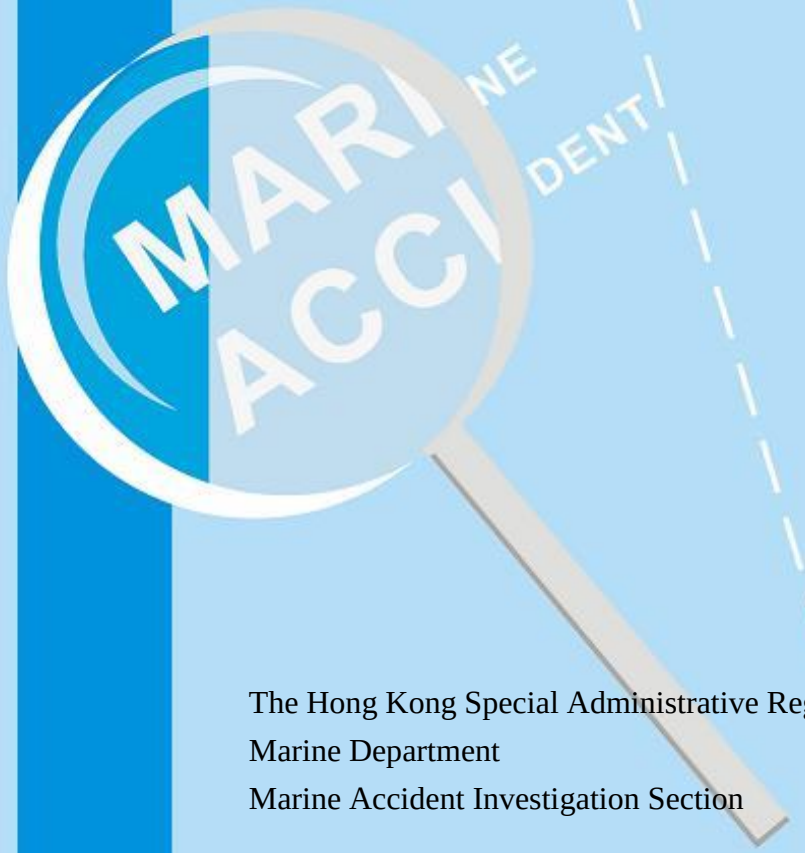
Report of Investigation into the fatal accident on board Hong Kong Registered Ship "CF CRYSTAL" at Port Authur, Texas, the USA on 13 December 2014.



The Hong Kong Special Administrative Region
Marine Department
Marine Accident Investigation Section

24 March 2016

Purpose of Investigation

This incident is investigated in accordance with the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (the Casualty Investigation Code) adopted by IMO Resolution MSC.255(84).

The purpose of this investigation conducted by the Marine Accident Investigation and Shipping Security Policy Branch (MAISSPB) of Marine Department, in pursuant to the Merchant Shipping Ordinance Cap. 281, the Merchant Shipping (Safety) Ordinance (Cap. 369), the Shipping and Port Control Ordinance (Cap. 313), or the Merchant Shipping (Local Vessels) Ordinance (Cap. 548), as appropriate, is to determine the circumstances and the causes of the incident with the aim of improving the safety of life at sea and avoiding similar incident in future.

The conclusions drawn in this report aim to identify the different factors contributing to the incident. They are not intended to apportion blame or liability towards any particular organization or individual except so far as necessary to achieve the said purpose.

The MAISSPB has no involvement in any prosecution or disciplinary action that may be taken by the Marine Department resulting from this incident.

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1. Summary

1.1 On 13 December 2014, a crew member of the Hong Kong registered bulk carrier "CF CRYSTAL" (the *"vessel"*) fell into the water and disappeared while the *vessel* was at the anchorage in the Port Authur, Texas, the USA.

1.2 Crew members were assigned to paint the draught marks of the *vessel* at midship on the starboard side. An able-bodied seaman (the AB) was lowered down over the ship side on a bosun chair which was hung at one end of a lifting rope while the other end of the lifting rope was secured to a structure on deck. He was secured by a lifeline that was not properly secured to the ship side railing. A lifebuoy with lifeline attached to ship side railing was to let afloat on the water surface. However, he did not wear a lifejacket as required by the company's Safety Management Manual and it was agreed by the bosun who was in charge of the work at the site.

1.3 After the painting work was completed at about 0900, the AB was lifted up by crew members on deck, and the lifting rope suddenly parted at about 2 metres above sea level. The AB fell into the water and his lifeline was detached from the ship side railing during his fall.

