

Report on the investigation of
the collision between the container ship

Cosco Hong Kong

and the fish transportation vessel

Zhe Ling Yu Yun 135

East China Sea

resulting in the loss of 11 lives

6 March 2011



Pursuant to Regulation 6 of Chapter XI -1 of the International Convention for the Safety of Life at Sea (SOLAS) and the Code of the International Standards and Practices for a Safety Investigation into a Marine Casualty (Casualty Investigation Code) (Resolution MSC.255 (84)), the MAIB has investigated this accident with the co-operation and assistance of the Marine Safety Administration of the People's Republic of China (MSA). The MSA's contribution to this investigation is acknowledged and greatly appreciated.

**Extract from
The United Kingdom Merchant Shipping
(Accident Reporting and Investigation)
Regulations 2005 – Regulation 5:**

“The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame.”

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	Able Bodied Seaman
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BSU	Bundestelle für Seefalluntersuchung (German Federal Bureau of Marine Casualty Investigation)
COG	Course over the ground
COLREGS	International Regulations for Preventing Collisions at Sea 1972 (as amended)
COSCO	China Ocean Shipping (Group) Company
Cosmar	COSCO Maritime (UK) Ltd
CPA	Closest Point of Approach
DOC	Document of Compliance
DP	Designated Person
DR	Dead Reckoning
DSC	Digital Selective Calling
ECDIS	Electronic Chart Display and Information System
ECS	Electronic Chart System
EP	Estimated Position
EPIRB	Emergency Position Indicating Radio Beacon
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
HRU	Hydrostatic release unit
ISM	International Safety Management
JRC	Japan Radio Company
kt	knot
kW	kilowatt
LPG	Liquid Petroleum Gas

MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MRCC	Maritime Rescue Co-ordination Centre
MSA	Maritime Safety Administration (People's Republic of China)
NCN	Non-Conformity
Nm	Nautical Miles
OOW	Officer of the Watch
Ro-ro	roll on, roll off
SMC	Safety Management Certificate
SMS	Safety Management System
SOG	Speed over the ground
SSO	Ship's Security Officer
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended
SVDR	Simplified Voyage Data Recorder
UNCLOS	United Nations Convention on the Law of the Sea
UTC	Universal Time, Co-ordinated
VDR	Voyage Data Recorder
VHF	Very High Frequency

Times: All times used in this report are UTC (+8) unless otherwise stated.

SYNOPSIS

At 0218 on 6 March 2011, the UK registered container ship *Cosco Hong Kong* collided with the China registered fish transportation vessel *Zhe Ling Yu Yun 135*. The accident occurred in international waters off the coast of Zhejiang Province, China. *Zhe Ling Yu Yun 135* sank almost immediately, with the loss of 11 lives. *Cosco Hong Kong* was not damaged.

On impact, *Cosco Hong Kong*'s officer of the watch (OOW) felt an unusual vibration and immediately put the engine telegraph to stop. He did not see *Zhe Ling Yu Yun 135* immediately before or after the collision and he was unaware of what the container ship had struck. *Cosco Hong Kong* remained drifting in the vicinity for over 1 hour while the master tried to establish what had happened. In the absence of any evidence that a collision had occurred, *Cosco Hong Kong* then resumed passage to Yangshan, China.

The Taizhou Maritime Rescue Co-ordination Centre was notified that *Zhe Ling Yu Yun 135* was missing at 2021, 18 hours after the collision. An air and sea search failed to find any trace of the vessel or her crew. The wreck of *Zhe Ling Yu Yun 135* was eventually located on 17 March 2011 close to the position of the collision.

Factors that led to the collision included:

- The performance of *Cosco Hong Kong*'s OOW fell well short of expected standards. He did not correctly apply the collision regulations or follow onboard instructions.
- *Zhe Ling Yu Yun 135* and *Cosco Hong Kong* turned towards each other at about the same time when only about 1.5nm apart and with a closing speed of over 20kts.
- *Cosco Hong Kong*'s OOW was the sole lookout. In darkness, in adverse weather conditions, and among large concentrations of fishing vessels, he did not see that *Zhe Ling Yu Yun 135* was approaching.
- Even though many fishing vessels were concentrated in the area, *Cosco Hong Kong*'s master or OOW did not consider amending the voyage plan, reducing speed, or enhancing the bridge manning.

Recommendations have been made to the China Ocean Shipping Company (COSCO) and COSCO Maritime UK Ltd (Cosmar) intended to improve bridge watchkeeping standards on all vessels managed by Cosmar and other COSCO subsidiaries. A recommendation has also been made to the Ministry of Agriculture of the People's Republic of China aimed at increasing the survivability of Chinese fishermen following marine casualties.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF VESSELS AND ACCIDENT

SHIP PARTICULARS

Vessel's name	<i>Cosco Hong Kong</i>	<i>Zhe Ling Yu Yun 135</i>
Flag	UK	China
Classification society	American Bureau of Shipping	Not applicable
IMO number/fishing numbers	9227778	Not applicable
Type	Container Ship	Fish Transportation
Registered owner	Coswin Shipping Ltd	Private
Manager(s)	Cosco Maritime (UK) Ltd	Not applicable
Construction	Steel	Steel
Length overall	280m	39m
Registered length	262.3m	Not applicable
Gross tonnage	65531	182
Minimum safe manning	16	Not applicable
Authorised cargo	Containers	Fish

VOYAGE PARTICULARS

Port of departure	Hong Kong	Shi Tang, Zhejiang Province, China
Port of arrival	Shanghai	Not applicable
Type of voyage	International	Fish transport
Cargo information	Containers	In ballast
Manning	23	11

MARINE CASUALTY INFORMATION

Date and time	6 March 2011, 0218 (UTC+8)	
Type of marine casualty or incident	Very Serious Marine Casualty	
Location of incident	28° 10'7N 122° 14'5E, 126° Xia Yu Light 22nm	
Place on board	Complete vessel	
Injuries/fatalities	Nil	11 fatalities
Damage/environmental impact	No damage	Vessel lost
Ship operation	On passage	On passage
Voyage segment	Mid-water	Mid-water

External & internal environment

The visibility was 3nm in rain, the sea state was moderate, and the wind was from the north-north-west force 5.

Persons on board

23

11

Photograph courtesy of www.fotoflite.com



Cosco Hong Kong



Zhe Ling Yu Yun 135

1.2 NARRATIVE

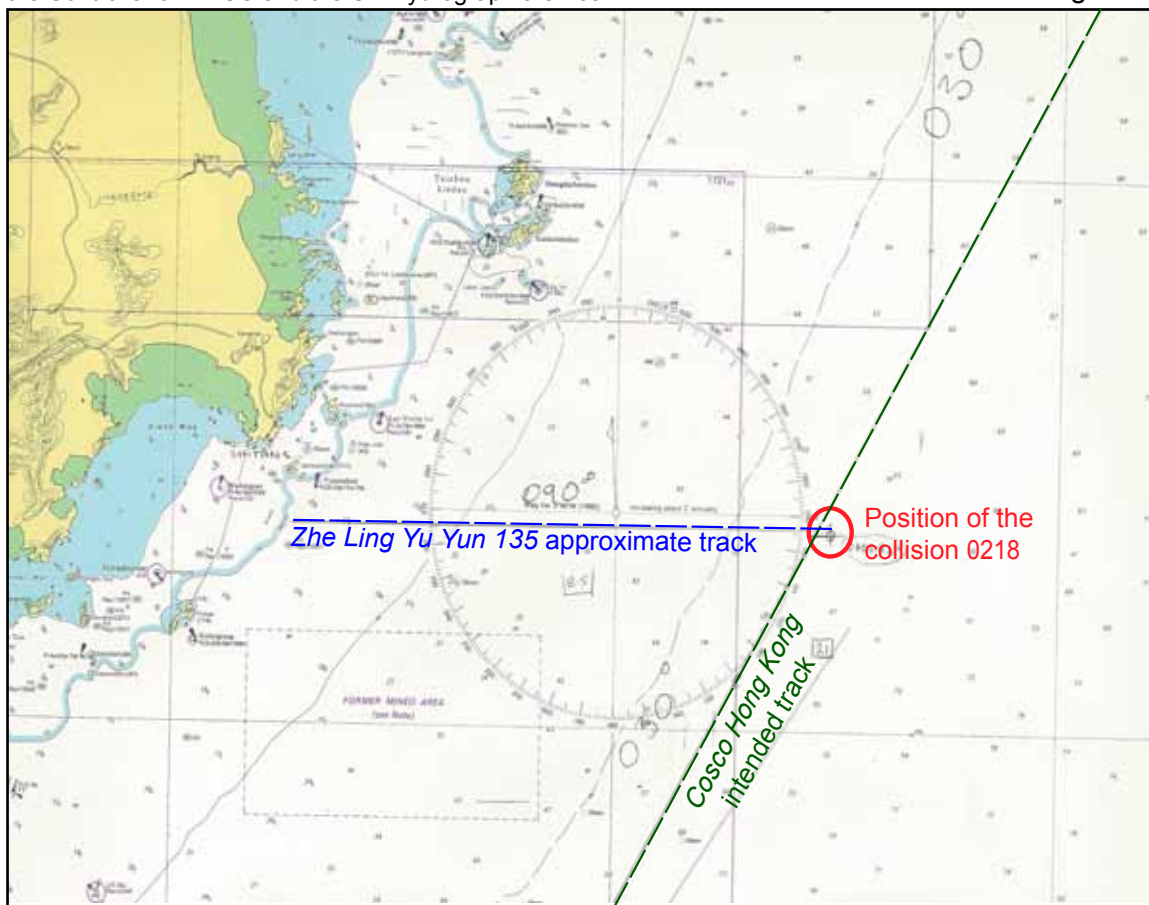
1.2.1 The collision

At 2209 on 5 March 2011, the fish transportation vessel *Zhe Ling Yu Yun 135* sailed from Shi Tang, Zhejiang Province, China (**Figure 1**). The vessel had 11 crew and was bound for fishing grounds 150nm to the east at a speed of about 8.5kts. *Zhe Ling Yu Yun 135*'s identity, position, course over the ground (COG) and speed over the ground (SOG) were being transmitted via her Automatic Identification System (AIS).

Cosco Hong Kong was on passage from Hong Kong to Shanghai, China using autopilot-controlled headings to follow a planned track of 030° (**Figure 1**). The vessel's speed was 21kts.

Reproduced from Admiralty Chart BA 1759 by permission of the Controller of HMSO and the UK Hydrographic Office

Figure 1



Extract of chart BA 1759

At about 2345, *Cosco Hong Kong*'s master completed writing his night orders (**Annex A**) and then went to bed in his cabin. At 2350, the second officer relieved the third officer as the officer of the watch (OOW). The second officer was accompanied on the bridge by an able seaman (AB) who was the nominated lookout. The visibility was good, the sea state was moderate, and the wind was from the north-north-west force 5.

At about 0150 on 6 March 2011, the OOW gave the AB permission to leave the bridge to conduct a fire patrol. This was a usual practice during which the AB also cooked noodles in the galley. By now, heavy rain had reduced the visibility to about 3nm. It had also adversely affected the quality of the radar picture as shown on the bridge radar displays.

Between 0153 and 0157, the second officer gradually altered the autopilot-controlled heading from 030° to 055° in order to keep clear of a group of near-stationary fishing vessels directly ahead of *Cosco Hong Kong* at a range of between 5nm and 6nm (**Figures 2 and 3**). *SITC Pyeongtaek*, a 9530t container ship making good a COG of 009° and an SOG of 15kts, was 5nm on *Cosco Hong Kong*'s starboard side. *Cosco Hong Kong* was overtaking *SITC Pyeongtaek*.

By about 0205, the distance between *Cosco Hong Kong* and *SITC Pyeongtaek* had reduced to approximately 2nm. *SITC Pyeongtaek*'s OOW was concerned that *Cosco Hong Kong* would pass only 3 cables ahead of his vessel, and he called *Cosco Hong Kong* in Mandarin via Very High Frequency (VHF) radio channel 16. No response was heard, so *SITC Pyeongtaek*'s OOW altered his vessel's heading to starboard to about 025° in order to increase the closest point of approach (CPA) of the overtaking vessel.

