



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2009

**MARITIME ECONOMICS**

Time: 3 hours

300 marks

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**PLEASE READ THESE INSTRUCTIONS CAREFULLY**

1. This paper consists of 12 pages. Please check that your paper is complete.
  2. Answer all questions.
  3. Read the questions carefully before answering.
  4. It is in your interests to write neatly.
  5. Where calculations are involved, all working must be shown.
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**QUESTION 1 THE MARITIME WORLD**

- 1.1 When steam replaced sail as the main propulsion used in maritime trade, ships were no longer totally reliant on winds and currents. Therefore the time a steamship spent at sea was less than a sailing ship. From early last century, the internal combustion engine was used in some ships and now, almost all modern ships have this form of propulsion.
- Some owners, such as the owners of the Beluga project cargo ships, are investigating the use of wind power. On one of their ships, they have a 'sky sail', a form of large kite attached to the ship's forecastle and wind conditions are monitored by a computerised anemometer (an instrument that measures wind speed and direction). The sky sail is released when conditions are right to fly ahead of the ship, and it pulls the ship along.
- 1.1.1 Besides the advantage given in the paragraph above, give an advantage of the switch from sail to steam propulsion in ships. (2)
- 1.1.2 List two advantages of the use of the internal combustion engine, rather than coal-fired steam engines in ships. (4)
- 1.1.3 What type of fuel is usually used in the main engine of a large tanker? (2)
- 1.1.4 Give a reason for some owners wanting to use wind power again. (2)
- 1.2 Study the Table provided in Addendum 1 on page 11 and answer the questions set.
- NOTE:** The Table shows the age of the world's containership fleet according to the size of the ships. The Age Range shows the number of ships in each of the classes according to their age, e.g. the first line on the table shows that of the container capacity aboard Post-Panamax containerships, 2.88 million *teu* (63.7%) are between 0 and 5 years old.
- 1.2.1 What does the figure 0.00 m *teu* for the age group 25+ years tell you about the Post-Panamax containerships in the world? (4)
- 1.2.2 Which of the four types of containerships has the youngest fleet age? (2)
- 1.2.3 In the total world fleet of containerships, are there more ships in the older groupings or in the younger groupings? (2)
- 1.2.4 From the information in the Table, quote figures to support your answer to Question 1.2.3. (2)
- 1.3 Read the advertisement provided in Addendum 2 on page 11 and answer the questions set.
- 1.3.1 What positions are being advertised? (6)
- 1.3.2 Describe **in your own words** what Stena Line does. (4)
- 1.3.3 What does the term STCW 95 mean in the context of this advertisement? (4)
- 1.3.4 Besides the qualifications, give two qualities of character that Stena Line want their new employees to have. (4)

1.4 The Philippines provides a large percentage of the world's seafarers, and the money earned by these seafarers is one of the largest sources of revenue for that country. South Africa has a serious problem of unemployment, yet reports indicate that there are thousands of vacancies for qualified officers on the world's ships. Most young South Africans are not aware of the opportunities for worthwhile, interesting and well-paid careers at sea, with very generous leave periods.

1.4.1 Why do many ship-owners use crews from other countries? (4)

1.4.2 You are employed as a consultant for the Marine Division of the South African Department of Transport and have been tasked to investigate career opportunities at sea. You discover that many young South Africans are not aware of the sea-going careers available.

Write a **point-form** proposal for a campaign to attract young South Africans to consider choosing a sea-going career. Use the following headings in your report:

(a) Reasons for young South Africans not choosing sea-going careers. (5)

(b) Opportunities for employment at sea. (5)

(c) Suggestions on how to encourage young South Africans to choose sea-going careers. (8)

<b>60 marks</b>
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**QUESTION 2      SHIPPING OPERATIONS**