1.4 The AB could not grab the lifebuoy floating on the water. Another lifebuoy was thrown to him but still could not be caught by him. Soon afterwards, the AB was drown and disappeared in the water.

1.5 The vessel's rescue boat was launched into the water for search and rescue operation, but the boat engine failed to run. Coastguard launch and rescue helicopter arrived at the scene at 1005 and commenced the search and rescue operation. It was stopped at 1642 on the same day without any finding.

1.6 The investigation had identified the following contributory factors to this accident:

a) lifting rope in poor condition, due to lack of maintenance, was used for lifting the bosun chair whereon the AB was seated and it parted prematurely;

b) lack of safety awareness of crew members on board was manifested by:

   i) the AB and the bosun did not follow the established safety procedures to ensure the donning of lifejacket when working over the ship side;

   ii) the bosun and his crew members did not well maintain the securing condition of the lifeline that attached the AB to the ship side railing and as a result the AB fell into the water and disappeared; and

c) the work supervision was not sufficient.

2. Description of the vessel

2.1 Particulars of "CF CRYSTAL"

Port of Registry	:	Hong Kong
IMO Number	:	9497050
Official Number	:	HK-3003
Call Sign	:	VRIC2
Classification Society	:	American Bureau of Shipping
Type of Ship	:	Bulk Carrier
Keel Laid	:	October 2010
Built At	:	Chengxi Shipyard Co.,Ltd. China.
Ship Owner	:	Changhong Group (HK) Limited
DOC Company	:	Shanghai CP International Ship Management & Broker Co.,Ltd.
Length	:	217 metres
Breadth	:	32.26 metres
Depth	:	19.60 metres
Gross Tonnage	:	41,073
Net Tonnage	:	25,634
Deadweight	:	75,725
Main Engine	:	one set of Hudong HHM B&W 5S 60MC-C Engine (China)
Engine Power	:	8,949 kW
No. of Crew	:	23

Fig 1: M.V. " *CF CRYSTAL"*

3. Sources of Evidence

a) The statements of the master, officers and the crew of the *vessel*

b) Information provided by the Ship Management of the *vessel*

c) Information from local port authority

4. Outline of Events

(All times were local time GMT – 6 hours)

4.1 At 0155 on 13 December 2014, the Hong Kong registered bulk carrier "CF CRYSTAL" (the *"vessel"*) under ballast condition arrived at Port Authur of Texas, the USA and dropped anchor in the approximate position of 29^0 33.60 N, 093^0 43.10 W waiting for berthing to load cargo.

4.2 As there was no schedule of berthing, crew members started their routine deck maintenance work on the morning of 13 December 2014. It was planned to repaint the midship draught marks on the starboard of the *vessel*. At 0745, a pre-work meeting was held by a bosun. During the meeting, the bosun briefed crew members of their duties and the relevant safety issues. Two able-bodied seamen, one ordinary seaman and one cadet attended the meeting. At 0800, after considering the job assessment and the job review prepared by the chief officer, the master approved and granted a work permit allowing crew members to work over the ship side to repaint the midship draught marks on starboard side.

4.3 At 0805, the chief officer briefed crew members in the mess room to explain the safety issues and working procedures as per the approved risk assessment and the Safety Management Manual before allowing them to start the job. Afterwards crew members began to pick up tools stored in the forward bosun store room. After checking the conditions of the personal protective equipment and ropes by the bosun, crew members proceeded to the starboard side at midship to set up a bosun chair. For the setting up of the bosun chair, a pulley block was attached to the ship side railing and a lifting rope was used to pass through the pulley block for lowering down a crew siting on the bosun chair to the ship side for the painting work (Fig.2 and 3). The crew would be secured by a lifeline connecting to the ship side railing. A lifebuoy with lifeline attached to ship side railing would be afloat on the water surface.

