Report of investigation into the fatal accident of the Bosun on board the Hong Kong registered bulk carrier "*Grand Amanda*" at sea on 18 October 2017

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

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Purpose of Investigation

The purpose of this investigation, conducted by the Marine Accident Investigation Branch (MAIB) of Marine Department, is to determine the circumstances and the causes of the incident with the aim of enhancing the safety of life at sea and avoiding similar incidents in future.

It is not intended to apportion blame or liability towards any particular organization or individual except so far as necessary to achieve the said purpose.

The MAIB 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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Summary

On 18 October 2017 at about 1410 hours, a fatal accident happened on board the Hong Kong registered bulk carrier *Grand Amanda* (*the vessel*) at sea when she was en route from Bahia Blanca, Argentina to Zhoushan, China. The Bosun and a sailor (Sailor A) used the provision crane as a movable working platform to paint the underdeck area of C Deck. Due to adverse weather, the provision crane moved fast towards the port side until stopped violently by the stopper plate. Afraid of the sudden uncontrolled move of the crane towards the shipside, the Bosun and Sailor A jumped from the provision crane onto A Deck. After landed, Sailor A saw the Bosun lying on A deck with his legs seriously injured with bleeding. Immediate medical assistance from the coastal state could not reach *the vessel* due to adverse weather, the Bosun was declared dead by the Master the next day.

The investigation identified that there was no clear working order avoiding working aloft in adverse weather when the Chief Officer assigned the painting task to them. Furthermore, the Bosun and Sailor A should not use the provision crane as the movable working platform when *the vessel* was underway.

The investigation also found that the Bosun was transferred from the accident scene to the tally office on A Deck instead of the hospital located on the same deck for proper medical treatment.

1. Description of the vessel

Ship name	:	*Grand Amanda* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9566813
Type	:	Bulk Carrier
Year built, shipyard	:	2011, Zhoushan Jinhaiwan Shipyard Co. Ltd.
Gross tonnage	:	43,501
Net tonnage	:	27,819
Summer deadweight	:	79,600 tonnes
Length overall	:	229 metres
Breadth	:	32.26 metres
Engine power, type	:	11,900 kW, MAN B&W 5S60MC-C8
Classification society (Class)	:	American Bureau of Shipping (ABS)
Registered owner	:	Grand Changjiang Shipping Limited
Management company	:	Haiyou Ship Management (Shanghai) Co. Ltd.

Figure 1 *The vessel*

2. Sources of evidence

2.1 The Master, the Chief Officer and one sailor of *the vessel*.

2.2 The management company of *the vessel*.

3. Outline of events

(All times are local time, UTC + 2 hours.)

3.1 After loading of 66,000 tonnes of soybean at Bahia Blanca, Argentina, *the vessel* departed for Zhoushan, China on 1 October 2017.

3.2 At 0700 hours on 18 October 2017, when *the vessel* was along the eastern coastal waters of South Africa, the Bosun went to the wheelhouse to receive his work order of the day from the Chief Officer. He was assigned to paint the aft area outside the accommodation.

3.3 At 1330 hours, the Bosun and Sailor A carried out painting on A Deck at the aft of the accommodation. They found that they could not reach the underdeck area of C Deck. As a result, they drove the provision crane to the port side and stood on the walkway of the provision crane. They used the provision crane as a movable working platform to paint the underdeck area of C Deck. While they were working on the provision crane, *the vessel* became rolling more severely due to the bad weather.

3.4 At about 1410 hours, when the Bosun and Sailor A were working on the provision crane, the crane suddenly lost control and moved rapidly towards the port side until stopped violently by the stopper plate. The stoppage emitted a loud banging noise. Sailor A responded to the uncontrolled movement of the crane and jumped onto A Deck through the gap between the walkways of the crane. When he landed on A Deck, he saw the Bosun lying on the deck with his legs seriously injured with bleeding. The Bosun told Sailor A that he also jumped from the provisions crane but his legs were fractured.

3.5 At about 1420 hours, the Master received Sailor A's report of the accident and went to the scene. In confirming that the Bosun had suffered a serious injury, he returned to the wheelhouse and broadcast

the accident to the crew by the public address system. He then ordered the second officer to navigate *the vessel* to the nearest port, East London of South Africa and instructed the Chief Officer to contact Maritime Rescue Coordination Centre (MRCC) South Africa for helicopter assistance.