2.1 Here are some details about the 60 000-deadweight bulk carrier *Blue Horizon*

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

Length	220 metres
Loaded Draught	11 metres
Beam	32 metres
Freeboard when loaded	5 metres
Port of Registry	Hong Kong
Classification Society	Bureau Veritas
Cargo	55 000 tons of coal of the same grade
Cargo distribution	No 1 Hold      4 000 tons No 2 Hold      8 000 tons No 3 Hold      8 000 tons No 4 Hold      9 500 tons No 5 Hold      9 500 tons No 6 Hold      8 000 tons No 7 Hold      8 000 tons
	The ship has one crane per hatch
Owner	Blue Horizon Shipping, Hong Kong
Managers	Mercury Ship Management, Isle of Man, UK
Charterer	Izmir Coal Distributors, Izmir, Turkey
	She is on a <b>time charter</b> for 12 months
Insurers	H & M      South China Insurers P & I      North of England P & I Club FFO      Western Pacific Insurers
Origin of Cargo	Eland Collieries, Witbank, Mpumalanga, South Africa
Loading port	Durban
Discharge Port	Izmir, Turkey
Destination of Cargo	Izmir Coal Distributors, Izmir, Turkey
Value of Ship	\$60 million
Value of Cargo	\$2 million
Value of Bunkers on board	\$520 000

2.1.1 The following are the restrictions for shipping at Izmir:

Length of Berth:	364 m
Depth of Water	12.5 m (Low spring tide)
Discharge facilities:	No bulk discharge facilities

- (a) Draw a cross section of *Blue Horizon* (port to starboard) indicating the clearance of water below her keel at low spring tide. *NB: Label only the relevant parts of the ship according to information given in Question 2.* (8)
- (b) Give four reasons for *Blue Horizon* being suitable for this charter to move coal from Durban to Izmir. (4)
- (c) Has *Blue Horizon* been flagged out? Answer YES or NO. (2)
- (d) Give a reason for your answer to Question 2.1.1 (c). (2)

- 2.1.2 What type of bulk carrier is *Blue Horizon*? (2)
- 2.1.3 Assume the following when the cargo was loaded in Durban:
- Loading was done by two ship loaders at a rate of 400 tons an hour **each**.
  - Loading began at 12:00 on 14 November.
  - Loading is on a 24-hour basis apart from the breaks mentioned below.
  - Breaks (tea breaks, change of shift, etc.) total 8 hours for the duration of the loading process.
  - A power failure meant that no loading was done from 14:00 to 20:00 on 15 November.
  - Before she can sail, various clearance procedures will take four 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 loading of the cargo be finished? (6)
- (d) Assume that the agreed lay time is 53 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 Durban? (6)
- 2.1.4 Assume that the cargo was carried FOB (the INCOTERM for *free on board*). Choosing your answers from either SHIPPER or CARRIER OR CONSIGNEE, state who pays for the following:
- (a) The costs of loading the cargo of coal in Durban.
- (b) The ocean freight costs between Durban and Izmir.
- (c) The costs of insurance on the cargo. (6)
- 2.1.5 How many bills of lading will be required for this cargo? Choose your answer from the following:  
ONE or TWO or FIVE or SEVEN (2)
- 2.1.6 Explain your answer to Question 2.1.5. (4)

2.2. On her voyage from Durban to Izmir, *Blue Horizon* passes the coast of Somalia where piracy occurs frequently.

2.2.1 What is piracy? (2)

2.2.2 When off the east coast of Somalia, *Blue Horizon* is steaming in a North, North Easterly direction. All exterior doors in the accommodation had been secured before the ship arrived off the Somali coast.

At 06:35 on 22 November, the officer of the watch notes on the radar that an unidentified vessel is speeding towards the ship from the West, and the lookout on the bridge wing reports sighting a small boat. He sounds the alarm, the captain arrives on the bridge within 3 minutes of the alarm being sounded and activates the international pirate attack signal and also calls for naval assistance on the ship's radio. The radio log indicates that the call was made at 06:39. The crew also arrive on the bridge.

The captain orders the helm hard to starboard to try to move away from the pirates. (According to the log, this order was given at 06:40).

The South African frigate SAS *Madiba* that has a speed capability of 35 knots, responds, indicating that she is about 25 nautical miles away and is speeding to assist, and will also dispatch a helicopter to assist. The helicopter should arrive at the scene within 7 minutes.

The captain orders four extra lookouts to take up position on the wing of the bridge and the rest of the crew to stand by with fire hoses on the wings of the bridge to try to repel any attempt to board the ship. They are to be ready to leave the hoses and return to the wheelhouse should the pirates actually board.

As the pirate boat closes with *Blue Horizon*, a shoulder-launched grenade smashes into the side of the ship, causing minor damage. The South African helicopter arrives, four marines are landed on the foredeck of the ship and the helicopter heads for the pirate boat. A marine in the helicopter opens fire on the pirate boat, which heaves to, and watching through binoculars, the officers on the bridge of *Blue Horizon* note that the pirates are standing in their boat and have their hands above their heads while the helicopter hovers overhead.