Fig 2: the bosun chair for working overside

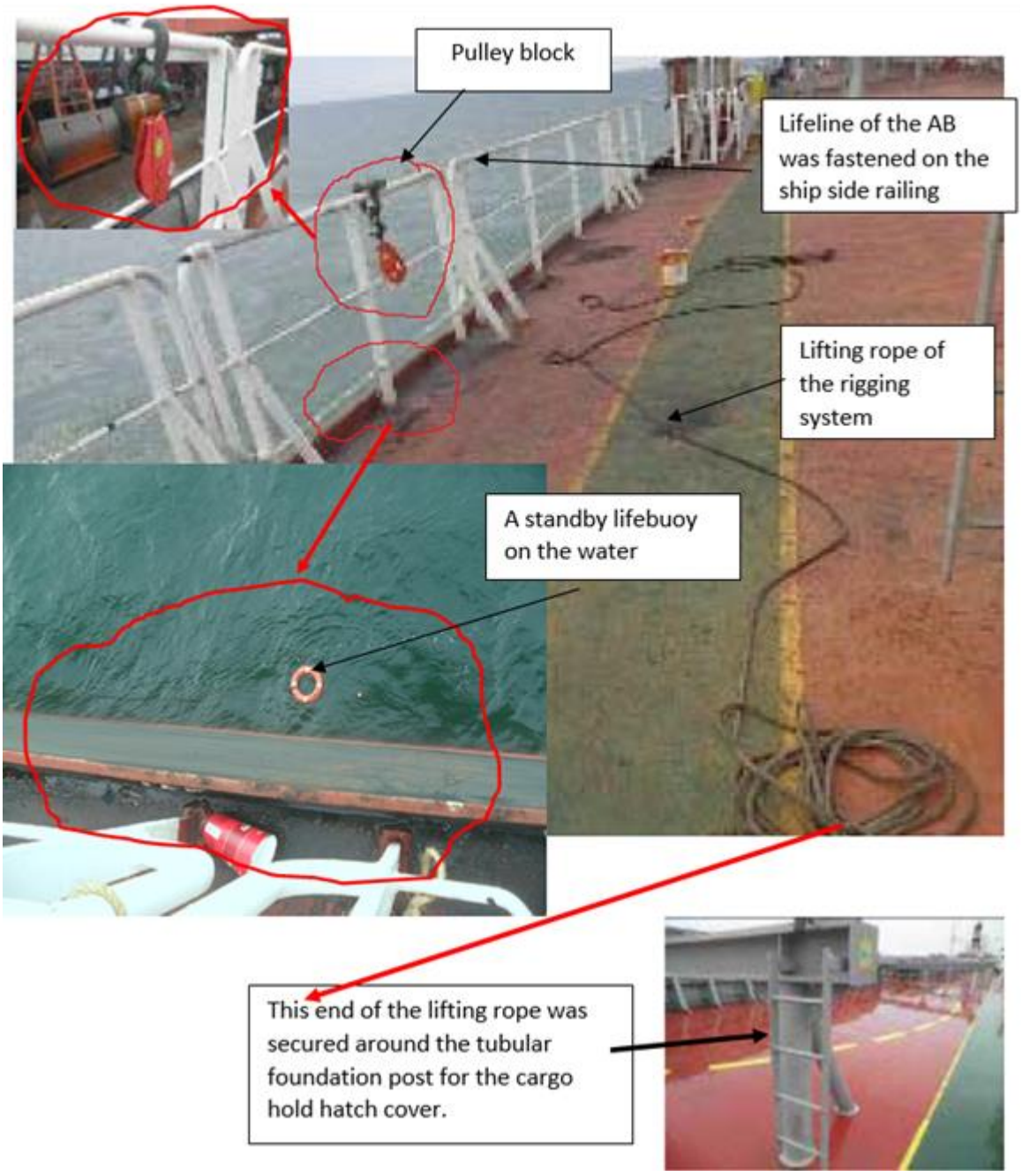

Fig 3: Rigging arrangement at midship starboard side

4.4 At 0815, crew members led by the bosun commenced the job. An able-bodied seaman (the AB) was assigned to work over the ship side for the painting work. The rest of the crew worked on the deck to adjust the length of the lifting rope for the AB. The lifting rope was secured around a tubular foundation post for the hatch cover as shown in Fig.3.

4.5 The AB carried with him a tin of paint and work items for painting the draught marks. He found that the lifejacket restrained him from working freely so he decided not to wear the lifejacket and this was agreed by the bosun. Throughout the work, the bosun and his teammate crew members did not pay attention to the lifeline of the AB allowing it being

loosely fastened to the ship side railing and it was slack (i.e. the length of the lifeline had not been adjusted).

4.6 At 0900, the AB completed the work and asked crew members to pull him up to return back to the main deck. During heaving and at about 2 metres above sea level, the lifting rope suddenly parted. The AB fell into the water and his lifeline was detached from the ship side railing during his fall.