3.6 At 1440 hours, the Master returned to the scene to command rescue operation. At the same time, the Chief Engineer reported the accident to the management company and contacted shore-based assistance.

3.7 At 1500 hours, the Bosun was transferred to the tally room on A Deck by a stretcher. Meanwhile, the Chief Officer and the management company continued to contact MRCC South Africa and the agent for helicopter and medical assistance.

3.8 At 1600 hours, the Bosun was conscious and kept on asking when the helicopter would arrive.

3.9 At about 1710 hours, medical advice was received from a doctor in China. At 1720 hours, the crew re-bandaged the Bosun's wounds according to the doctor's advice. At 1730 hours, the setting up of fluid dripping was ready. *The vessel* arrived at the position 33°30'.30 S, 028°02'.80 E, about 19 nautical miles to the reporting point of East London, South Africa.

3.10 At about 1750 hours, following the doctor's advice, the crew carried out intravenous infusion, oxygen therapy, measuring of blood pressure and body temperature. However, the Bosun started to go into unconsciousness.

3.11 At about 2220 hours, when *the vessel* was at the position about 1.5 nautical miles outside the breakwater of East London, a rescue boat carrying a doctor arrived by the side of *the vessel*. The doctor could not board *the vessel* due to adverse weather. The rescue boat then left

the vessel.

3.12 At about 0530 hours, the Bosun showed no vital signs, the Master together with the crew who carried out resuscitation decided to stop the infusion and oxygen therapy. The Bosun was declared dead by the Master when the *vessel* was at position about 33°05.95'S, 028°00.00'E.

3.13 At about 1007 hours, the management company advised the Master to keep the body on board. The Bosun's body was transferred to the refrigerated meat room.

3.14 At 1240 hours, *the vessel* continued her passage to Zhoushan, China.

3.15 *The vessel* arrived at Zhoushan on 16 November 2017 and the dead body of the Bosun was transported to his hometown. The management company arranged disinfection of the accommodation and the refrigerated meat room of *the vessel*.

4. Analysis

Certification, training and experience

4.1 *The vessel* was manned by a total of 23 crew members including the Master. The statutory trading certificates of *the vessel* were valid and in order.

4.2 Master held a valid Class 1 licence of the Deck Officer. He was in charge of *the vessel* for about 5 months and was in the capacity of master for more than two and a half years.

4.3 Chief Officer held a valid Class 1 licence of the Deck Officer. He joined *the vessel* in February 2017 and was in the capacity of Chief Officer for about two and a half years.

4.4 The Bosun was in the capacity of Bosun for more than one year. Both the Bosun and Sailor A joined the *vessel* in March 2017.

4.5 There were no abnormalities found with regard to crew's certification and experience.

Fatigue, alcohol and drugs

4.6 There was no evidence to show that any crew involved, including the Bosun, was suffered from fatigue at work. There was also no evidence of alcohol and drug abuse of the Bosun.

Weather and sea conditions

4.7 There was northerly wind with Beaufort Wind Scale force 6 and wave was about 3 to 4 meters high. The sea condition was rough on the day of the accident and was considered as a contributory factor to the accident.

Provision crane

4.8 The provision crane was an electric monorail crane installed under C Deck (Figure 2). Its main structure consisted of a runway beam and a gangway beam (Figure 3). The general specifications of the provision crane are as follows:

Safe working load (SWL)	4 tonnes
Working radius (Maximum)	5.0 metres
Working radius (Minimum)	2.0 metres
Minimum design service temperature	-20℃
Maximum angle of trim	2 degrees
Maximum angle of heel	5 degrees either way
Maximum wind speed during operation	18m/s
Maximum wind speed in non-working condition	44m/s

4.9 The provision crane was designed and used for lifting food provisions or spare parts within the SWL when *the vessel* is not underway. Even not underway, the provision crane must be operated within the operational limits as set out in paragraph 4.8 above (e.g. the wind speed, trim and heeling angles etc.). In terms of the heeling angle, the maximum angle is 5 degrees either way which means that the braking system might not be able to hold the provision crane in position when the heeling angle is beyond 5 degrees. This limit of heeling angle might be reduced further when the crane is subjected to strong wind. On the day of the accident, the Bosun and Sailor A used the provision crane as the movable working platform when *the vessel* was underway in adverse weather. The wind force scale at 6 would imply that the gust speed could probably be higher than force 8 (i.e. 18 m/s)[1]. With

[1] According to Hong Kong Observatory, gusts brought by intense thunderstorms last for shorter duration, but with larger fluctuations associated with the rapid development and dissipation of thunderstorms. Even though

the vessel rolling heavily, the braking system might not be able to hold the gangway beam resulting in its rapid movement along the runway beam. Apparently, the loss of control of the provision crane was caused by the working environment which was beyond the designed working condition.

