Report of the investigation into a fatal accident on board *"Seaspan Expeditor"* at Western Anchorage No.3, Hong Kong on 17 August 2016.

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

15 November 2018

Purpose of Investigation

The purpose of this investigation conducted by the Marine Accident Investigation and Shipping Security Policy Branch (MAISSPB) of Marine Department 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.

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 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 At about 1529 hours on 17 August 2016, a fatal accident happened to a fitter on board a Hong Kong registered container ship "Seaspan Expeditor" (*the vessel*) anchored at Western Anchorage No.3 in Hong Kong.

1.2 In the afternoon on 17 August 2016, *the vessel* received back the machinery parts of one cylinder head and two exhaust valves of the main engine that had been delivered ashore on the first day of arrival in Hong Kong. The machinery parts were first placed on the aft main deck of *the vessel* and then transferred item by item using the ship's mono rail hoist through the skylight hatch into the engine room. All the machinery parts would be placed and secured on their designated stowage stands in the engine room.

1.3 The first exhaust valve was successfully transferred to the designated stowage stand in the engine room. When the second engineer was busy in securing the exhaust valve on the stand, the fitter alone handled the transfer of the second exhaust valve into the engine room. The fitter placed the second exhaust valve (about 3 tonnes in weight) on a removable floor plate (*RFP*) in the engine room, and released the hoisting hook.

1.4 Soon after the hoisting hook was released, the exhaust valve toppled and crushed the fitter at his left side abdomen causing serious injury. The fitter was immediately rushed to hospital by an emergency paramedic helicopter, but he was declared dead on arrival at the local Tuen Mun hospital.

1.5 The investigation identified that the main contributory factor to this incident was due to the *RFP* being overloaded by the exhaust valve. The 6 mm thick *RFP* was designed as an access cover for piston rod complete (i.e. piston rod together with piston as a set) and was not meant for the use as a landing platform to support an object of 3-tonne weight. As a result of the overloading, the *RFP* deformed thus toppled the exhaust valve crushing the fitter to death.

1.6 The following safety issues were also identified:

(a) the crew should be assigned to work in group rather than leaving the fitter to handle the exhaust valve transfer operation alone; and

(b) the toolbox talk made neither any discussion nor risk assessment about the operation of the receipt of heavy machinery parts.

2. Description of *the vessel*

Name of vessel	:	***Seaspan Expeditor*** (Figure 1)
Flag	:	Hong Kong, China
Port of Registry	:	Hong Kong
IMO Number	:	9251389
Ship type	:	Container carrier
Year built, shipyard	:	2003, Mitsubishi Heavy Industries Ltd - Kobe
Gross tonnage	:	53,822
Net tonnage	:	30,660
Summer deadweight	:	63,098 tonnes
Length	:	285.22 metres
Breadth	:	32.22 metres
Main engine & power	:	1 x Sulzer 9RTA96Cl diesel engine, 49,410 kW
Classification society	:	American Bureau of Shipping (ABS)
Management company	:	Seaspan Ship Management Ltd.

Figure 1: Seaspan Expeditor

3. Sources of evidence

3.1 The information from the management company of *the vessel*.

3.2 The weather report from the Hong Kong Observatory.

3.3 The autopsy report from the Department of Health, Hong Kong.

4. Outline of events

(All times were local time GMT + 8 hours)

4.1 *The vessel* arrived in Hong Kong on 11 August 2016 and transferred some machinery parts (three exhaust valves, two cylinder heads and one piston rod complete of the main engine) ashore at the anchorage. The *vessel* then waited for delivery to her new owner.

4.2 On 15 August 2016, the company instructed that two exhaust valves and one cylinder head would be returned back to *the vessel* on 17 August 2016. Furthermore, fuel oil and lubrication oil of *the vessel* would also be unloaded to a bunker barge on the same day. As such, three groups of crew were formed to handle these two tasks simultaneously.

4.3 A toolbox talk was held which had focused on the safety of oil transfer as *the vessel* would be penalized should there be any oil spill. No discussion was made with regard to the receipt of machinery parts.

4.4 Group 1 of the crew was assigned to deal with oil transfer. For receiving back the machinery parts, it was assigned to two groups, Group 2 on deck and Group 3 in the engine room. The fitter was allocated to Group 3 (i.e. in the engine room).

4.5 On 17 August 2016, the Hong Kong Observatory issued a tropical cyclone warning signal No.1 at 1130 hours. The delivery of the machinery parts to *the vessel* started at 1315 hours that day. The delivered machinery parts were firstly placed on the aft main deck of *the vessel*. The parts were then transferred to the engine room one by one through the skylight hatch by using the mono rail hoist on the after main deck. Once landed in the engine room, the engine room overhead crane was used to shift the machinery parts to their designated stowage stands.