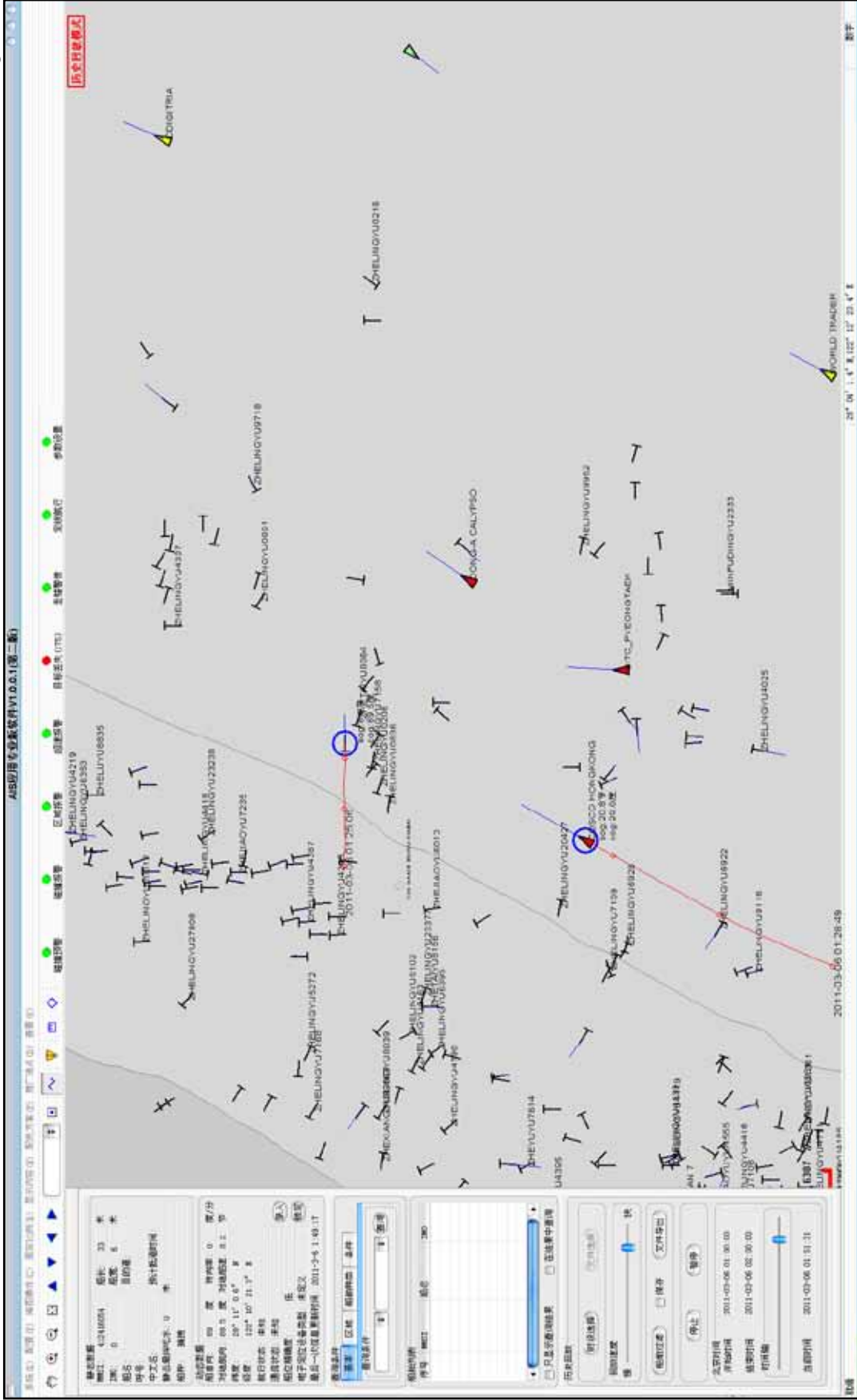
Between 0205 and 0210, *Cosco Hong Kong*'s OOW adjusted the autopilot-controlled heading to about 040°, and again at 0210 to about 048°. During this period, he saw a second group of near-stationary targets on the radar approximately 6nm ahead (**Figure 4**). The OOW also saw an east-moving radar target, later identified as *Zhe Ling Yu Yun 135*, to the north of the closest group of fishing vessels. The OOW estimated that *Zhe Ling Yu Yun 135* was crossing from the port bow. However, as the OOW was not monitoring the AIS receiver or the 'X' band radar which was able to display AIS targets, he was not aware that this vessel was *Zhe Ling Yu Yun 135*. *Cosco Hong Kong* was now to the east of her intended track.

At 0214, *Cosco Hong Kong* was passing ahead of *SITC Pyeongtaek* at a distance of 6 cables; she was also clearing the group of fishing vessels on her port side (**Figure 5**). However, the second officer remained concerned by the movement of *Zhe Ling Yu Yun 135*, which had closed to within 2nm. The OOW sounded one blast lasting approximately 3 seconds on the ship's forward whistle but *Zhe Ling Yu Yun 135* maintained her course and speed.

The OOW decided to leave the fish transporter on his vessel's starboard side by making a bold alteration of course to port to a heading of 330°. He considered that this action would not only eliminate the risk of collision with *Zhe Ling Yu Yun 135*, but it would also keep *Cosco Hong Kong* clear of the numerous fishing vessels ahead and move the container ship back towards her intended track.

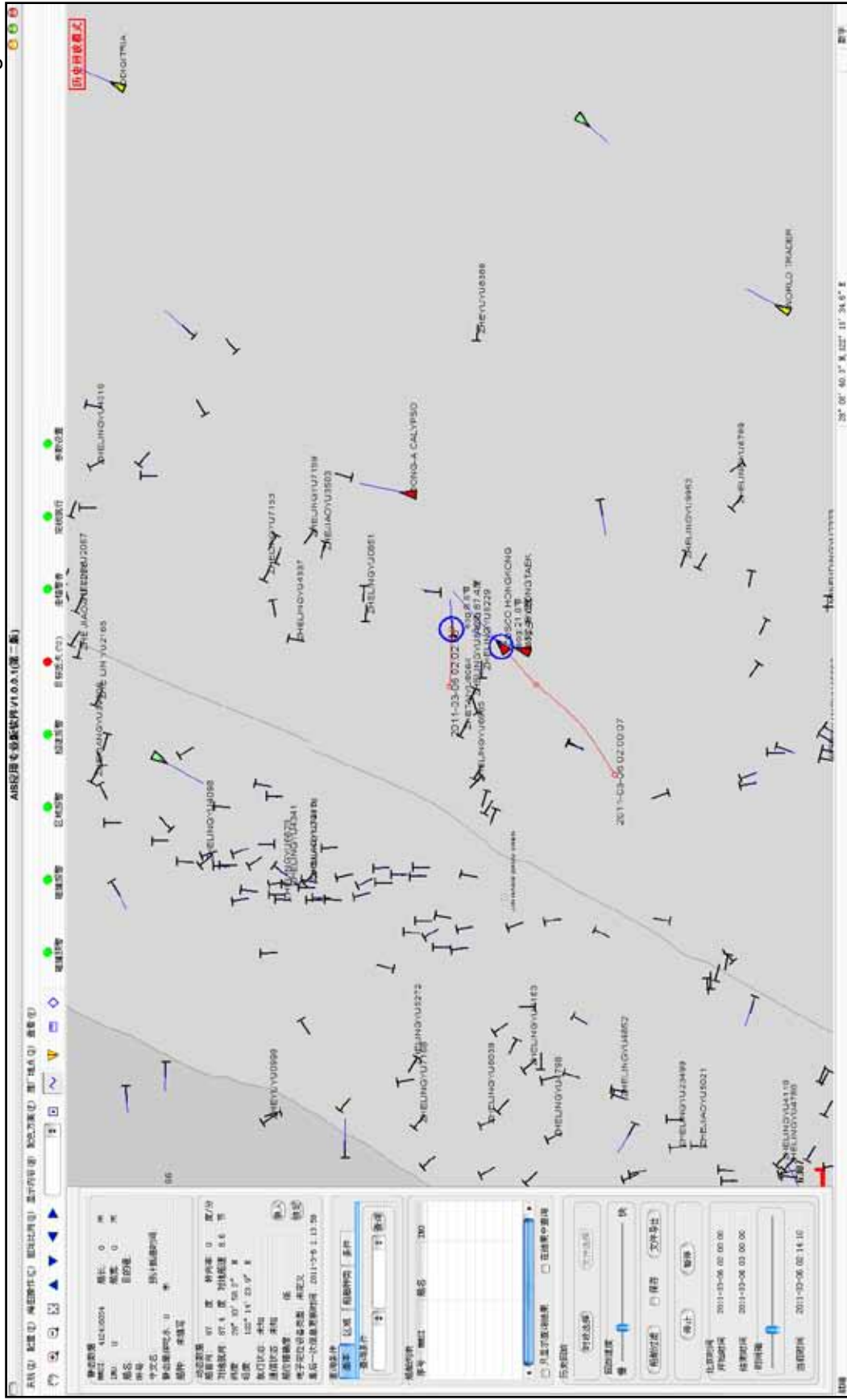
The second officer checked the 'S' band radar display sited on the starboard side of the bridge (**Figure 6**) to confirm that the intended heading of about 330° was clear of other vessels. He then moved to the port bridge wing and looked over the port bow and the port beam to ensure that it was safe to alter course. The OOW then returned to the centreline console and began to adjust the vessel's heading to port using the joystick control on the vessel's track pilot system.

Figure 2



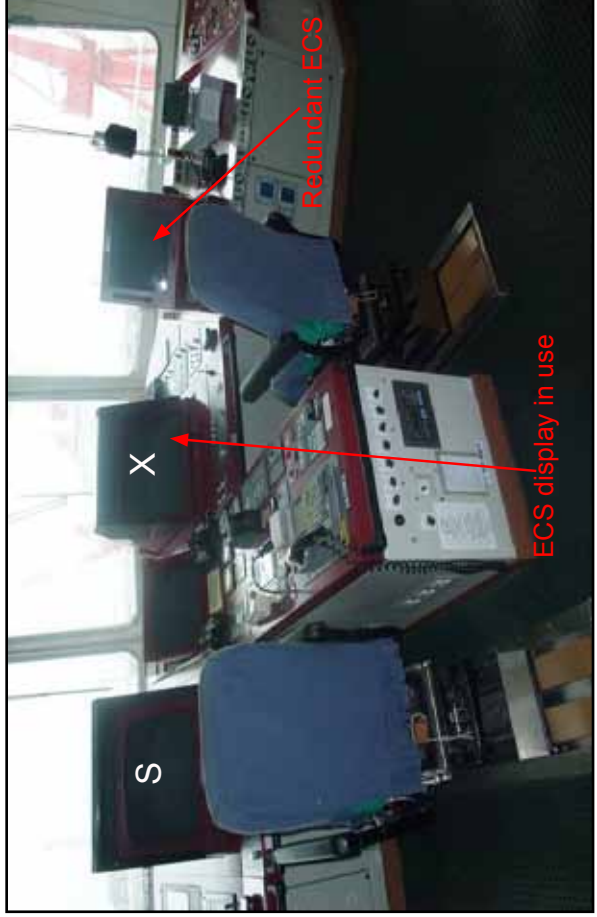
AIS screen-shot at 0149

Figure 5



AIS screen-shot at 0214

Figure 6



Cosco Hong Kong - bridge layout

At 0215, *Cosco Hong Kong* began turning to port. *SITC Pyeongtaek*'s OOW could now see a white light from *Zhe Ling Yu Yun 135*, which was directly ahead of his vessel at a distance of about 2nm. *SITC Pyeongtaek*'s OOW had also not identified *Zhe Ling Yu Yun 135* by AIS; and he no longer saw the white light from the fish transporter after the *Cosco Hong Kong* again crossed in front of his vessel's bow.

Between 0215 and 0216, *Zhe Ling Yu Yun 135* altered course to starboard to make good a COG of 220°, towards the path of *Cosco Hong Kong* (**Figure 7**). *Cosco Hong Kong*'s OOW also moved to the port wing to check that the container ship was turning into clear water and then returned to the 'S' Band radar display. He did not see *Zhe Ling Yu Yun 135* alter course. The two vessels began to close rapidly and at 0218:08, *Cosco Hong Kong* and *Zhe Ling Yu Yun 135* collided.

1.2.2 Post-collision

On impact, *Cosco Hong Kong*'s OOW felt a sudden and unusual vibration from the forward part of the vessel. The OOW was unaware of what had caused the vibration and he quickly put the engine telegraph to stop. He did not know that his vessel had collided with the fish transporter. The vibration was also felt by the chief officer, who was awake in his cabin two decks below the bridge. He immediately telephoned the OOW and asked what had happened. The OOW replied that '*the ship might have collided with another vessel*'.