4.10 The last annual inspection of the provision crane by the Class of *the vessel* was carried out on 27 May 2017. The latest inspection by the engine room crew was done on 5 August 2017.

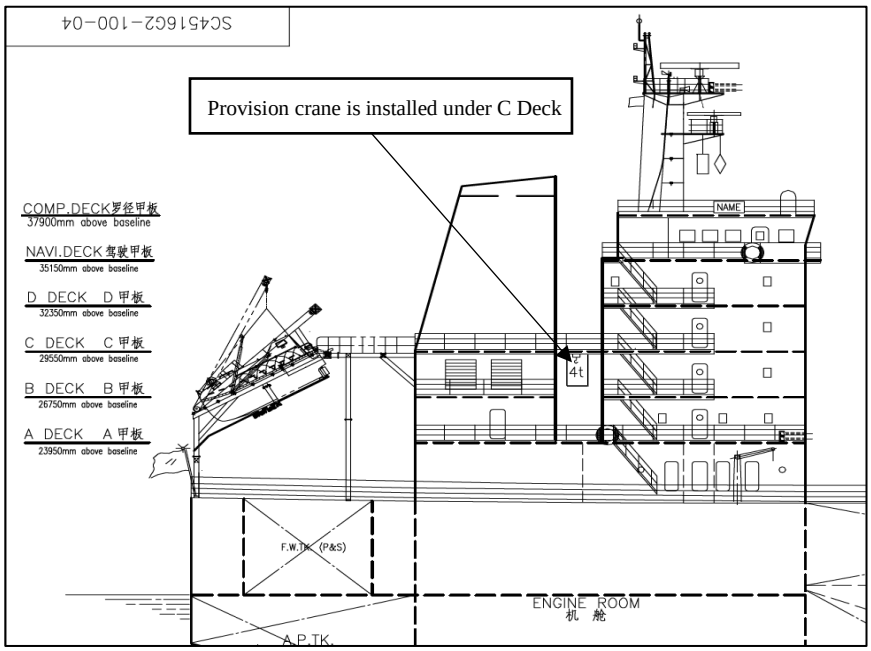

Figure 2 Location of the provision crane

the gusts brought by thunderstorms can be rather short-lived, they can be astonishingly destructive due to the rapid soar of wind speeds. (https://www.hko.gov.hk/en/education/weather/meteorology-basics/00529-gust-vs-sustained-wind.html)