SAS *Madiba* arrives and sends a boat to capture the pirates, the helicopter picks up the marines from *Blue Horizon*, and, escorted by the frigate, the bulker alters course at 07:30 to steam the shortest possible distance to Bab el Mandeb and the Red Sea.

(a) How long would SAS *Madiba* have taken to reach the bulker? (6)

(b) What time did the helicopter arrive at *Blue Horizon*? (4)

(c) Why would the ship's classification society be involved in the incident, once she reached a port? (4)

(d) You were the lookout who first saw the pirate boat approaching the bulker. On which side of the ship's bridge were you standing? (2)

(e) How long was the ship steaming off her usual course? (2)

- (f) Remembering that she was on charter at the time of this incident, what term is given to the fact that *Blue Horizon* had turned off her usual course and would have been delayed? (2)
- (g) What type of marine insurance covers this period of the ship having to divert to try to escape from pirates? (2)
- (h) You are the master of *Blue Horizon*. Prepare a report on the incident for the IMO's Maritime Bureau in Singapore. Begin with the following:  
*06:35 Officer of the watch sounded the pirate alarm*  
*06:38 I reached the bridge ... , etc.*  
 Continue listing each action and observation until the ship is back on course. (Remember to work out the times that the various actions occurred. If no time is given, give a realistic 'guesstimate'). (12)

2.3 While under pilotage on arrival in Izmir, *Blue Horizon* suffers a power blackout when approaching the berth and the ship collides with the wharf. Fenders alongside the wharf are smashed, the wharf itself is damaged and plating on the port bow is badly damaged.

2.3.1 Consult the details of the ship given in Question 2.1 and indicate the following:

- (a) The insurers who will ultimately receive a claim for the damage to the wharf.
- (b) The insurers who will ultimately receive a claim for the damage to the ship's plating. (4)

2.3.2 Who is in command of a ship when she is under pilotage in a port? (2)

2.3.3 The ship requires to be dry-docked for the plating to be repaired. The cost of the repairs totals \$550 230. General average is declared.

- (a) Who declares general average? Choose your answer from the following: THE MASTER or THE CHARTERER or THE AGENT or THE OWNER or THE INSURERS. (2)
- (b) In terms of General Average, calculate the amount that the ship-owner would pay towards the cost of repairs. (See the information given in Question 2.1). (6)
- (c) If \$1 = 1.78 Turkish Lira, how many Turkish Lira did the repair company receive for the repair work? (6)

2.3.4 Which two organisations will have to certify that the ship is seaworthy once the repairs have been done? (4)

<b>120 marks</b>
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**QUESTION 3      INTERNATIONAL TRADE**

- 3.1 Ships are being diverted to the Cape route instead of passing through Suez. This is because of piracy in the Gulf of Aden and because of the high tariffs for Suez transits. A large containership will pay about \$720 000 for one transit, and the insurance surcharge (if passing through pirate area in Gulf of Aden) will be about \$58 000. Assume the following for a large containership on a service from Europe to China:

Additional steaming time via the Cape	7 days
Daily operating cost (excluding fuel)	\$45 000 per day
Fuel consumption:	
HFO	190 tons per day
MDO	3 tons per day
Fuel cost	
HFO	\$250 per ton
MDO	\$365 per ton

- 3.1.1 How much will it cost to steam the additional distance via the Cape? (8)
- 3.1.2 How much will a ship save by steaming via the Cape instead of passing through the Suez Canal? (6)
- 3.1.3 Considering the number of convergence zones through which a ship will have to pass between North-Western Europe and China via the Suez Canal, the Cape Route is much easier for the navigating officer. List two convergence zones through which the ship will pass if she steams via the Cape. (4)
- 3.1.4 Give two reasons for the navigating officers preferring the Cape Route to the Suez route. (4)
- 3.1.5 How many times will the ship cross the Equator during the voyage from Europe to China via the Cape? (2)
- 3.1.6 List three cargoes that will be in some of the containers when the ship returns to Europe. (Besides the Chinese cargo, she will also be carrying cargo from countries such as Japan and Korea on the voyage to Europe, although the ship does not call at Japanese or Korean ports). (6)
- 3.1.7 How will the containers from Japan and Korea get to a Chinese port for shipment to Europe? (2)
- 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 west coast of North America. (2)
- 3.2.2 Ships entering the Panama Canal are lifted to a series of lakes that are well above sea level. Explain how this is done. (8)