The OOW then telephoned the master, who was asleep in his cabin, and informed him that he had felt an unusual vibration and that *Cosco Hong Kong* might have collided with another vessel; he also asked the master to come to the bridge. The second officer then telephoned the crew mess and galley and recalled the AB back to the bridge. He also switched on the deck lights so that he could see the sea surface close by. The OOW went onto the port and starboard bridge wings but he did not see anything unusual.

The master arrived on the bridge at about 0220 to find *Cosco Hong Kong* on a heading of 300° and reducing speed. The master quickly saw *SITC Pyeongtaek* close on the port quarter and passing astern. He also noticed the group of fishing vessels on the port side at a distance of 0.8nm, and another group of fishing vessels 45° off the starboard bow at a distance of 2.1nm. By 0224, *Cosco Hong Kong* was heading 309° at a speed of 9kts.

The master asked the OOW what had happened, why the cargo ship astern was so close, and why the deck lights were switched on. The second officer did not answer the master's questions. Instead, he went to the starboard bridge wing to monitor *SITC Pyeongtaek* passing astern. When the OOW returned inside the bridge, the master again asked him what had happened. The second officer informed him that a small seagoing vessel had approached *Cosco Hong Kong* from the port side but she had not taken any action after he had sounded the whistle. The second officer was turning the container ship to port when he had felt an unusual vibration. The second officer confirmed to the master that he did not see anything ahead of the ship, either by radar or visually, during the course alteration.

The master was concerned that *Cosco Hong Kong* might have grounded or collided with something. He instructed the second officer to log the vessel's position and then checked that the vessel was clear of navigational dangers. He also arranged for the chief officer, the bosun and the carpenter to check for damage on the upper

Figure 7



deck and in the ballast tanks, and for engineering crew to check for damage in the engine room. No damage was found. The Global Maritime Distress and Safety System (GMDSS) and AIS equipment were also checked for distress alerts or safety messages, but none had been received.

At about 0240, the master started to broadcast regular safety messages via VHF radio, channel 16, stating *Cosco Hong Kong's* position and that she was drifting. The broadcasts also requested other vessels to keep clear and to contact *Cosco Hong Kong* if necessary. The master continued to broadcast these messages at regular intervals, although the wording of each broadcast varied slightly.

The VHF radio broadcasts were heard by *SITC Pyeongtaek's* OOW, who had realised that the white light that he had seen ahead at 0215 had disappeared after *Cosco Hong Kong* had crossed his vessel's bow for a second time. At about 0250, *SITC Pyeongtaek's* OOW called *Cosco Hong Kong* via VHF radio and asked why there had been no response to his earlier call, why *Cosco Hong Kong* had twice crossed ahead of *SITC Pyeongtaek*, and why the container ship's whistle had been sounded. *Cosco Hong Kong's* master replied that he was sorry and embarrassed. *SITC Pyeongtaek's* OOW then asked if *Cosco Hong Kong* had collided with a fishing vessel; no response was heard.

Cosco Hong Kong's master continued to discuss the situation with the second officer. He also discussed the situation with the ship's security officer (SSO), who was the ship's political commissar, and decided to continue with the safety broadcasts and wait and see if the ship was contacted or received a distress message.

No distress messages were received and, other than the call from *SITC Pyeongtaek*, no further calls were received in response to the VHF radio broadcasts. The fishing vessels in the vicinity also appeared to be getting on with their business as usual. The master analysed the situation and concluded that the vibration felt during the alteration of course was possibly caused by waves hitting the hull. Passage was resumed at 0325. By this time, *Cosco Hong Kong* had drifted 2.4nm from the position of the collision.

At about 1000, the master was shown readings from the vessel's cathodic protection system that indicated a significant change (**Annex B**). During the afternoon, the master again asked the second officer what had happened earlier that morning. The second officer repeated that a small sea-going vessel had approached from the port side. He had sounded the whistle but the vessel did not take avoiding action so he had made a bold alteration of course to port. The second officer stated that he did not think anything had happened during the turn. The master reminded the second officer of the need to take avoiding action as early as possible in the future and to keep a safe distance from other vessels.

Cosco Hong Kong arrived alongside in Yangshan at 1646 on 6 March 2011.

1.2.3 Search and rescue

At 2021 on 6 March 2011, the Wenling Ocean and Fisheries Bureau advised the Taizhou Maritime Rescue Co-ordination Centre (MRCC) that *Zhe Ling Yu Yun 135* was missing. An air and sea search was quickly commenced, involving a fixed-wing aircraft and a helicopter, and 29 surface vessels, including local fishing vessels.

Review of AIS information by the Taizhou MRCC indicated that the vessel's position had last been transmitted at 0218 when very close to *Cosco Hong Kong*. At 0100 on 7 March 2011, the Maritime Safety Administration People's Republic of China (MSA) contacted *Cosco Hong Kong* through the vessel's commercial agent and instructed the master to save the information on the vessel's voyage data recorder (VDR). This action was taken by the master about 10 minutes later. Subsequent inspection of *Cosco Hong Kong's* hull identified paint damage and paint marks on her bulbous bow (**Figure 8**).

At 1800 on 10 March, the search for *Zhe Ling Yu Yun 135* and her 11 crew was called off as the crew's chances of survival were remote.

Figure 8



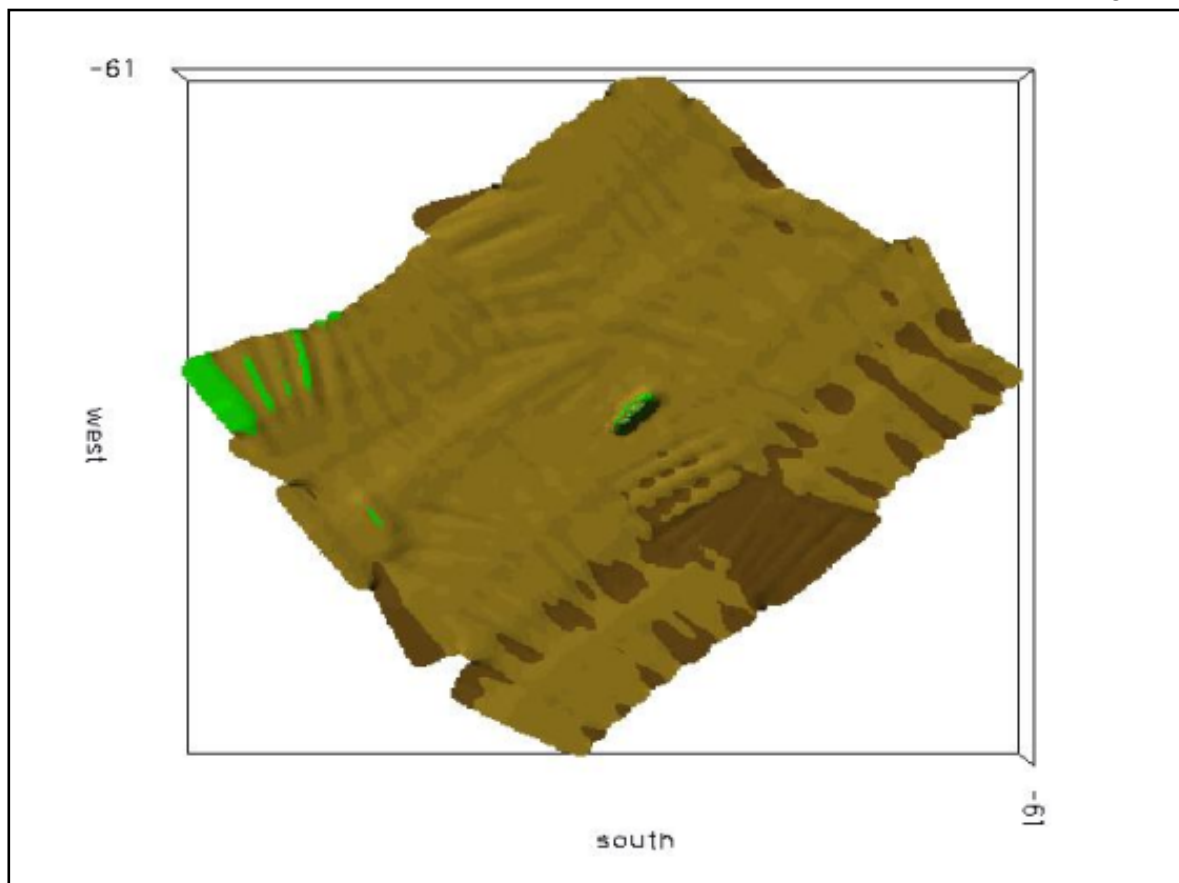
Marks on *Cosco Hong Kong's* bulbous bow

1.2.4 Side-scan survey

A multi-beam side-scan sonar survey of the area in the vicinity of the position last transmitted by *Zhe Ling Yu Yu 135* was conducted by the Department of Hydrography, MSA, Shanghai on 17 March 2011. The wreck of *Zhe Ling Yu Yun 135* was located on the seabed in position 28°10.7926N, 122° 14.4973E, approximately 30m from the vessel's last AIS transmission at 0218.07. The wreck was lying at a depth of 61m on a line bearing 050° - 230° (**Figure 9**).

1.3 ELECTRONIC DATA

Cosco Hong Kong was fitted with a Japan Radio Company (JRC) JCY 1800 simplified VDR (SVDR). The only data saved on the SVDR relevant to the accident was the vessel's heading, log speed, SOG, COG and AIS information. Bridge audio and radar information covering the period of the collision and the immediate actions of *Cosco Hong Kong's* crew had been overwritten due to the time that had elapsed between the collision and the SVDR information being saved. **Figures 2 to 5** are taken from AIS information recorded by MRCC Taizhou.



Side-scan sonar image of the wreck of *Zhe Ling Yu Yun 135*

Figure 7 shows the reconstruction of the ground tracks of *Cosco Hong Kong* and *Zhe Ling Yu Yun 135* based on SVDR and AIS information respectively. From the reconstruction, it has been determined that *Cosco Hong Kong*'s bow struck *Zhe Ling Yu Yun 135* seconds after the fish transporter's last AIS transmission at 0218.07 when *Cosco Hong Kong*'s heading was passing through 342° and her speed was 18.4kts.

1.4 ZHE LING YU YUN 135

Zhe Ling Yu Yun 135 was a 39m, transport ship which was used to land fish from fishing vessels, which then remained at sea. She was owned by her captain, Guo Wen Sheng, who held a Chinese fishing vessel Class III Open Sea Captain certificate. The vessel's chief officer, Su Kun Mao, held a Chinese fishing vessel Class III Open Sea Chief Officer certificate. The vessel's inspection certificate was valid until 4 April 2011, and her registration certificate was valid until 23 July 2012.

Zhe Ling Yu Yun 135 was fitted with a Class B AIS¹. Details of other navigational aids fitted in the wheelhouse are unknown, but she did not carry an Emergency Position Indicating Radio Beacon (EPIRB). The vessel was required by Chinese fishing vessel regulation to carry two liferafts, each secured by a hydrostatic release unit (HRU) to enable the liferafts to float free in the event of the vessel foundering.

¹ Vessels fitted with Class B AIS mainly send fixed length messages using time slots not used by vessels fitted with Class A AIS. This can affect the intervals at which vessel information is transmitted, particularly in areas where there is a high density of AIS-fitted vessels within radio range.

1.5 COSCO HONG KONG

1.5.1 Operations

Cosco Hong Kong is owned by Coswin Ltd and is one of seven sister vessels on bareboat charter to Cosmar, and on time charter to COSCO Container Lines. The vessel operates a liner service between the Far East and the Mediterranean, calling at 10 different ports over a 6-week cycle based on a voyage speed of 21kts. The vessel was able to maintain a voyage speed of up to 23 kts but the lower speed was preferred for reasons of fuel economy.

Cosco Hong Kong's 23 crew were Chinese, and Mandarin was the working language on board.

1.5.2 Bridge equipment and visibility

The main control console on *Cosco Hong Kong's* bridge was sited to starboard of the centreline (**Figure 6**) and contained displays for STN Atlas 'X' and 'S' band radars with automatic radar plotting aids (ARPA), an electronic chart system (ECS), and AIS. The engine telegraph and an Atlas Trackpilot were also mounted on the console. The Trackpilot joystick was used to change the vessel's heading to port or starboard.