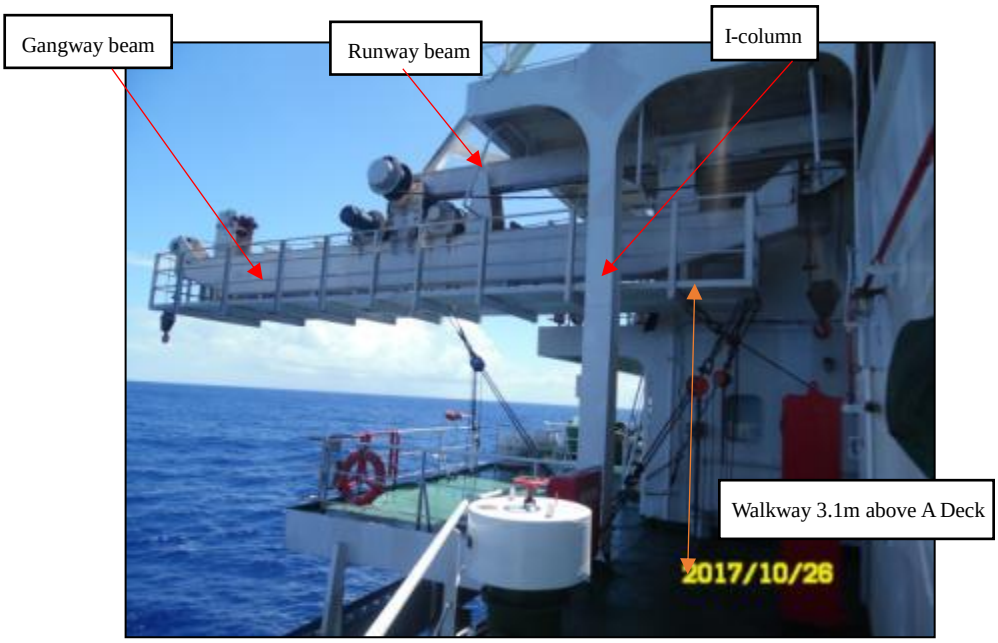

Figure 3 Construction of the provision crane

Probable cause of the accident

4.11 The gangway beam of the provision crane was a box structure with two walkways on sides leaving a space of about 350 mm between them (Figures 4 and 5). There were two I-columns at port and starboard sides of A Deck to support the C Deck structure (Figure 6). There was a gap of about 100 mm between the gangway beam and the I-column (Figure 7). Under normal working condition, the provision crane was held in position by the crane's braking system. The travel distance of the provision crane to the ends (port and starboard) is limited by limit switches. For fail-safe arrangement in case that the limit switches fail to stop the provision crane, the crane will be stopped by a stopper plate fitted at the end of the runway beam (Figure 8).