- 3.3 The Straits of Malacca are extremely important in international shipping.
- 3.3.1 List two of the most important cargoes (EXCLUDING OIL) that pass through those straits. (4)
- 3.3.2 What region is the main source of the oil cargoes that pass through the Straits of Malacca? (2)
- 3.3.3 Which major port lies at the southern end of the Straits of Malacca? (2)
- 3.3.4 A ship passes through the Straits of Malacca from the south. Which sea/ocean/gulf will she enter once through the straits and heading for Africa? Choose your answer from ARABIAN GULF or GULF OF ADEN or INDIAN OCEAN or SOUTH CHINA SEA. (2)
- 3.4 Read the article provided as Addendum 3 on page 12, and answer the questions set.

**NOTE:**

- Conditions in the shipping market may have changed since the publication of this article in *Lloyd's List* in February 2009.
  - The term *teu* is used frequently in the article to inform the reader how many container slots aboard ships are involved, e.g. *xxxx teu have been laid up* means that ships with a total cargo capacity of *xxxx teu* have been laid up.
- 3.4.1 At the time this article was published, how many containerships were at anchor or in lay up as a result of the decline in trade? (2)
- 3.4.2 Does the writer of the article think that this number represents an increase or a decrease in ships at anchor or in lay-up? Answer either INCREASE or DECREASE. (2)
- 3.4.3 Quote a sentence from the article to support your answer to Question 3.4.2. (2)
- 3.4.4 Does the writer believe that the situation will improve or become worse? Answer either IMPROVE or BECOME WORSE. (2)
- 3.4.5 Quote a sentence from the article to support your answer to Question 3.4.4. (2)
- 3.4.6 How many *teu* were sold to breakers in the first month of 2009? (2)
- 3.4.7 In your opinion, will 2009 see more or fewer ships sold to breakers than in previous years? Answer MORE or FEWER. (2)
- 3.4.8 What evidence is mentioned in the article that supports your answer to Question 3.4.7? (4)

3.4.9 Some owners are scrapping ships while others are cancelling orders for new ships.

- (a) Imagine you are a ship-owner who has decided to scrap six ships out of a fleet of 25 containerships. Which ships would you scrap first? (2)
- (b) Give two ways in which this will help you. (4)
- (c) What effect will the cancelling of shipbuilding contracts have on the shipbuilding companies? (2)
- (d) How will cancelled orders affect the workers in the shipbuilding yards? (2)

3.4.10 *Do not look for the answer to this question in the article.*

Assume you are a seafarer employed on a ship that will be scrapped. Write down how you would feel about the situation and the prospects for finding another job a sea. (10)

**90 marks**

#### QUESTION 4      MARINE ENVIRONMENTAL CHALLENGES

4. A crack appears in the starboard side of the laden tanker *Clifton Beach* as she is passing Cape Point, spilling 2 000 tons of crude oil into the sea. She is ordered to steam to a position 50 nautical miles out to sea as she poses a serious environmental threat. The barograph (an instrument that measures air pressure) is dropping and the wind is becoming stronger from the west.

- 4.1 Which agency would have ordered the tanker out to sea? (2)
- 4.2 In terms of which IMO convention would that agency have ordered her out to sea? (2)
- 4.3 Explain the dangers posed **to the ship** by the order for the tanker to go out to sea. (8)
- 4.4 Explain the dangers posed to the environment if the ship remains close to the coast. (8)
- 4.5 Provide realistic suggestions to deal with this problem, and hopefully save the tanker. (10)