The second officer primarily used the 'S' band radar display during his watch on the morning of 6 March. The display was set on the 6nm range scale and the radar origin was off-centred to the south-south-west, giving a look-ahead range of about 10nm. The radar was in true motion. Neither of the Atlas radar displays were interfaced with the AIS.

A Furuno 'X' band ARPA radar was sited on the port side of the bridge (**Figure 6**). In addition to radar data, this display also showed AIS targets, but it was not used by the second officer. No CPA or TCPA alarms were set on any of the ARPA radars as the master considered the use of these alarms in coastal waters could potentially lead to the watchkeepers relying on them too much, instead of monitoring the radars effectively.

As the ECS was not an approved Electronic Chart Display Information System (ECDIS), paper charts were used as *Cosco Hong Kong's* primary means of navigation. Before the collision, the ship's position was marked on the paper chart in use at 0000 by the third officer and at 0100 and 0200 by the second officer.

At the time of the collision, the 'shadow zone'² directly ahead of the vessel was about 567m.

1.5.3 The master

The master was 54 years old. He had worked for COSCO for over 30 years, serving as a master for the last 20 years. The master had worked on board container ships since 1981 and joined *Cosco Hong Kong* on 7 November 2010. This was the first occasion he had worked on board the vessel, but he had previously commanded four of her sister ships.

² The area in front of the vessel's bow which is obscured from the bridge by the vessel's structure and/or deck cargo.

The master did not keep bridge watches at sea but during the day usually visited the bridge about twice per watch when the chief and second officers were on duty, and three times per watch when the third officer was on duty. After sailing from Hong Kong at 1410 on 4 March 2011, the master went to bed from midnight until 0700 on 5 March, and took a nap in his cabin between 1200 and 1430 in the afternoon.

1.5.4 The second officer

The second officer was 26 years old and had joined COSCO Shanghai as a cadet in March 2007. After graduating from Shanghai Maritime University he served on board *Fei Yun He* as a trainee marine navigator between August 2007 and March 2008, and was awarded his third officer's licence on completion. He then worked as a third officer on board *Cosco Antwerp*, *Luo Ba He* and *Cosco Boston*. He then qualified as a second officer and joined the container ship *Tian Jin He* in June 2010 where he understudied the second officer for 2 months prior to taking over his duties. Appraisals of the second officer's performance on board each of the vessels on which he had served, which were all managed by COSCO Shanghai, were completed by a senior officer. No concerns were raised in these appraisals regarding the second officer's ability or competence as an OOW. His average score for professional ability was 10 out of 12 (meeting job requirements).

The second officer joined *Cosco Hong Kong* on 7 November 2010. He was scheduled to leave the vessel on her arrival in Shanghai on 7 March 2011. The second officer's contract length was usually between 8 and 9 months, but on this occasion, he was working a short contract because his wife was pregnant. His duties on board included the 12-4 watches on the bridge at sea and the 12-8 deck watches when the vessel was alongside. He was also responsible for voyage planning and training other crew in the use of the bridge equipment.

Between 3 and 6 March 2011, the second officer had the opportunity to take adequate rest between his watches. He had suffered minor flu symptoms while the vessel was in Hong Kong but was not taking any medication; he felt well and did not feel tired at the time of the accident.

1.6 COSMAR

1.6.1 History and structure

Cosmar is a wholly owned subsidiary of COSCO and its office is in Barking, Essex. The company has managed its fleet of seven vessels from build. In 2008, Cosmar's vessels, which had been leased, were purchased by COSCO. The vessels were then transferred from either the Hong Kong or Bahamas shipping registers to the UK shipping register.

1.6.2 Manning

All of the crew employed on board Cosmar's vessels are supplied through COSCO Shanghai, another wholly owned subsidiary of COSCO. The vessels' senior officers (master, chief engineer, chief officer and first engineer) were usually proposed by COSCO Shanghai to Shanghai-based superintendents employed by Cosmar, who then decided in discussion with the company's management in the UK, whether

or not the proposed officers were acceptable. The provision of the remaining crew followed a similar process but with their acceptability being decided by the vessels' senior officers.

1.6.3 Safety management

The Designated Person (DP) for *Cosco Hong Kong* was British and did not speak Mandarin. He was also the DP for the other six vessels managed by Cosmar. The DP had been in post since 20 December 2010 and was assisted in the safety management of the vessels by a marine superintendent and two engineering superintendents, who were Chinese nationals based in the UK. The UK based marine superintendent was the deputy DP.

The DP was also assisted by the two superintendents based in Shanghai who conducted the internal audits of Cosmar's vessels. The Shanghai-based superintendents were normally used by the vessel's masters as their first points of contact with the company's management.

The last internal audit on board *Cosco Hong Kong* occurred on 16 May 2010; no non-conformities (NCN) were identified. The audit reports were completed in Mandarin. Other documents, such as minutes of safety meetings, which were forwarded to Cosmar, were also in Mandarin.

Onboard instructions and procedures were available in Mandarin and English. The bridge standing orders, details of the responsibilities of the master and OOW at sea, and the safety of navigation are at **Annexes C, D and E**. The AB on watch on the bridge was expected to complete a fire patrol at the end of his watch. There were no onboard instructions regarding the saving of the vessel's SVDR data.

Following the collision between *Cosco Hong Kong* and *Zhe Ling Yu Yun 135*, Cosmar immediately began its own investigation. As part of the investigation, the UK-based marine superintendent tested several bridge watchkeeping officers on board the company's vessels on their knowledge of the International Rules for Preventing Collisions at Sea 1972, as amended (COLREGS). The results of the tests clearly indicated to the superintendent that the officers concerned had insufficient knowledge in this subject.

1.6.4 External audit

On 27 June 2009, the Maritime and Coastguard Agency (MCA) conducted an initial International Safety Management (ISM) Code Safety Management Certificate (SMC) audit on board *Cosco Hong Kong*, during which four NCNs were identified. The NCNs were connected with inaccuracies in the ship's official logbook and crew agreement, the expiry date of the master's medical care certificate, the issue of permits to work prior to ballast tank operations, and the provision of in-date chemical store data sheets. The NCNs were subsequently addressed and *Cosco Hong Kong* was issued with an SMC on 14 May 2010.

The MCA conducted an ISM Document of Compliance (DOC) audit of Cosmar in September. The audit identified five NCNs in relation to: the absence of instructions for the election of safety representatives; ship safety officers not being given suitable

and proper training; the failure to investigate and analyse accidents; the absence of a system to confirm receipt and implementation by ships of safety management system (SMS) updates; and, a lack of control of the issue of fleet memoranda.

The DOC audit also made four observations connected with: the selection of the safety officer; records of expiry dates of medical care certificates; the absence of instructions on the action to be taken in the event of deviation from hours of rest regulations; and, the completion of stability calculations prior to departure or during a voyage. Cosmar was issued with a DOC on 18 October 2010, and the NCNs were closed out on 5 January 2011.

1.7 COSCO

COSCO was established in 1961. The company is based in Beijing, China and owns and controls over 800 merchant vessels, including fleets of container vessels, dry bulk carriers, oil and Liquid Petroleum Gas (LPG) tankers, multi-purpose vessels and specialist vessels such as heavy lift ships. The company's fleets are operated through a network of wholly owned subsidiaries.

Within China, the subsidiaries include: COSCO Shanghai (container ships), COSCO Dalian (oil and LPG tankers), COSCO Bulk Carrier Co Ltd (bulk carriers – based at Tianjin), COSCO Guangzhou (specialist and multi-purpose vessels), COSCO Qingdao (dry bulk carriers), and COSCO Xiamen (various vessel types). Internationally, in addition to Cosmar, COSCO subsidiaries managing vessels include COSCO Hong Kong and COSCO Singapore, both of which operate dry bulk carriers. All of the subsidiaries manage and operate their vessels in accordance with policies set by COSCO, with minor variations allowed in order to meet specific flag administration requirements. All COSCO vessels are subject to a safety bonus scheme in which crews are rewarded financially for maintaining a good safety record.

The crews for all COSCO vessels are recruited and trained in China, with the company owning and operating training centres and manning agencies in Shanghai for its container ships, in Dalian for its tankers, and in Tianjin and Qingdao for its bulk carriers. The company also operates its own maritime college in Qingdao. In recent years COSCO has had some difficulty in recruiting and retaining crews for its vessels due to changing social and economic factors within China.

1.8 MCA GUIDANCE

Marine Guidance Note (MGN) 315 (M) includes guidance to masters and officers in charge of a navigational watch connected with performing the navigational watch, watch arrangements, maintaining a safe lookout, and safe speed. It contains the following:

Masters, owners and operators are reminded that the MCA considers it dangerous and irresponsible for the OOW to act as sole look-out during periods of darkness or restricted visibility.

It is implicit in STCW 95 that at all times when a ship is underway a separate dedicated look-out must be kept in addition to the OOW.

In areas of high traffic density, in conditions of restricted visibility and in all hazardous navigational situations ensure the vessel is in hand steering.

Station a person to steer the vessel and to put the steering into manual control in good time to allow any potentially hazardous situation to be dealt with in a safe manner. Officers are further reminded that when the vessel is in automatic steering it is highly dangerous to allow a situation to develop to the point where the OOW is without assistance and has to break the continuity of the look-out in order to take emergency action. [sic]

1.9 REGULATION

1.9.1 COLREGS

Rules 2, 5, 6, 8, 13, 15, 16, 17 and 34 of the COLREGS are at **Annex F**.

1.9.2 United Nations Convention on the Law of the Sea (UNCLOS)

The UNCLOS requires the master of any ship involved in a collision to stand by and offer assistance to the other vessel:

Article 98 - Duty to render assistance

1. Every State shall require the master of a ship flying its flag, in so far as he can do so without serious danger to the ship, the crew or the passengers:

(a) to render assistance to any person found at sea in danger of being lost;

(b) to proceed with all possible speed to the rescue of persons in distress, if informed of their need of assistance, in so far as such action may reasonably be expected of him;

(c) after a collision, to render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of his own ship, its port of registry and the nearest port at which it will call.

1.10 CHINESE FISHING VESSEL REGULATION

Chinese fishing industry vessels, including fish transporters, are administered and regulated by the Fisheries Department of the Chinese Ministry of Agriculture. Over 280,000 fishing vessels are registered in China, but it is estimated that up to 1 million Chinese fishing vessels operate along the Chinese coast.

The cost of fitting the AIS on board *Zhe Ling Yu Yun 135* was jointly subsidised by the Zhejiang Provincial Government and the Chinese Ministry of Agriculture as part of an initiative to improve fishing vessel safety. Over 16000 fishing vessels in Zhejiang Province have been fitted with Class B AIS through this scheme.

The Chinese Ministry of Agriculture requires registered fishing vessels to carry liferafts secured by hydrostatic release units (HRUs), but it has found that many fishing vessel skippers also tie down the liferafts in order to prevent them from being lost overboard in rough weather.

1.11 PREVIOUS ACCIDENTS

1.11.1 Cosmar vessels

In 2003, *Cosco Rotterdam* collided with a Taiwanese fishing vessel resulting in four fatalities among the fishing vessel's crew. No details of this accident have been found.

In 2004, *Cosco Hamburg* collided with *PO Nedlloyd Finland* on the River Elbe, Germany. Both vessels were being manoeuvred as advised by embarked river pilots. An investigation was conducted by the Bundestelle für Seefalluntersuchung (BSU) (German Federal Bureau of Marine Casualty Investigation) which highlighted that the collision occurred as a result of interaction as *Cosco Hamburg* overtook *PO Nedlloyd Finland*, which caused the latter vessel to lose control of her steering.

In 2009, the MAIB conducted a preliminary examination into the grounding of *Cosco Hong Kong* off Hong Kong, following which the Chief Inspector of Marine Accidents advised Cosmar:

- It is apparent that the OOW became over-loaded when trying to avoid a large number of small fishing vessels in the Dadanwei Shuidao channel and forgot about the presence of the Lixin Pai Reef. This could have been avoided had, when the passage was planned, proper consideration been given to the risks of encountering high traffic densities and the proximity of hidden dangers in this area.
- A critical review of the plan might have prompted a number of precautions to be taken when transiting the channel such as; proceeding at a slower speed to allow the OOW more time to meet the potential demands of collision avoidance as well as navigational safety, and the provision of additional support to enable the ship's position to be quickly and accurately monitored by several methods, including radar parallel indexing and the use of the vessel's electronic chart system.
- Therefore, in order to try and prevent similar accidents occurring in the future, I strongly advise that you take measures to ensure that all passage plans are critically reviewed by masters to identify the areas in which routine bridge manning potentially requires enhancement, and where the speed of transit requires careful consideration. I also advise that you stress to all bridge watchkeeping officers the importance of calling the master when in doubt or when having difficulty in keeping a vessel safe.