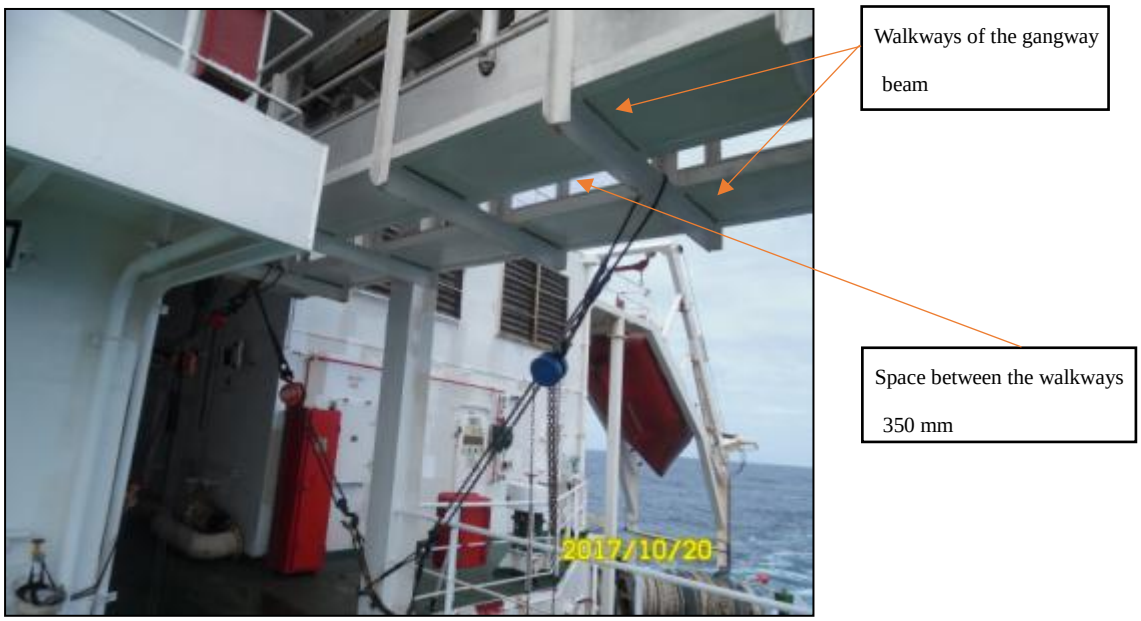

Figure 4　Walkways of the gangway beam of the provision crane

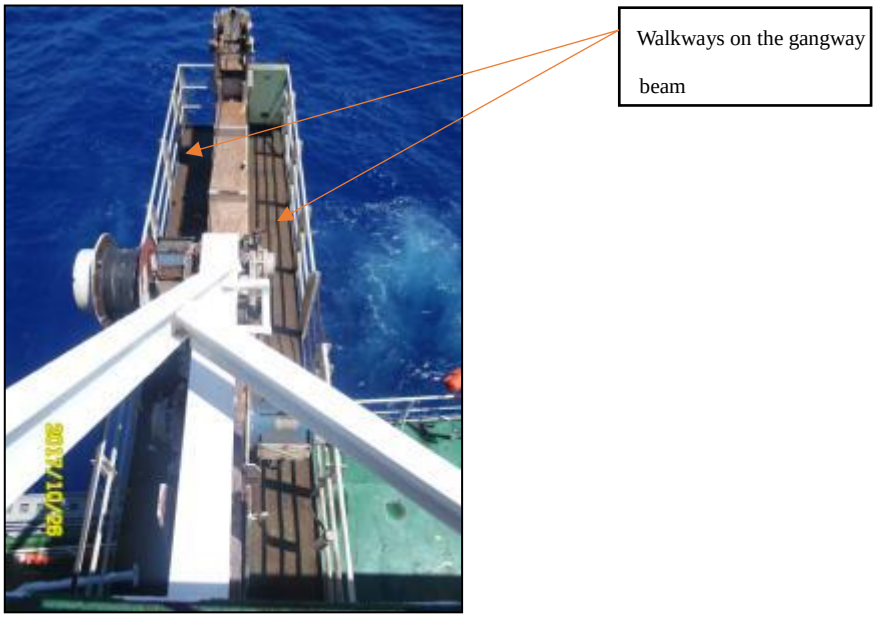

Figure 5　Top view of the walkways of the gangway beam of the provision crane

Figure 6 I-column connecting A Deck and C Deck

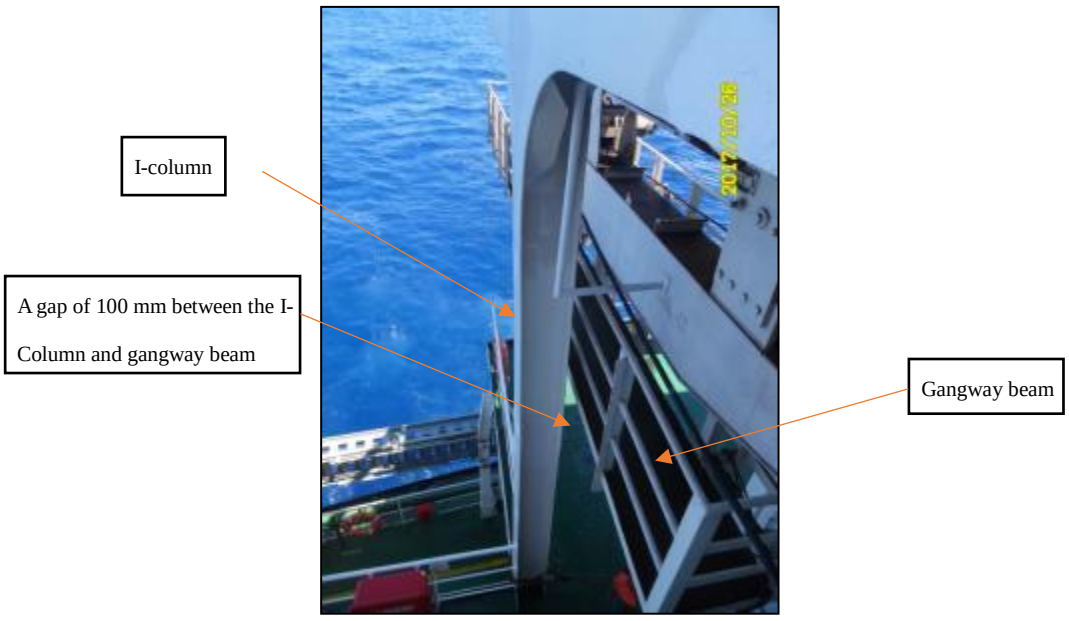

Figure 7 A gap of 100mm between the I-column and gangway beam

Figure 8 Stopper plate of the provision crane on the runway beam

4.12 Based on the evidence, the probable cause of the accident was deduced as below. On the afternoon of 18 October 2017, the Bosun and Sailor A used the provision crane as the working platform to paint the underdeck area of C Deck. *The vessel* was rolling in adverse weather condition. The rolling motion overcame the designed braking force of the provision crane causing the crane moved unexpectedly towards the port side (Figure 9(a)). Both the Bosun and Sailor A were responded intuitively and jumped over the walkway. The Bosun's legs were trapped and crushed in the space between the I-column and the gangway beam (Figure 9(b)). He then fell onto A Deck with his legs fractured and bleeding (Figures 10 and 11). The Sailor A jumped onto A Deck through the space between the walkways (Figure 9(c)). The provision crane was then stopped by the stopper plate. When Sailor A was on A Deck, he saw the Bosun lying on the deck near the I-column.

