bulk Carrier Adapted for Dry cargoes only Str. heavy cargoes DB 11 Ho/ER G.170 496 L(oil) 179 067 11 Ha (sil) ER	Suizer Oil 2SA 8Cy. 1050 X 1800 32 000bhp (23 538kW) Cie. de Const. Mec. Suizer, CCM Gen 1 X 848kW 2 X 824kW	16,25kn	8RND105	

ADDENDUM FIVE – QUESTION 4.1