1.11.2 Chinese registered fishing vessels

The MSA Annual Report 2010 details Chinese fishing vessel casualties in 2009 and 2010 as:

Year/Type	Foundering	Fatality
2009	42	109
2010	38	146

In 2009, there were 11 collisions involving fishing vessels that resulted in three or more fatalities. The report also identified that UK registered vessels had been involved in five accidents or incidents in Chinese waters since 2006.

1.11.3 Recent similar accidents

There have been four recent accidents between merchant vessels and UK registered fishing vessels that have been investigated by the MAIB and have similarities with the collision between *Cosco Hong Kong* and *Zhe Ling Yu Yun 135*.

Alam Pintar/Etoiles des Ondes ([MAIB Report No 11/2010](#))

On 20 December 2009, the Singapore registered bulk carrier *Alam Pintar*, collided with the fishing vessel *Etoiles des Ondes* in the English Channel. As a result of the collision, *Etoiles des Ondes* sank and one of her crew was lost. The remaining crew were rescued from the vessel's liferaft by a passing ferry. The fishing vessel was carrying an EPIRB, which activated soon after she foundered.

Alam Pintar's OOW (fourth officer) was an inexperienced officer and, although he had seen *Etoiles des Ondes* and realised that there was a risk of collision, his initial alterations of course were rendered ineffective when the fishing vessel also changed course to start shooting her pots. Although *Alam Pintar's* OOW ordered the helm hard-a-starboard, his action was not effective in avoiding the collision. Both *Alam Pintar's* master and OOW were aware of the collision but did not stop the vessel, report the incident, or attempt to check if *Etoiles des Ondes'* crew were safe.

Scottish Viking/Homeland ([MAIB Report No 4/2010](#))

On 5 August 2010, the Italian registered ro-ro passenger ferry *Scottish Viking* collided with the fishing vessel *Homeland* about 4 miles off St Abbs Head, England. As a result of the collision, the fishing vessel sank and one of her crew was lost. As the fishing vessel sank, her liferaft was automatically released and it inflated on reaching the surface.

Among the factors that led to the collision identified in the MAIB investigation report was that *Scottish Viking's* OOW (second officer) did not: determine at an early stage if there was a risk of collision with *Homeland*; sufficiently monitor or plot *Homeland's* track; and, once a risk of collision was deemed to exist, take sufficient action to avoid a collision.

Following the collision, *Scottish Viking's* manager took action aimed at improving the performance of the company's bridge teams, including reiterating the importance of following the company's navigational procedures, carrying out unscheduled navigational audits at sea, and randomly scrutinising VDR data.

Boxford/Admiral Blake ([MAIB report 17/2011](#))

On 11 February 2011, the Marshall Islands registered container ship *Boxford* collided with the fishing vessel *Admiral Blake* in the English Channel. On impact, two of *Admiral Blake's* deckhands were thrown overboard, but both were safely recovered; one of them was rescued by the crew of *Boxford's* rescue boat, which had been launched to assist. *Admiral Blake* was badly damaged and had to be towed to Plymouth, England.

The MAIB investigation report identified that *Boxford's* bridge team was unaware of the presence of *Admiral Blake* until shortly before the collision. Neither the radar nor the visual lookout was fully effective and the vessel's master inaccurately assessed the fishing vessel's proximity and movement. The resulting manoeuvres taken were hazardous and resulted in the collision. A recommendation was made to the vessel's manager aimed at improving the standard of lookout and bridge watchkeeping across its fleet.

Philipp/Lynn Marie ([MAIB Report 20/2011](#))

On 9 April 2011, the Gibraltar registered container feeder vessel *Philipp* collided with the scallop dredger *Lynn Marie* in the Irish Sea, 6nm south of the Isle of Man. There were no injuries, but *Lynn Marie* was badly damaged and had to be towed to Port St Mary, Isle of Man.

The MAIB investigation report identified that *Philipp's* OOW (chief officer) had not properly assessed the risk of collision with *Lynn Marie* and that his actions taken to try and avoid the fishing vessel were unnecessary and contrary to the requirements of the COLREGS. A recommendation was made to *Philipp's* manager aimed at raising the competency of its bridge watchkeeping officers and ensuring that the navigation and anti-collision aids fitted on board its vessels were used effectively.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 RISK OF COLLISION

It is evident from the OOW's adjustment of *Cosco Hong Kong's* heading to 055° between 0153 and 0157 that he was aware of, and was taking action to avoid, the group of fishing vessels between 5nm and 6nm directly ahead of the bow (**Figures 2 and 3**).

Before the alteration to 055°, *Zhe Ling Yu Yun 135* was crossing ahead of *Cosco Hong Kong* at a distance of 7nm and would have passed down the container ship's starboard side with a CPA of over 2nm. Similarly, *SITC Pyeongtaek* had almost been overtaken by *Cosco Hong Kong* and was also passing well clear. Following the alteration to 055°, *Cosco Hong Kong's* CPA with the fish transporter was reduced to approximately 2 cables on *Cosco Hong Kong's* port quarter, and the container ship was predicted to pass only 3 cables ahead of *SITC Pyeongtaek*. In effect, in taking action to avoid the drifting fishing vessels, *Cosco Hong Kong's* OOW had caused a risk of collision with two vessels that had previously been passing clear.

The adjustments to *Cosco Hong Kong's* heading between 0205 and 0210 would have led to some increase of the CPA with *SITC Pyeongtaek*. However, most of the increase in CPA from 3 cables to 6 cables can be attributed to the earlier action taken by the overtaken vessel's OOW. However, the adjustment to *Cosco Hong Kong's* heading had little effect on her CPA with *Zhe Ling Yu Yun 135*, which remained steady at about 2 cables. Although the container ship was now approaching *Zhe Ling Yu Yun 135* from abaft the fish transporter's starboard beam, the fish transporter was still crossing ahead. In accordance with Rule 15 of the COLREGS (**Annex F**), *Zhe Ling Yu Yun 135* was the give way vessel and *Cosco Hong Kong* was the stand on vessel. The onus to take avoiding action rested with *Zhe Ling Yu Yun 135*.

2.3 DECISION-MAKING

2.3.1 The use of a sound signal

Having assessed that there was a risk of collision between *Cosco Hong Kong* and *Zhe Ling Yu Yun 135*, the second officer's expectation that the fish transporter would take avoiding action was justified. When this did not happen by the time the vessels had closed to within 2nm at 0214, his decision to alert the crew on board *Zhe Ling Yu Yun 135*, by sounding the ship's whistle, was appropriate.

However, Rule 34 of the COLREGS (**Annex F**) provides clear instructions for the use of manoeuvring and warning signals when vessels are in sight of one another. In this case, the sound signal that should have been used by *Cosco Hong Kong's* OOW to indicate his concern over the actions and intentions of the crew on board *Zhe Ling Yu Yun 135* was at least five short blasts.

The OOW's use of one blast of approximately 3 seconds, which is not prescribed in the COLREGS, was therefore incorrect. It could easily have been mistaken on board *Zhe Ling Yu Yun 135* for one short blast, indicating that *Cosco Hong Kong* was altering course to starboard. Nonetheless, it is possible that the sound signal did alert *Zhe Ling Yu Yun 135*'s crew to the approach of the container ship and prompted her wheelhouse watchkeeper to alter the fish transporter's heading boldly to 220°.

2.3.2 Alteration to port

Rule 17 of the COLREGS (**Annex F**) allows a stand-on vessel to take action by her manoeuvre alone as soon as it becomes apparent that the vessel required to keep out of the way is not taking appropriate action, Rule 17 (c) states:

A power-driven vessel which takes action in a crossing situation...shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

In this case, there were no navigational constraints or other vessels that prevented *Cosco Hong Kong*'s OOW from altering course to starboard at any time, or from reducing speed once the container ship was clear of *SITC Pyeongtaek*. However, the second officer decided to alter the vessel's heading to port. Although this decision might have been influenced by the advantages of the alteration taking *Cosco Hong Kong* back towards her intended track and leaving the next group of fishing vessels clear on the starboard side, it was contrary to the requirements of the COLREGS. Consequently, *Cosco Hong Kong*'s alteration to port would not have been expected by the crew on board the other vessels in the vicinity, including *Zhe Ling Yu Yun 135* and *SITC Pyeongtaek*.

2.4 MONITORING OF AVOIDING ACTION

2.4.1 *Cosco Hong Kong*

Figure 7 shows that when *Cosco Hong Kong*'s heading began to alter to port at 0215, *Zhe Ling Yu Yun 135*'s heading was altered to starboard at almost the same time. However, although *Zhe Ling Yu Yun 135* eventually turned over 120° to a new heading of about 220°, neither this bold alteration nor the fish transporter's approach were seen by *Cosco Hong Kong*'s OOW, despite the fish transporter's lights being visible to the more distant *SITC Pyeongtaek*'s OOW.

Rule 8 of the COLREGS states:

Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear

In this case, the rule was clearly not followed by the OOW. This was probably due to a combination of several factors.

First, the OOW had allowed the AB to leave the bridge, which left the OOW as the sole lookout.

Second, in using the joystick control on the vessel's track pilot system to alter *Cosco Hong Kong's* heading, the OOW had overridden the autopilot and was in hand-steering. Consequently, he was also the helmsman, and his effectiveness as a lookout was reduced.

Third, *Zhe Ling Yun 135's* radar target might have been lost within the clutter near the origin of the S-band radar display the OOW was monitoring, particularly as the 6nm range scale was selected and the quality of the display was affected by rain. The OOW was also not monitoring AIS information.

Fourth, it is highly likely that, during the 3 minutes from the start of the course alteration until the collision, the OOW focused on ensuring that *Cosco Hong Kong* was turning into clear water. It is also possible that the OOW considered that as he was making such a bold alteration, *Zhe Ling Yu Yun 135* was no longer a problem and did not need watching.

Finally, *Zhe Ling Yu Yun 135* would not have been visible from *Cosco Hong Kong's* bridge when the fish transporter was within 567m of the container vessel's bow because of the shadow zone ahead of the vessel due to the deck cargo carried. Given a closing speed of about 20kts at that point, the fish transporter would not have been visible to the OOW for approximately the 50 seconds immediately before the collision. Although the shadow zone of *Cosco Hong Kong* exceeded the maximum of 500m as prescribed in the International Convention for the Safety of Life at Sea (SOLAS), the excess 67m equated to approximately 6 seconds, during which the fish transporter could not be seen, and is highly unlikely to have been contributory to the accident in this case.

2.4.2 *Zhe Ling Yu Yun 135*

It must be assumed that *Zhe Ling Yu Yun 135's* alteration of heading towards 220° between 0215 and 0216 was initiated by her wheelhouse watchkeeper in order to avoid *Cosco Hong Kong*. **Figure 5** shows that the fish transporter was passing ahead of *SITC Pyeongtaek* and there were no other vessels transmitting on AIS that were of concern. It will never be known if the alteration was prompted by the watchkeeper hearing the single blast on the container ship's whistle.

When *Zhe Ling Yu Yun 135* began to alter course to starboard, it is estimated that she was about 30° on *Cosco Hong Kong's* port bow. On steadying on a heading of about 220° at 0217:09, the fish transporter was now only about 6° on the container ship's port bow. It is not known if the wheelhouse watchkeeper intended to make such a large alteration or whether he continued to turn on seeing that *Cosco Hong Kong* was altering to port. Nonetheless, the container ship's aspect was likely to have been confusing to the wheelhouse watchkeeper, and the fish transporter was now only 4 cables from the container ship's bow and closing rapidly. The wheelhouse watchkeeper therefore had only about 1 minute in which to re-assess the situation and take avoiding action. Given that the watchkeeper might not have realised that *Cosco Hong Kong* remained under helm to port, this was an extremely difficult situation and it is evident from the collision that whatever further avoiding action he might have attempted it was not successful.