4.13 The ABS surveyor conducted the damage inspection of the provision crane on 19 November 2017 and found that both the reduction gearbox and the travelling motor were damaged.

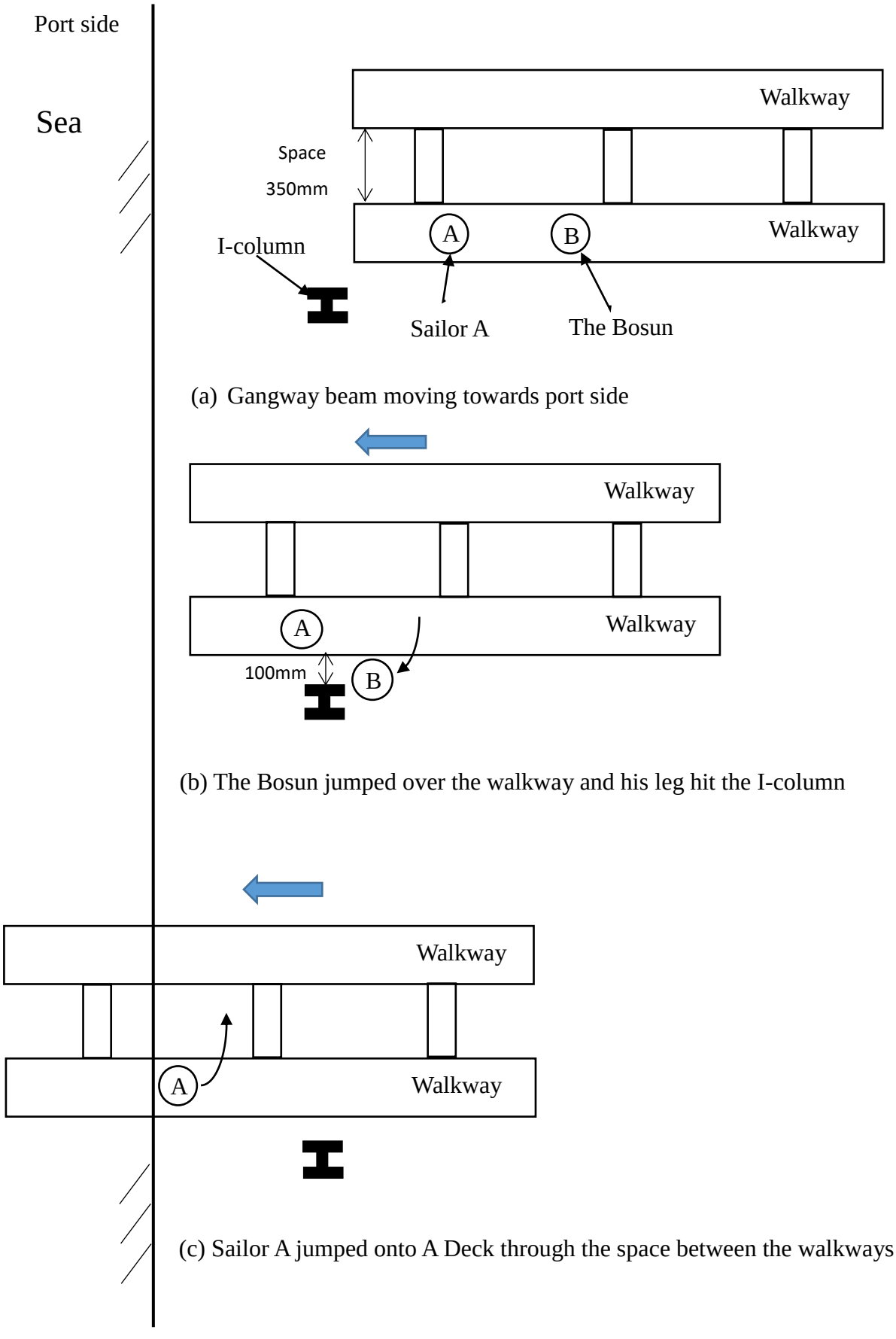

Figure 9 Sketch showing the probable responses of the Bosun and Sailor A when the provision crane moved towards port side