4.7 When the AB was in the water, he could not grab the lifebuoy. The bosun immediately found another lifebuoy and threw it into the water for the AB. But the AB could not catch that lifebuoy as well. The bosun informed the officer of the watch on the bridge about the man-overboard incident and requested to raise an emergency alarm to summon a rescue team. Few seconds later, the AB was seen sinking and subsequently disappeared in the water leaving his safety helmet and working glove floating on the water.

4.8 At 0902, the master summoned a rescue team which was in charge by the chief officer. The rescue team prepared to launch the rescue boat. The ship main propulsion engine was standby to cater for any necessary movements of the *vessel*.

4.9 At 0905, the rescue boat was launched into the water. However, the rescue boat engine failed to run and the search and rescue operation could not start. In response to an emergency broadcast by the coastguard, a pilot boat arrived at the scene to help search of the AB.

4.10 At 1005, a coastguard launch and a helicopter arrived at the scene to start the search and rescue operation. The crew members on board the rescue boat moved to the coastguard launch to assist. At 1500, the crew members returned back to the *vessel* without any finding. After aerial and water surface searching without any finding, the coastguard stopped the operation at 1642.

4.11 On 14 December 2014, a diving company employed by the ship management company of the *vessel* conducted an underwater search from 0630 till 1030, but in vain. Finally, the *vessel* heaved up anchor at 1245 on the same date and proceeded to berth for cargo loading. The AB was still missing and could not be found.

5. Analysis

Manning of the vessel

5.1 The *vessel* was manned by a total of 23 crew members from Mainland, China.

5.2 The master had served as a master for more than 12 years. He possessed a Certificate of Competency as master on ship issued by the People's Republic of China valid until 17 March 2019, and a Class 1 License (Deck Officer) issued by the Hong Kong Marine Department on 12 August 2014. He signed on this *vessel* as a master for about 6 months before the accident.

5.3 The chief officer had served as a chief officer for about 2 years. He possessed a Certificate of Competency as chief officer on ships issued by the People's Republic of China valid until 31 December 2016, and a Class 2 License (Deck Officer) issued by the Hong Kong Marine Department on 12 August 2014. He signed on the *vessel* as a chief officer for about 6 months before the accident.

5.4 The Bosun had about 25 years of seagoing experience, about 12 years of which were in the capacity of a bosun. He held a Certificate of Competency to support navigation issued by the People's Republic of China on 27 June 2014 valid until 7 November 2037. He signed on the *vessel* as a bosun about 4 months before the accident.

5.5 The missing able-bodied seaman (the AB) had about 6 years of seagoing experience, about three years of which were in the capacity of an AB. He joined the *vessel* in the rank of AB about 4 months before the accident. He held a Certificate of Competency to support navigation issued by the People's Republic of China on 18 August 2014 valid until 28 November 2050.

Working hours and alcohol abuse

5.6 There was no evidence to show that any of the crew members involved in the operation, including the missing AB, suffered from fatigue at work.

5.7 There was no indication or evidence of alcohol abuse of the AB.

Weather and sea conditions

5.8 On the day of the accident, the weather condition was occasional shiny with easterly breeze of force 3 on the Beaufort scale. The sea condition was slight with westerly current of about one knot. The weather and sea conditions did not contribute to the accident.

Rigging of bosun chair for work over the ship side

5.9 During heaving up the bosun chair wherein the AB was seated, the lifting rope parted at a position slightly above the knot tying to the bosun chair (Fig.4).