2.5 RELEASE OF THE LOOKOUT

In view of the fact that *Cosco Hong Kong's* OOW did not notice that *Zhe Ling Yu Yun 135* altered course to 220°, or see her as the vessels continued to close, the release of the AB lookout from the bridge was potentially pivotal to this accident. Had the lookout remained on the bridge, it is possible that he would have seen the approach of *Zhe Ling Yu Yun 135* in sufficient time for avoiding action to be taken. If necessary, the AB would then have been available to take the helm. Even if a collision could still not have been avoided, the presence of the AB would have at least enabled the OOW to monitor the fish transporter immediately after the collision and ensure that the alarm was quickly raised.

Many bridge watchkeepers interviewed by the MAIB in recent years have considered the employment of deck ratings on the bridge as an additional lookout to have little value, even during darkness or in busy shipping areas. In many cases where they are used, their presence is seen as a token gesture aimed at meeting regulatory requirements. Others simply prefer to keep their watches alone.

In this case, although the release of the lookout during the midnight to 0400 bridge watch was contrary to the vessel's onboard instructions for the safety of navigation (**Annex E**), and the guidance provided in MGN 315 (Paragraph 1.8), it had become a routine practice. In allowing the lookout to leave the bridge at a critical time, when the vessel was on a night passage through dense shipping in adverse weather conditions, the second officer appears not to have appreciated the value of the lookout or the dangers developing ahead.

2.6 EXECUTION OF THE VOYAGE PLAN

In view of the size of China's fishing fleet, it is not surprising that dense concentrations of fishing vessels are frequently encountered along its coast. While the fishing is seasonal, peaking during the summer months, similar numbers of fishing vessels to those shown in **Figures 2 to 5** can be expected to be encountered in this area, and other coastal areas of China, at any time of the year.

Like many container ships on a liner service, *Cosco Hong Kong* was operating on fixed routes and her voyage plan between Hong Kong and Shanghai, including the track along the coast of Zhejiang Province, had probably been used without difficulty on numerous previous occasions. Nevertheless, although the master indicated in his night orders (**Annex A**) that he was aware that large numbers of fishing vessels might be encountered, these did not specify any precautionary measures that could be observed in such circumstances. Consequently, when the second officer detected the first group of fishing vessels ahead of the bow shortly before 0200, he continued to try and follow the intended track at the planned speed of 21kts. This action was clearly inappropriate and unnecessary.

It is evident from **Figures 2 to 5** that *Cosco Hong Kong* could have avoided most of the fishing vessels in the vicinity had her voyage plan been adjusted further to the east, similar to the tracks of other vessels including *World Trader*, *Dong-Z Calypso* and *Odigitria*, which were also transiting the area. Although this would have increased the length of her passage, the overall effect would have been negligible, particularly as the vessel would probably have been able to safely continue at 21kts.

Alternatively, a reduction in speed would have provided *Cosco Hong Kong's* OOW with more time to assess any risk of collision and to take appropriate avoiding action. Given the reduced visibility in rain showers, the concentrations of fishing vessels, and the effect of the sea state and rain on radar detection, such action was also warranted by Rule 6 of the COLREGS (**Annex F**).

The relatively high speed of container ships in areas of high traffic density and/or restricted visibility has been identified as a contributory factor in many marine casualties; the grounding of *Maersk Kendal* (MAIB report 2/2010) is a recent example. Although *Cosco Hong Kong's* passage speed of 21kts was lower than the vessel's service speed, this reduction had been made to save fuel, rather than to aid safe navigation. Moreover, the passage speed was still considerably faster than other vessels in the area.

Finally, although the vessel's instructions for the safety of navigation (**Annex E**) stated that the master:

Should be present on the bridge supervising Officers' work and take over the navigating himself when the ship is in an area of heavy shipping or where fishing boats are dense [sic]

this did not happen in this case. Had the master been on the bridge, he could have enhanced the effectiveness of the bridge team through his knowledge and experience. He would also have been best placed to assess and mitigate the risks posed by the concentrations of fishing vessels by amending the vessel's route or by reducing speed. It is highly unlikely that the master would have allowed the lookout to leave the bridge.

It is disappointing that several of the lessons to be learned from *Cosco Hong Kong's* grounding in 2009 (Paragraph 1.11.1), particularly the need to critically review passage plans in order to identify the areas in which routine bridge manning requires enhancement, and where the speed of transit requires careful consideration, were again not taken into account on this occasion. If further similar accidents are to be avoided in the future, it is important that masters and deck officers are made aware of the need to continually assess the risks to a vessel's safe navigation during a passage and, where necessary, implement appropriate mitigating measures.

2.7 ACTION TAKEN FOLLOWING THE COLLISION

Immediately after feeling the vibration caused by the impact of *Zhe Ling Yu Yun 135*, *Cosco Hong Kong's* OOW was undoubtedly concerned that his vessel had struck an object in the water. However, because he had not seen the fish transporter during the turn or after the collision, he was totally unaware of her involvement.

When the master arrived on the bridge, he quickly tried to establish whether *Cosco Hong Kong* had collided with another vessel. He was aware that the vibration felt by the OOW and the chief officer must have been quite serious to cause the OOW to put the engine telegraph to 'stop'. However, several other factors also influenced the master's decision-making, including:

- The OOW was unsure what had happened but maintained that the vessel had been turning into clear water.

- There was no sign of a vessel in distress or any flotsam to indicate that a vessel had sunk.
- There was apparently no damage to *Cosco Hong Kong*.
- There were no distress alerts or messages on the GMDSS or AIS.
- Other than the communication from *SITC Pyeongtaek*'s OOW, there was no reaction by other vessels to the master's VHF broadcasts.
- There was no unusual activity among the fishing vessels in the area.

The master took over 1 hour to decide that *Cosco Hong Kong* should resume her passage. It is clear that he did not rush this decision. It is also clear from the master's concern that, had he been aware of a vessel in distress or sinking, he would have not hesitated to render assistance as required by UNCLOS (Paragraph 1.9.2), unlike the master of *Alam Pintar* (Paragraph 1.11.3). Although the provision of 'safety bonuses' similar to those offered by COSCO has been found to have had an adverse effect on the reporting of accidents, notably in the offshore sector of the shipping industry, this did not affect the master's decision-making on this occasion.

Nevertheless, in view of the uncertainty of *Cosco Hong Kong*'s involvement in a collision with another vessel or object, it would have been appropriate for the master to have manoeuvred his vessel towards the position where the impact had been felt. It would also have been prudent for the master to ask *SITC Pyeongtaek*'s OOW why he thought *Cosco Hong Kong* might have been in collision with a fishing vessel, to inform the MRCC Taizhou of the possible collision, and to save the vessel's SVDR data. Had these actions been taken, the search and rescue operation might have been triggered much sooner and the record of the OOW's actions would have been comprehensive.

The changes in the readings taken from the vessel's cathodic protection system, which were shown to the master during the morning of 6 March 2011, indicated that *Cosco Hong Kong* had lost some paint from the forward part of her hull since sailing from Hong Kong. However, although this would probably have increased the master's suspicion that his vessel had hit 'something', the continued absence of a distress message or alert over 8 hours after the incident would have supported his view that *Cosco Hong Kong* had not collided with another vessel.

2.8 BRIDGE WATCHKEEPING STANDARDS

Notwithstanding the current difficulties experienced in recruiting and retaining seafarers in China, COSCO Shanghai and other COSCO subsidiaries still currently maintain their own pools of deck officers, which have been trained in-house and are employed on board their managed vessels. Despite this control over the provenance of the seafarers on board the company's vessels, the circumstances of this accident strongly indicate that the second officer was not competent to keep his bridge watch in the conditions experienced.

During the events leading to the collision between *Cosco Hong Kong* and *Zhe Ling Yu Yun 135*, *Cosco Hong Kong*'s OOW failed to comply with fundamental requirements of the COLREGS (**Annex F**), the master's night orders (**Annex A**), the vessel's onboard instructions (**Annexes D** and **E**) and MCA guidance (Paragraph 1.8). In particular, he:

- Did not reduce the speed of *Cosco Hong Kong* when encountering concentrations of fishing vessels.
- Released the lookout from the bridge.
- Caused *SITC Pyeongtaek*'s OOW to take avoiding action, despite *Cosco Hong Kong* being the overtaking vessel.
- Sounded one single blast lasting about 3 seconds on the ship's whistle, which was potentially confusing to the watchkeepers on board other vessels in close proximity.
- Altered the container ship's heading to port when *Cosco Hong Kong* was the stand on vessel in a crossing situation.
- Did not monitor the effectiveness of his action and therefore did not see that *Zhe Ling Yu Yun 135* had turned to starboard and continued to close with his vessel.

These were serious departures from regulation, guidance and best practice that bring the OOW's knowledge and application of the COLREGS, his judgment, and his overall competency into question. Although the second officer was qualified for his rank, and had completed three contracts as a third officer and one contract as a second officer, aspects of his bridge watchkeeping on board *Cosco Hong Kong* on the morning of 6 March 2011 fell well short of the standard required by STCW.

The second officer had been trained by COSCO Shanghai and had previously served on board vessels that were managed by COSCO Shanghai and Cosmar (*Cosco Antwerp*). His training and employment was similar to other deck officers working on board vessels also managed by COSCO subsidiaries. Although the second officer's apparent lack of competency on 6 March 2011 might have been an aberration, the previous accidents involving Cosmar-managed vessels (Paragraph 1.11.1) and the unsatisfactory results of the rule of the road tests subsequently conducted, indicate that there is an underlying problem with the continuation and refresher training provided to deck officers by COSCO Shanghai, and possibly other COSCO subsidiaries.

Ship managers frequently assume that a deck officer's STCW qualification automatically guarantees a level of competency. The collision between *Cosco Hong Kong* and *Zhe Ling Yu Yun 135* and the recent similar accidents identified in Paragraph 1.11.3, clearly show that this is not the case. An OOW's knowledge and skills are perishable, and therefore need to be continually monitored, refreshed and developed.

However, judging the competency of bridge watchkeepers is not straightforward, and relies heavily on masters setting and demanding appropriate standards. In this case, the failure of the second officer's performance assessments to identify his lack of competency with regard to the COLREGs, indicates that these were not robust and their accuracy could not be relied upon.

Furthermore, although internal and external ISM audits and other ship visits by superintendents are generally useful in identifying documentary or procedural deficiencies (Paragraphs 1.6.3 and 1.6.4), these audits invariably occur when vessels are alongside and their usefulness in identifying competency issues among bridge watchkeeping officers is extremely limited. Other checks such as navigation audits, conducted while the vessels are at sea, the random scrutiny of VDR data, and the periodic testing of OOWs in key areas such as application of the COLREGS, are measures which are more likely to be effective in this respect.

2.9 FISHING VESSEL SAFETY

2.9.1 Speed of loss

The wreck of *Zhe Ling Yu Yun 135* lies only 30m from the position where the vessel last transmitted on AIS, which was at 0218.07, seconds before the collision. The fish transporter's contact with the container ship's bulbous bow at a closing speed in excess of 20kts would undoubtedly have resulted in catastrophic damage to the fish transporter. Given the position of the wreck, together with the lack of any radar or visual evidence of her being afloat after the collision, and the absence of any calls for assistance on VHF radio, it can only be concluded that *Zhe Ling Yu Yun 135* sank almost immediately after being struck. Consequently, as many of her crew would probably have been asleep in the vessel's accommodation, only the crew who were in the wheelhouse would have had any chance of escaping.

2.9.2 Survivability

It is of serious concern that, although *Zhe Ling Yu Yun 135* was required to carry two liferafts secured with HRUs, neither liferaft floated to the surface and inflated after the vessel sank. Consequently, if any of her crew did manage to escape from the vessel, their chances of survival were considerably reduced. In addition, as the inflated liferafts would have been visible, a potential means of alerting *Cosco Hong Kong* and other vessels in close proximity was lost.

Although it is possible that the vessel's liferafts did not float to the sea surface because their HRUs malfunctioned or were damaged in the collision, it is equally likely that the liferafts were prevented from floating from the vessel as it sank by lashings intended to prevent their loss overboard or movement in bad weather. The lashing of liferafts in this manner is a dangerous practice which has been found among many fishing vessel crews worldwide, including the UK. As the potential effects of such practice on the lives of fishermen are severe, it must be discouraged if liferafts are to be available when needed.

It is also of serious concern that *Zhe Ling Yu Yun 135* was not reported to be missing until 18 hours after her collision with *Cosco Hong Kong*. She was not working with any of the fishing vessels in close proximity when she sank, and it was not recognised that she was missing until she failed to meet with fishing vessels operating 150nm offshore during the late afternoon of 6 March 2011.