**30 marks**

**Total: 300 marks**

**ADDENDUM ONE – QUESTION 1.2**

Container	Fleet age	Total TEU	Age Range (by TEU)					
			0 – 5	6 – 10	11 – 15	16 – 20	21 – 25	25+
Post-Panamax	5.6 yrs	4.52 m	2.88 m 63.7%	1.17 m 25.8%	0.43 m 9.5%	0.03 m 0.6%	0.02 m 0.5%	0.00 m 0.0%
Panamax	9.0 yrs	3.36 m	1.57 m 46.8%	0.55 m 16.4%	0.62 m 18.4%	0.34 m 10.0%	0.25 m 7.5%	0.03 m 0.9%
Sub-Panamax	10.6 yrs	1.82 m	0.64 m 35.4%	0.41 m 22.6%	0.35 m 19.0%	0.14 m 7.5%	0.15 m 8.4%	0.13 m 7.1%
Handy	11.6 yrs	1.78 m	0.54 m 30.5%	0.9 m 16.6%	0.47 m 26.4%	0.20 m 11.4%	0.12 m 6.7%	0.15 m 8.5%
<b>Total Fleet</b>	<b>8.3 yrs</b>	<b>11.5 m</b>	<b>5.64 m 49.1%</b>	<b>2.42 m 21.1%</b>	<b>1.86 m 16.2%</b>	<b>0.70 m 6.1%</b>	<b>0.54 m 4.7%</b>	<b>0.31 m 2.7%</b>

[Source: Clarksons]

**ADDENDUM TWO – QUESTION 1.3**

## Second, Third & Fourth Engineers

Irish Sea Attractive salary, benefits and pension package



Stena Line is one of the world's largest ferry operators and has the most comprehensive route network in Europe, strategically located around the UK and Scandinavia.

**We are looking to expand our team of experienced, career-minded professionals on our Irish Sea Routes. Applications are therefore invited for the positions of Second, Third & Fourth Engineers.**

Requirements for each role:

**Second Engineer**  
STCW 95 III/2 Chief Engineer unlimited Certificate of Competency.

**Third Engineer**  
STCW 95 III/2 2nd Engineer unlimited Certificate of Competency - studying towards a Chief's Certificate would be an advantage.

**Fourth Engineer**  
STCW 95/III/1 OOW unlimited Certificate of Competency.

These positions require a dynamic and progressive approach to Ship Management. Proven motivational and people-managements skills, combined with an ability to communicate at all levels of the organisation are essential.

You will also need to be self-motivated with driven, enthusiasm and flexibility. A good working knowledge of IT is also advantageous. The successful candidates will be required to live on. The current roster is on a 7 days on and 7 days off or 14 days on and 14 days off basis.

Please send your CV with a covering letter by e-mail to [hdrecruitment@stenaline.com](mailto:hdrecruitment@stenaline.com) or post to the **Human Resources Manager, Stena Line, Stena House, Holyhead, LL65 1DQ**

Closing date 1 March 2009.



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**ADDENDUM THREE – QUESTION 3.4**

**Nearly 400 ships at anchor or lay-up as trade volumes fall**

**Janet Porter**

CONTAINER shipping faces at least another four years of misery, and probably more, as supply continues massively to outstrip demand.

Figures from AXS-Alphaliner show that the number of unemployed boxships has soared over the past couple of weeks as lines continue to cancel services.

By the beginning of this week, an estimated 392 ships with combined total capacity of 1.1m teu were idle, according to AXS-Alphaliner.

This represents a huge jump from the 303 ships of 800,000 teu out of work at the start of the month, and figures from Lloyd's MIU last week putting the amount of idle boxship capacity at almost 830,000 teu.