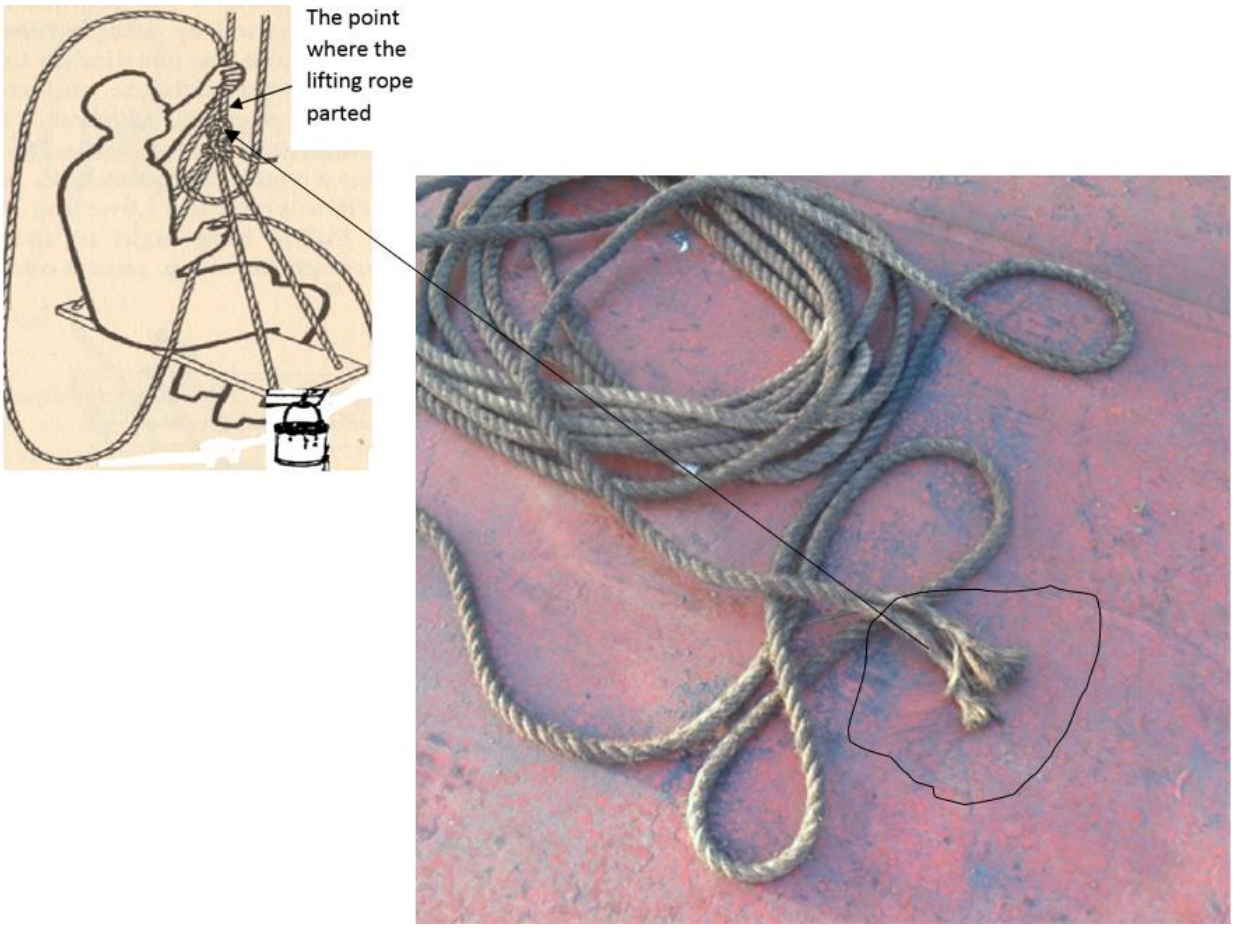

Fig 4: The lifting rope parted.

5.10 The lifting rope was a 3-strand manila rope of diameter 24 mm. As per the product certificate, the average tensile strength of the rope was 35.9 kilo-newton (about 3660 kilogram force) measured in accordance with the Federal Specification and Cordage Institute Standard.

5.11 In this accident, the total weight of the AB and the work items carried by him was about 82 kilogram, which was well below the breaking load of the lifting rope.

5.12 There was no maintenance records of the lifting rope on board. As shown in Fig.4, the point where the rope parted appeared to be a transverse cut. The general condition of the rope was deemed having deteriorated with signs of wears and molten yarns at the broken section of the lifting rope. Under such circumstances, the strength of the lifting rope could have been reduced substantially. In the case of sharp pulling forces applied on the lifting rope during pulling up of the AB, shock loading could have caused the deteriorated rope to part.

Safety awareness and supervision

5.13 It was stipulated in the company's Safety Management Manual and the Code of Safe Working Practices for Merchant Seamen published by the Hong Kong Marine Department that lifejacket should be donned by a person who is required to work over ship side. The excuse of the AB for not using a lifejacket because of inconvenience should not be agreed by the bosun.

5.14 A lifeline was used to safeguard the AB from falling into the water when working at height in this incident. However, the lifeline did not work as it was not properly secured the ship side railing.

5.15 In view of paragraph 5.13 and 5.14, the bosun, the missing AB and other crew members involved in the work were lack of safety awareness. Firstly, the missing AB did not follow the established safety procedures to use lifejacket when working over the ship side. Secondly, the bosun did not follow the established safety procedures to permit the AB to take off his lifejacket while working over the ship side. Thirdly, the bosun and his crew members did not well maintain the securing condition of the lifeline and as a result the AB fell into the water and later disappeared.