The carriage of EPIRBs on board all Chinese fishing vessels would be highly impractical and would inevitably burden MRCCs with large numbers of false alarms. Indeed, the carriage of EPIRBs on board many Chinese fishing vessels which usually operate in groups or pairs relatively close to the shore, is probably unnecessary. In this case, however, the carriage of an EPIRB on board *Zhe Ling Yu Yun 135*, a fish transporter which frequently operated alone and was essentially 'ocean-going', would have quickly alerted the Chinese MRCCs, and a search would have started almost immediately after her sinking. Although this might not have increased the chances of survival for *Zhe Ling Yu Yun 135*'s crew, the carriage of EPIRBs on board similar vessels could help save many lives in the future.

2.9.3 The use of AIS

Figures 2 to 5 show all vessels transmitting on AIS in the area. The large number of AIS targets would have crowded the port X-band radar display on board *Cosco Hong Kong*, particularly as the radar targets of the fishing vessels would have also been shown. Therefore, without the effective management of the received AIS data through the use of an appropriate range scale, the preference of *Cosco Hong Kong*'s OOW not to use this information was understandable. However, although the OOW denied himself valuable information concerning the identity of *Zhe Ling Yu Yun 135*, the vessel's heading and speed would have been available on the S-band ARPA radar.

AIS is a very useful aid to OOWs in identifying vessels, but when large numbers of vessels fitted with AIS are operating in the same area, the value of interfacing AIS information on radar, ECS, or ECDIS displays is reduced considerably. In such circumstances, although a vessel might transmit AIS information, it should not be taken for granted that this information has been seen and taken into account by the watchkeepers on board other vessels.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. The use by *Cosco Hong Kong's* OOW of one blast of approximately 3 seconds on the ship's whistle was incorrect and could easily have been mistaken on board *Zhe Ling Yu Yun 135* for one short blast, indicating that *Cosco Hong Kong* was altering course to starboard. [2.3.1]
2. *Cosco Hong Kong's* alteration to port to avoid *Zhe Ling Yu Yun 135* was contrary to the requirements of the COLREGS, and would not have been expected by the crew on board *Zhe Ling Yu Yun 135*. [2.3.2]
3. When *Zhe Ling Yu Yun 135's* heading was altered over 120° to starboard, neither this bold alteration nor the fish transporter's resulting approach were seen by *Cosco Hong Kong's* OOW. [2.4.1]
4. The release of the AB lookout from *Cosco Hong Kong's* bridge about 30 minutes before the collision was potentially pivotal to this accident. In allowing the lookout to leave the bridge at a critical time, when the vessel was on a night passage through dense shipping in adverse weather conditions, the second officer appears not to have appreciated the value of the lookout or the dangers developing ahead. [2.5]
5. *Cosco Hong Kong* could have avoided most of the fishing vessels in the vicinity had her voyage been planned further to the east, similar to the tracks of other vessels which were also transiting the area. [2.6]
6. Although *Cosco Hong Kong* was expected to encounter concentrations of fishing vessels, no consideration appears to have been given to amending the vessel's track, reducing speed, or enhancing the manning on the bridge. [2.6]
7. Several of the lessons to be learned from *Cosco Hong Kong's* grounding in 2009 were not taken into account on this occasion. If further similar accidents are to be avoided in the future, it is important that masters and deck officers are made aware of the need to continually assess the risks to a vessel's safe navigation during a passage and, where necessary, implement appropriate mitigating measures. [2.6]
8. Although *Cosco Hong Kong's* master took positive steps to determine whether his vessel had been involved in a collision, he did not take several precautions which might have triggered the search for *Zhe Ling Yu Yun 135* much sooner. [2.7]
9. The second officer's performance as the bridge watchkeeping officer on board *Cosco Hong Kong* on the morning of 6 March 2011 fell well short of the standard required by STCW. [2.8]
10. The second officer's apparent lack of competency, the previous accidents involving Cosmar managed vessels and the subsequent unsatisfactory results of the rule of the road tests, indicate that there is an underlying problem with the continuation and refresher training provided to deck officers by COSCO Shanghai, and possibly other COSCO subsidiaries. [2.8]

11. The second officer's performance assessments did not identify his lack of competency with regard to the application of the COLREGS, and the usefulness of internal and external ISM audits and other ship visits by superintendents in identifying competency issues among bridge watchkeeping officers was extremely limited. [2.8]

3.2 OTHER SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION ALSO LEADING TO RECOMMENDATIONS

1. *Zhe Ling Yu Yun 135* was required to carry two liferafts secured with HRUs, but neither liferaft floated to the surface and inflated after the vessel sank. Although it is possible that the vessel's liferafts did not float to the sea surface because their HRUs malfunctioned or were damaged in the collision, it is equally likely that the liferafts were prevented from floating from the vessel as it sank by lashings intended to prevent their loss overboard or movement in bad weather. [2.9.2]
2. *Zhe Ling Yu Yun* was not reported to be missing until 18 hours after her collision with *Cosco Hong Kong*. Had the fish transporter been carrying an EPIRB, a search could have started almost immediately after her sinking. [2.9.2]

SECTION 4 - ACTION TAKEN

COSCO MARITIME (UK) LTD

Cosmar has conducted its own investigation and has:

- Arranged for leading training organisations to provide, under licence, 'Maritime Crew Resource Management' and 'Collision Avoidance' courses to the Cosco Shanghai training centre. The centre's instructors will be trained by the training providers and all masters and watchkeeping officers employed on Cosmar vessels will be required to attend these courses.
- Arranged risk assessment training for its shore staff based in Shanghai.
- Arranged for P&I ship inspectors to visit its vessels more frequently and to conduct spot checks on bridge watchkeeping officers to test their knowledge of the COLREGS.
- Implemented a programme of random spot checks on watchkeeping officers' knowledge of the COLREGS during routine ship visits by shore staff.
- Put in place a system for the provision of training materials in both Chinese and English on board its ships.
- Initiated a series of spot checks by telephone to confirm that a lookout is on the bridge during the hours of darkness.
- Issued instructions to its fleet which detail how SVDR information is saved.

SECTION 5 - RECOMMENDATIONS

The **Fisheries Department of Ministry of Agriculture People's Republic of China** is recommended to:

2011/145 Issue guidance to its fishing industry which:

- Highlights the dangers of lashing down liferafts at sea.
- Encourages owners and skippers of fishing industry vessels that are engaged in single handed operations, or which operate at long distances from the shore, to fit an EPIRB.

COSCO Maritime (UK) Co Ltd is recommended to:

2011/146 Develop in-house procedures and controls designed to provide senior managers with assurance that the company's vessels are being navigated competently to an acceptable standard. These may include inter alia:

- At sea auditing.
- The periodic review / assessment of VDR data.
- The provision of specific instruction to ships' masters on the importance of conducting dynamic risk assessments such that, where required, voyage plans are amended, speed is reduced and/or bridge manning is increased to mitigate the effect of risks that may be identified during the voyage.

The **China Ocean Shipping Company** is recommended to:

2011/147 Monitor and evaluate the effects of the actions taken by Cosmar that are aimed at improving the competency of its bridge watchkeepers with a view to adopting similar measures throughout its ship-managing subsidiaries.

Marine Accident Investigation Branch
December 2011

Safety recommendations shall in no case create a presumption of blame or liability

Master's night orders (translated from Mandarin)

Voyage Number
Route (or Anchorage)

762
HONG KONG to SHANGHAI

Date	2011.3.5	Time	2350
Instructions	<ol style="list-style-type: none">1. Taking cabotage along the coast of Zhejiang Province may come across many vessels; there may be fishing boats appearing now and then sailing not in compliance with relevant regulations.2. Watch carefully, pay attention to movements of vessels around, and have a grasp of a situation and know how to deal with it.3. Make judgements as soon as possible; and avoid collisions in accordance with relevant regulations. It is better to take coordinated measures as soon as possible to avoid collisions.4. If the hand steering is applied during collision avoidance, actions should be taken as soon as possible to ensure a safe passing.5. Observations on <i>(text here is illegible)</i> system and VHF16 / 70 cm watch and aid to navigation must be done properly.6. Charting must be kept up to the operation time, and night eyes must be kept in good working conditions.7. The able bodied must watch, and monitor the steering all the time, in order to ensure the safety of sailing.8. Observing fire safety laws and regulations.9. Measuring <i>(text here is illegible)</i> regularly. <p style="text-align: right;">Shipmaster's Signature: <i>(Signature)</i></p>		
Officers of the Watch	<i>(Three signatures)</i>		

Cathodic protection records

Bridge Standing Order [sic]

Bridge Standing Order

- 1.0 Purpose
This instruction defines the bridge standing order to ensure the safety navigation of ships.
- 2.0 Responsibility
- 2.1 The Master and Officers are responsible for implementing this instruction.
- 2.2 The Duty Officer is responsible for inspecting and maintaining navigational aids and emergency equipment.
- 2.3 The S.G.1 is responsible for look out and cleaning.
- 3.0 Instruction
- 3.1 Bridge is the command center of ship navigation, it consists of wheel house, chart room, both bridge wings and standard compass deck. During navigation, except Master and duty personnel, no one is allowed to enter unless for working purpose.
- 3.2 Duty Officers on the bridge must remain alert at all times. No one is to do anything irrelevant, not to play and chat, not to make loud noises or listen to broadcasting. No one is allowed to sit while on duty or to have meals or sleep on bridge.
- 3.3 Duty Officers on bridge should be dressed neatly, no vest, underwear, slippers should be permitted. Master and Officers should wear in neat appearance when ship is entering or departing foreign ports.
- 3.4 Bridge must be kept clean and tidy, both inside and outside windows should be cleaned, desks, cabinets, walls and floor to be neat. No spitting or littering will be allowed. During navigation S.G.1 on 0400-0800 shift should be responsible for cleaning inside and outside of bridge, a thorough cleaning is necessary before ship enters a port or prior to departure. Duty Officer should notify S.G.1 on duty to carry out comprehensive cleaning and tidy.
- 3.5 During navigation, doors and windows of wheel house can not all be closed. Especially when visibility is poor or restricted, look-out man should maintain their position at bridge wings.
- 3.6 Instruments, meters, equipment, navigational documents, notices, curve and information on bridge are not to be read or tampered with by unauthorized persons, and can not be destroyed or brought out of bridge without permission of Master.
- 3.7 Ferric or magnetic materials can not be placed in wheel house or closed to standard compass. Important navigation instruments and materials should be placed neatly in designated places.
- 3.8 Lights which may affect normal navigation and look-out should be shuttered during night navigation.
- 3.9 Where no one is on bridge duty, 2nd Officer should put portable valuable instruments and materials into a locked cabinet and properly locked. Doors and windows on bridge should be locked and no outsiders should be allowed to visit bridge without permission of Master. When outsiders visit, inspect or repair, specific crew member(s) should be assigned to accompany and cooperate.
- 3.10 Duty Officer have the responsibility to maintain proper order of the bridge, keeping the bridge clean and tidy and strictly implement these rules.
- 3.11 EPIRB should be under custody of 2nd Officer and duty deck officer. In the event that distress signal is mistakenly released during cleaning or maintenance work. Company, Rescue center and/or Marine Safety Searching Center and Flag State Administration should be notified at

once.

3.12 Communication facilities, instruments, meters installed on bridge or in its vicinity should not be tampered by unauthorized persons.

4.0 Records

Nil.