Figure 10 The blood stains near the I-column

Figure 11 Blood stains on the I-column

Safety awareness

4.14 According to the Chief Officer, he ordered the Bosun to paint the aft of the accommodation on the morning of the accident day. However, he did not instruct the Bosun to use the provision crane as the movable working platform. From Sailor A, he was told by the Bosun that they would go onto the provision crane to paint the underdeck area of C Deck. Sailor A followed the Bosun's instruction and did not know whether it was the Chief Officer's instruction or the Bosun's idea to use the provision crane for the job. Sailor A did not know whether permission of working aloft by using the provision crane as the movable working platform had been sought from Chief Officer or Chief Engineer.

4.15 There was no evidence to ascertain who gave the permission of working aloft by using the provision crane as the movable working platform for the job. On a day of bad weather, the Chief Officer should give clear safety instruction to the Bosun to avoid working aloft. Without clear safety instruction from the Chief Officer, the Bosun and Sailor A showed their insufficient safety awareness by working aloft in bad weather.

4.16 Unless authorization was obtained, the crew should not operate the provision crane for purpose other than lifting. In the accident, the provision crane was operated as the movable working platform for persons working on top in adverse weather condition. Neither risk assessment, proper planning nor other safety procedures, e.g falling prevention, clamping the platform, etc. was implemented.

4.17 The crew was lack of knowledge on the safe use of the provision crane and its operational limits, i.e. general specifications mentioned in paragraph 4.8. As such the Bosun and Sailor A failed to operate the

provision crane safely when proper planning, appropriate safety precautions and protections, etc. were not provided.

Medical treatment

4.18 The accident happened at the port side of A Deck. Instead of taking the Bosun to the ship's hospital located at the starboard side of A Deck for better treatment, it was quite unusual that the Bosun was transferred by a stretcher to the tally office on A Deck at the port side for first aid treatment. Though the convenience for the timely application of the first aid treatment for the Bosun was the reason as explained by the company, the practice was not recommended.

5. Conclusions

5.1 On 18 October 2017 at about 1410 hours, when *the vessel was* at the eastern coastal waters of South Africa and en route to Zhoushan, China, the Bosun and Sailor A used the provision crane as the movable working platform to paint the underdeck area of C Deck. Due to heavy rolling of *the vessel*, the braking system of the provision crane failed to hold the crane at position. As a result, the crane moved quickly towards the port side. The Bosun and sailor A jumped from the provision crane onto A Deck. However, the Bosun hit himself onto the I-column and was seriously injured. He was declared dead onboard the next day.

5.2 The investigation found that the uncontrolled movement of the provision crane was probably caused by the heavy rolling of *the vessel* under adverse weather condition which overcame the holding power of the crane's braking system. The strong wind blowing to the heeling side could make the situation worse.

5.3 The investigation had identified the following contributory factors in this accident and lessons learnt to avoid recurrence of similar accidents:

(a) the crew was lack of general safety awareness. The senior officer should provide clear working order and safety instruction to avoid working aloft in adverse weather condition; and

(b) the crew was lack of knowledge on the safe use of the provision crane and its limitations. The knowledge should include the understanding of the safe operational limits of the provision crane, i.e. the ship's angles of heel and trim, etc. before using it and its usage was for lifting purpose only.

5.4 The investigation also identified that the Bosun was transferred from

the accident scene to the tally office on A Deck instead of the hospital on the same deck. The tally office was not designed for medical treatment. The hospital equipped with essential medical equipment, such as oxygen cylinder and fluid dripping equipment etc., should always be used for injured persons.

6. Recommendations

6.1 The management company of *the vessel* is recommended to:

(a) issue notice/circular to draw the attention of their masters, officers and crew to the findings of the investigation;

(b) require its fleet to follow company's procedure/instruction for working aloft; and

(c) remind its fleet that a patient or a casualty should always be transferred to ship's hospital for medical treatment.

6.2 A Hong Kong Merchant Shipping Information Note should be issued to promulgate the lessons learnt from this accident.

7. Submission

7.1 The draft investigation report had been sent to the management company and the Master of *the vessel* for their comments.

7.2 During the consultation period, comment from the management company was received and the report has been amended as appropriate.