5.16 The chief officer, assisted by the bosun, was the supervisor of the work. The work started at 0815 and finished at 0900 when the accident happened. It was performed in an unsafe condition without intervention by the bosun and the chief officer. The supervision was not sufficient.

Familiar with the operation of rescue boat engine

5.17 A rescue boat was launched into the water immediately after the accident. However, the crew failed to start and run the rescue boat engine.

5.18 According to maker's operation instruction displayed inside the rescue boat, the fuel control lever of the engine should be kept at the minimum position after starting to allow the engine to pick up speed before increasing the fuel throttle. However, the crew pushed the fuel control lever to maximum position immediately after starting of the engine and this caused the engine failure. Even the crew had taken several attempts, they still failed to start the engine.

6. Conclusions

6.1 On 13 December 2014, a crew member of the Hong Kong registered bulk carrier "CF CRYSTAL" (the *"vessel"*) fell into the water and disappeared while the *vessel* was at the anchorage in the Port Authur, Texas, the USA.

6.2 Crew members were assigned to paint the draught marks of the *vessel* at midship on the starboard side. An able-bodied seaman (the AB) was lowered down over the ship side on a bosun chair which was hung at one end of a lifting rope while the other end of the lifting rope was secured to a structure on deck. He was secured by a lifeline that was not properly secured to the ship side railing. A lifebuoy with lifeline attached to ship side railing was to let afloat on the water surface. However, he did not wear a lifejacket as required by the company's Safety Management Manual and it was agreed by the bosun who was in charge of the work at the site.

6.3 After the painting work was completed at about 0900, the AB was lifted up by crew members on deck, and the lifting rope suddenly parted at about 2 metres above sea level. The AB fell into the water and his lifeline was detached from the ship side railing during his fall.

6.4 The AB could not grab the lifebuoy floating on the water. Another lifebuoy was thrown to him but still could not be caught by him. Soon afterwards, the AB was drown and disappeared in the water.

6.5 The vessel's rescue boat was launched into the water for search and rescue operation, but the boat engine failed to run. Coastguard launch and rescue helicopter arrived at the scene at 1005 and commenced the search and rescue operation. It was stopped at 1642 on the same day without any finding.

6.6 The investigation into the accident revealed the main contributory factors as follows : -

a) lifting rope in poor condition, due to lack of maintenance, was used for lifting the bosun chair whereon the AB was seated and it parted prematurely;
b) lack of safety awareness of crew members on board was manifested by:
    i) the AB and the bosun did not follow the established safety procedures to ensure the donning of lifejacket when working over the ship side;
    ii) the bosun and his crew members did not well maintain the securing condition of the lifeline that attached the AB to the ship side railing and as a result the AB fell into the water and disappeared; and
c) the work supervision was not sufficient.

6.7 The investigation also revealed that crew members were not familiar with the procedures to start the rescue boat engine.

7. Recommendations

7.1 A copy of this report should be sent to the master and the company of the *vessel*, advising them the findings of this incident. The owners / management company of the *vessel* should issue circular to inform all masters, officers and crew on board ships the findings of this accident investigation.

7.2 The owners / management company and master of the vessel must instruct that : -

(a) all crew members on board ship must strictly follow all shipboard safety procedures and code of safety working practice relevant to the work to be performed (for example: donning of lifejacket when working over the ship side and securing of lifeline properly);

(b) all equipment used for the work (for example : lifting rope) must be in good working conditions;

(c) officer who is in charge of work must closely monitor the safe operation of work carried out by crew members; and

(d) crew members responsible for operating survival crafts and rescue boats must be properly trained.

7.3 A Hong Kong Merchant Shipping Information Notice is to be issued to promulgate the lessons learnt from the accident.

8. Submissions

8.1 In the event that the conduct of any person or organization is commented in an accident investigation report, it is the policy of the Marine Department to send a copy of the draft report, either in part or in its entirety, to that person or organization for comments.

8.2 The draft report was sent to the following parties for their comments:

a) the shipowner, ship management company and master of the vessel; and

b) the Ship Safety Branch of the Marine Department.

8.3 During the consultation period, comment from the manager of the vessel was received and had been properly considered and the report has been amended. No comment was received from the rest of the recipients.