Covered in SI-0710

Responsibilities of Master or Duty Officers in Sailing [sic]

Responsibilities of Master or Duty Officers in Sailing

- 1.0 Purpose
This instruction defines the Responsibilities of Master or Duty Officers in Sailing to ensure the safety navigation of ships.
- 2.0 Responsibility
- 2.1 The Master is responsible for implementing this instruction and supervising the performance of Duty Officer.
- 2.2 The Duty Officer is responsible to implementing this instruction.
- 3.0 Instruction
- 3.1 To earnestly implement “Bridge Standing Order” and “Rules of Night Order Book”, notices and instructions in respect of safe navigation issued by the Company.
- 3.2 To strictly comply with “International Regulations for Preventing Collisions at Sea” and also concentrate on the look-out duty and keeping a safe distance of passing ships, fishing nets, buoy and other floating objects.
- 3.3 To fix ship position by navigational aids, celestial body, shore marks, fix the position frequently when the ship sails near coastal area or in narrow channel. Duty Officers should fix ship position at any time when Master thinks necessary.
- 3.4 To observe coast lines and various objects that the ship passes by and check carefully against relevant nautical publications when these objects appear for the first time and report to Master if there are any irregularities.
- 3.5 To appropriately observe and check compass errors of various types and report to Master if the errors exceed allowable limits or fluctuate abnormally.
- 3.6 To closely monitor the surrounding circumstances and report to Master on the occurrence of the following: sudden change of weather, ship well off the course, distress signal at sea, suspicious signal or objects.
- 3.7 To be aware of the daily weather report and monitor any change of wind force, wind direction and atmospheric pressure. Before poor or restricted visibility or other hazardous weather approaches, records should be made and Rule of “International Regulations for Preventing Collisions at Sea 1972” be strictly observed.
- 3.8 To closely implement Master’s instructions on routes, course, compass error, leeway set and other navigation instructions etc.. Unless the ship is threatened by maritime incident such as collision or the ship is engage in rescuing lives or efficient action taken in an accident. The course and the engine revolution (or pitch angle of propeller) should not be changed without permission of Master.
- 3.9 To closely monitoring and supervise the accuracy of auto-pilot steering and its recorder as well as S.G.1 on wheel in response of the steering work. Chart-work should limit to a short period of time and meanwhile, S.G.1 should be assigned to pay more attention to the look out duty.
- 3.10 To supervise the S.G.1 to switch on the navigation lights when sails at night or in poor visibility and frequently inspect the performance of navigation lights. Any lights that may obstruct the look-out should be sheltered.
- 3.11 To strictly comply with the relevant rules of the traffic separation scheme, and pay particular attention to regional rules.

-
- 3.12 To adopt effective measure and sound alarm on occurrence of a fire, man overboard, ship taking in water or any other emergency situation that should also be recorded and Master should be notified at once.
- 3.13 To following Master's instructions for altering course and turning around in heavy weather.
- 3.14 To take care of hold ventilation as assigned by Chief Officer. In sudden change of weather, especially when heavy weather is approaching, S.G.1 should be sent to close the ventilation vents of each hold; attention should also be given to ensure there is no movement of cargo within holds or on deck.
- 3.15 Never leave the bridge without substitution of Master or other Officer. For the sake of safety navigation, phone should be used or S.G.1 should be sent to report to Master in the event of an emergency.
- 3.16 Master may take over navigating at any time when necessary. Under such circumstances, Duty Officers should, nevertheless, keep a careful look out, fix ship position and implement the instructions of Master. Master should clearly delegate if he wants to restore Officer's navigating duty. Master may direct Officer's maneuvering but before Master's clear instruction to take over navigation, Duty Officer should still be responsible for the ship maneuvering and should not give up their duties.
- 3.17 When ship enters or departs a port, S.G.1 should get the relevant flag signal ready, light/shape signal and the turning around signal for immediate use. He should also carefully observe the various communication signals, report to Master promptly and respond as directed by Master.
- 3.18 To supervise S.G.1 who complete the preparation work for the pilot embarking and disembarking and to personally receive and see off the pilot. During pilotage, look-out should not be neglected and Master should be reported to when there is anything abnormal.
- 3.19 Should be familiar and comply with the relevant Port Regulations and special provisions when the ship is navigation in canal, river or port area.
- 3.20 On board of a bridge-controlled (remote control) ship, if there is an emergency alarm or equipment breakdown. Master and Chief Engineer should immediately reported to, so that proper crew members are send to inspect the situation and make repairs.
- 4.0 Records
- 4.1 Night Order Book
- 4.2 Compass Observation Book
- 4.3 Weather Facsimile and Weather Forecast

Instruction of Safety Navigation [sic]

Instruction of Safety Navigation

- 1.0 Purpose
This instruction defined the key points of navigation to ensure the safety navigation of ships.

- 2.0 Responsibility
 - 2.1 The Master is responsible for implementing and supervising Duty Officers to execute the instruction.
 - 2.2 The Duty Officer is responsible for executing item 3.1 to 3.4 and supervising the S.G.1 to carry out a proper lookout duty.
 - 2.3 S.G.1 is responsible to carry out proper lookout duty.

- 3.0 Instruction
 - 3.1 To comply with Navigation Regulations, navigate with caution and give wide sea room in ample time to passing ships.
 - 3.1.1 In compliance with International Regulations for Preventing Collisions at Sea.
 - 3.1.2 In compliance with the applicable Regional Navigation Rules.
 - 3.1.3 In compliance with the applicable Port Regulations.
 - 3.1.4 In compliance with the safety navigation requirements of the Company.
 - 3.2 To keep a proper look-out and fix ship position frequently.
 - 3.2.1 To observe Rules 5 of “International Regulations for Preventing Collisions at Sea in respect of the (Look-out).
 - 3.2.2 A proper look-out is the key issue to ensure safety navigation, Duty Officers should concentrate on “look-out” by means of sight, hearing, necessary instruments and all appropriate means suitable for the circumstances and situation at the time.
 - 3.2.3 An extra look-out man may be added when necessary.
 - 3.2.4 A look-out man is obliged to report his observation to Officer on duty, Master and Pilot.
 - 3.2.5 Pay attention to the changes of environment. meteorology, and hydrology, whereby Master should be immediately notified in case anything is found to be abnormal or doubtful, and appropriate safety measures are to be taken in such instances.
 - 3.2.6 Ship position should be frequently fixed to ensure that it is sailing on the planned course.
 - 3.2.7 Duty Officer and Duty Engineer should check ship’s clock and change “Deck Noon Report” and “Engine Noon Report” at 12 o’clock every day.
 - 3.3 To correctly use of and familiar with the characteristics, function, errors and limitation of navigational aids and instruments, such as the gyro compass, magnetic compass, sextant, chronometer, radar’s, satellite navigator, radio direction finder, echo sounder, GMDSS etc.
 - 3.4 A good understanding of the ship’s condition and characteristics as well as the restriction of the sailing area.
 - 3.4.1 Ship position should be frequently fixed in order to ensure that it is sailing in a safe area. Master should be immediately reported of any suspicious circumstances or when ship is getting close or in immediate danger. Effective measures are to be taken to keep clear of dangerous areas.
 - 3.4.2 Using of adequate scale charts and knowing the features of land, light house, current, etc.
 - 3.4.3 Master and Officers should familiarize themselves with the ship’s maneuvering characteristics, including the stopping distance, turning circle, rudder efficiency and the effect of the changing

- r.p.m. on ship speed and rudder efficiency.
- 3.4.4 Shoals, submerged reefs and obstacles on sea charts should be marked with red pencil for alert.
- 3.5 Requirements for Master
- 3.5.1 If necessary Master should personally taking command on the bridge when the ship is sailing in a narrow channel or canal, e.g. the Strait of Seto and the Japanese inland sea, Singapore strait, Strait of Malacca, English Channel and rocky areas, congested waters, dangerous areas, etc.
- 3.5.2 If necessary Master should personally taking command on the bridge when in poor or restricted visibility, e.g. fog, storm, dusty wind, snow and other weather characteristics affecting visibility.
- 3.5.3 Master should be present on the bridge supervising Officers' work and take over navigating himself when the ship is in an area of heavy shipping traffic or where fishing boats are dense.
- 3.5.4 Master should personally direct on the bridge when the ship is mooring to berth or unberthing, shifting, entering or departing a port, or when the pilot is embarking or disembarking.
- 3.5.5 Master should, before going to sleep every night, write down his instructions or other important assignments in the Night Order Book. Duty Officer must acting accordingly.
- 3.5.6 Irrespective of the time of day, if called by a Duty Officer, he should immediately get to bridge and take safety measures.
- 3.5.7 Master should strictly control duty personnel not to taking any alcohol drinks 4 hours before duty (including himself).
- 3.5.8 Master should carefully implement various instructions of the Company in respect of safety navigation.
- 3.5.9 Master should carefully supervise the work of Chief Officer and Deck Officers and should correct their errors, if any.
- 4.0 Records
- 4.1 Deck Noon Report
- 4.2 Engine Noon Report
- 4.3 Night Order Book
- 4.4 Compass Observation Book
- 4.5 Radar Log and Records of Maintenance
- 4.6 Direction Finder Calibration Records
- 4.7 Meteorology Facsimile
- 4.8 Weather Forecast Report

Extracts from the International Regulations for Preventing Collisions
at Sea 1972 (as amended)

Extracts from the International Regulations for Preventing Collisions at Sea 1972

(as amended)

Rule 2

Responsibility

(a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

(b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.

Rule 5

Lookout

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

Rule 6

Safe Speed

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account:

- (a) By all vessels:
 - (i) the state of visibility;
 - (ii) the traffic density including concentrations of fishing vessels or other vessels;
 - (iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions;
 - (iv) at night the presence of background light such as from shore lights or back scatter of her own lights;
 - (v) the state of wind, sea and current, and the proximity of navigational hazards;
 - (vi) the draught in relation to the available depth of water
- (b) Additionally, by vessels with operational radar:
 - (i) the characteristics, efficiency and limitations of the radar equipment;
 - (ii) the constraints imposed by the radar range scale in use;

- (iii) the effect on radar detection of the sea state, weather and other sources of interference;
- (iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range;
- (v) the number, location and movement of vessels detected by radar

Rule 8

Action to avoid collision

- (a) Any action to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.
- (b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.
- (c) If there is sufficient sea-room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.
- (d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.
- (e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.
- (f) (i) A vessel which, by any of these Rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea-room for the safe passage of the other vessel.
(ii) A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching the other vessel so as to involve risk of collision and shall, when taking action, have full regard to the action which may be required by the Rules of this part.
(iii) A vessel the passage of which is not to be impeded remains fully obliged to comply with the Rules of this part when the two vessels are approaching one another so as to involve risk of collision.

Rule 13

Overtaking

- (a) Notwithstanding anything contained in the Rules of Part B, Sections I and II any vessel overtaking any other shall keep out of the way of the vessel being overtaken.
- (b) A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the sternlight of that vessel, but neither of her sidelights.
- (c) When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.

- (d) Any subsequent alteration of bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these Rules or relieve her of her duty of keeping clear of the overtaken vessel until finally past and clear.

Rule 15

Crossing situation

When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.

Rule 16

Action by give-way vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Rule 17

Action by stand-on vessel

- (a) (i) Where one of two vessels is to keep out of the way the other shall keep her course and speed.
- (ii) The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.
- (b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.
- (c) A power-driven vessel which takes action in a crossing situation in accordance with subparagraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.
- (d) This Rule does not relieve the give-way vessel of her obligation to keep out of the way.

Rule 34

Manoeuvring and Warning Signals

- (a) When vessels are in sight of one another, a power-driven vessel under way, when manoeuvring as authorized or required by these Rules, shall indicate that manoeuvre by the following signals on her whistle:

- one short blast to mean "I am altering my course to starboard";
- two short blasts to mean "I am altering my course to port";
- three short blasts to mean "I am operating astern propulsion".

(b) Any vessel may supplement the whistle signals prescribed in paragraph (a) of this Rule by light signals, repeated as appropriate, whilst the manoeuvre is being carried out:

(i) these signals shall have the following significance:

- one flash to mean "I am altering my course to starboard";
- two flashes to mean "I am altering my course to port";
- three flashes to mean "I am operating astern propulsion".

(ii) the duration of each flash shall be about one second, the interval between flashes shall be about one second, and the interval between successive signals shall not be less than ten seconds.

(iii) the light used for this signal shall, if fitted, be an all-round white light, visible at a minimum range of 5 miles, and shall comply with the provisions of Annex I to these Regulations.

(c) When in sight of one another in a narrow channel or fairway:

(i) a vessel intending to overtake another shall in compliance with Rule 9 (e)(i) indicate her intention by the following signals on her whistle.

- two prolonged blasts followed by one short blast to mean "I intend to overtake you on your starboard side";
- two prolonged blasts followed by two short blasts to mean "I intend to overtake you on your port side".

(ii) the vessel about to be overtaken when acting in accordance with 9(e)(i) shall indicate her agreement by the following signal on her whistle:

- one prolonged, one short, one prolonged and one short blast, in that order.

(d) When vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by at least five short and rapid flashes.

(e) A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. Such signal shall be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.

(f) If whistles are fitted on a vessel at a distance apart of more than 100 meters, one whistle only shall be used for giving manoeuvring and warning signals.