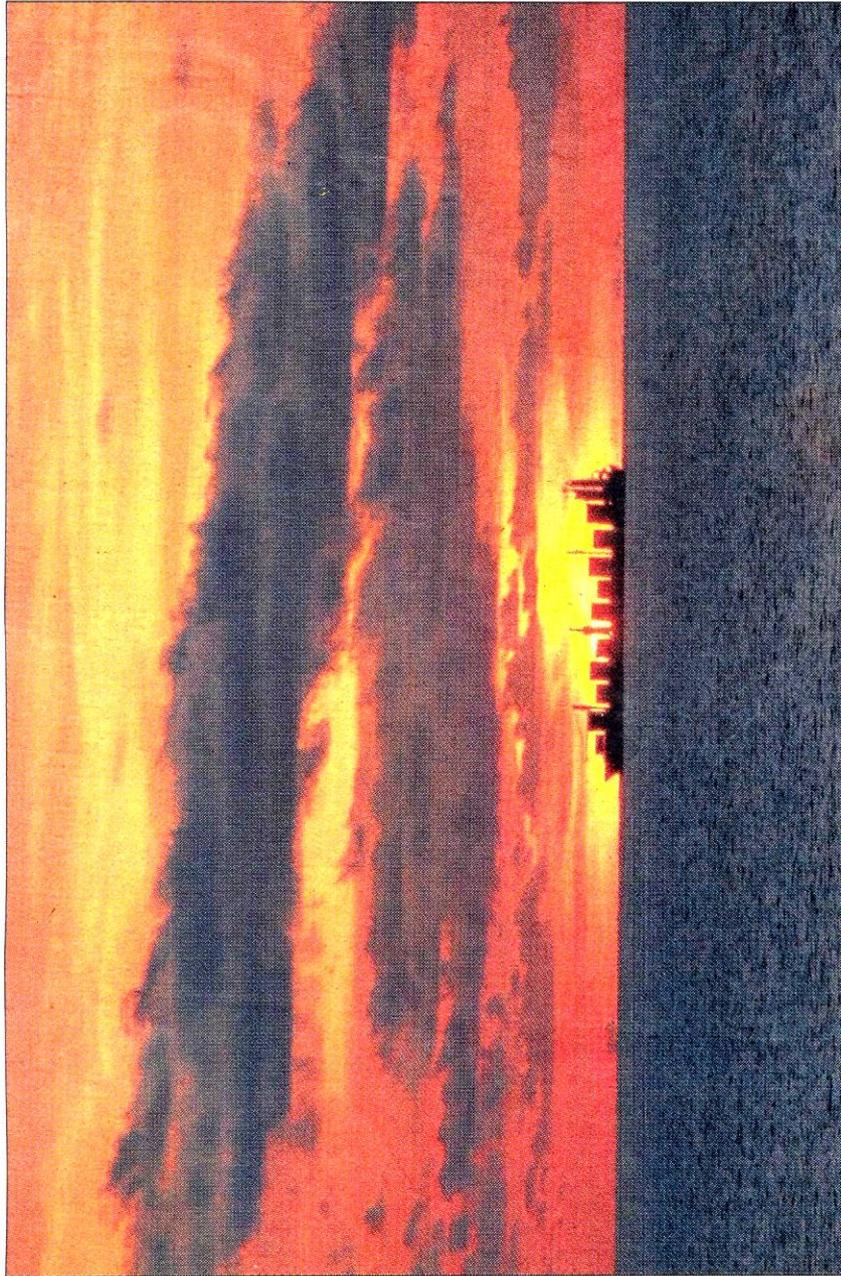
At 1.1m teu, the number of slots withdrawn from service equates to 8.8% of the total cellular fleet, way above the previous peak of 5% touched two decades ago when US Lines went bankrupt and its ships seized, and the 3.2% recorded at the height of the 2002 market slump. The latest data include 19 units with nominal capacity in excess of 7,500 teu.

With so much tonnage now either at anchor or in lay-up, AXS-Alphaliner estimates that demand would have to grow at an average of 15% over the next three years to restore equilibrium by early 2013.

That scenario seems totally unrealistic, with a slightly more probable growth figure of 10% pushing supply and demand balance back to 2014.

But the main container trades are witnessing a drop in overall volumes at the moment, with little on the horizon to suggest there will be a turnaround in the foreseeable future.

Asian export ports are reporting a huge decline in outbound traffic as retail spend-



**Gathering clouds: at the beginning of this week 392 boxships were idle, up from 303 vessels at the start of the month.**

ing in the US and Europe remains in the doldrums, while recent statistics from the European Liner Affairs Association showed a steep decline in container line liftings towards the end of last year, when the full impact of the credit squeeze hit economies around the world.

AXS-Alphaliner said that its projections were based on the current fleet and order-book, and an assumption that 160,000 teu per year will be scrapped. Its figures also do not allow for any possible newbuilding cancellations.

Maersk Broker has provisionally fore-

cast that at least 120,000 teu will be broken up this year, followed by 70,000 teu in 2010, but it also said that the final figures for demolition activity were likely to be higher.

The first month of 2009 saw just over 40,000 teu sold to breakers.

On the supply side, around 1.8m teu is scheduled for delivery between now and the end of the year, adding 14.6% to the fleet in 2009, followed by another 12.1% in 2010.

Contracting activity remains at a standstill, while the shipyards are keeping tight-

lipped about whether they have agreed to delay deliveries.

Negotiations continue, but most industry sources do not think any firm agreements have yet been reached, with the South Korean yards determined to make clients stick to the terms of their contracts despite pressure from owners and their bankers to reschedule production programmes.

As banks try to find any loophole they can to extract themselves from credit agreements, some owners are resorting to legal action to force the finance houses to keep to their contractual commitments.