4.6 Upon the first exhaust valve had successfully placed to its designated stowage stand, the second engineer was busy to secure the valve. The fitter was then left alone to handle the transfer of the second exhaust valve.

4.7 The fitter guided the second exhaust valve to land on a *RFP* and then released the hoisting hook. Upon the hoisting hook was released, the *RFP* was deformed and the exhaust valve toppled, striking the fitter at his left abdomen causing serious injury (Figure 2).

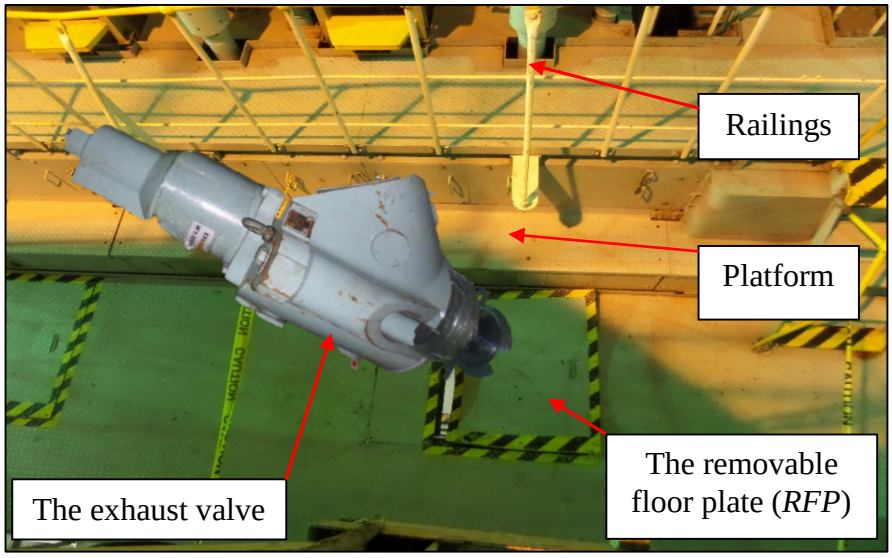

Figure 2: Illustration of the toppled exhaust valve

4.8 The crew on deck noticed the incident and raised the alarm by shouting. The second engineer was also aware of the incident and immediately informed the second officer on the bridge by walkie-talkie. The second officer then activated the general alarm to initiate the rescue operation. The ship's master reported the incident to his local agent immediately, and requested for emergency help from the port authority.

4.9 The fitter was taken to local Tuen Mun hospital by helicopter for emergency medical treatment but was declared dead upon arrival at the hospital.

5. Analysis

Ship's manning and certification

5.1 *The vessel's* crew of 20 consisted of Ukrainian, Chinese, Indian, Sri Lankan and Philippine nationals and the manning complied with the flag State's minimum safe manning requirements.

5.2 The second engineer and the fitter involved in the transfer of the machinery parts in the engine room held valid certificates respective to their posts. The Filipino second engineer became a second engineer in 2008. He joined *the vessel* on 25 April 2016.

5.3 The Indian fitter had worked as fitter since 2004. He joined *the vessel* on 24 April 2016. Before joining *the vessel*, he completed a two-day training course "Ratings training on personal safety" in the company training centre in Mumbai, India.

Weather and sea condition

5.4 At the time of the incident, tropical cyclone No.1 warning signal was issued. The weather condition was cloudy with shower. The wind was north-east force 5 and was intensifying continuously. The sea was moderate swell. As advised by the crew, they did not experience apparent rolling of *the vessel* during the transfer of the machinery parts. Therefore, weather and sea conditions were not considered to be the factors causing the incident.

Fatigue, drugs and alcohol abuse

5.5 *The vessel* arrived in Hong Kong on 11 August 2016 and stayed at anchorage. The investigation did not reveal that the fitter was subjected to fatigue. There was also no evidence that *the vessel*'s crew had been subjected to drug or alcohol abuse.

Cause of death

5.6 The autopsy report of the fitter concluded that the direct cause of death was "traumatic rupture or mesenteries with massive haemorrhage". It matched with the situation that the fitter was heavily struck by the exhaust valve on his abdomen.

Failure of the *RFP*

5.7 A box-shaped reinforced structure platform (Figure 3) was provided in the engine room to stow cylinder heads and piston rod complete. A *RFP* with size about 800 mm in square length and 6 mm thick plating was fitted on the platform as the access for the piston rod complete to pass through (Figure 4). The *RFP* should have been fixed to the underneath supporting framework of the platform by securing screws but these securing screws were missing at the time of the incident. Warning stripe around the *RFP* was marked in conspicuous color and pattern to distinguish it from the surrounding floor plates (Figure 5).

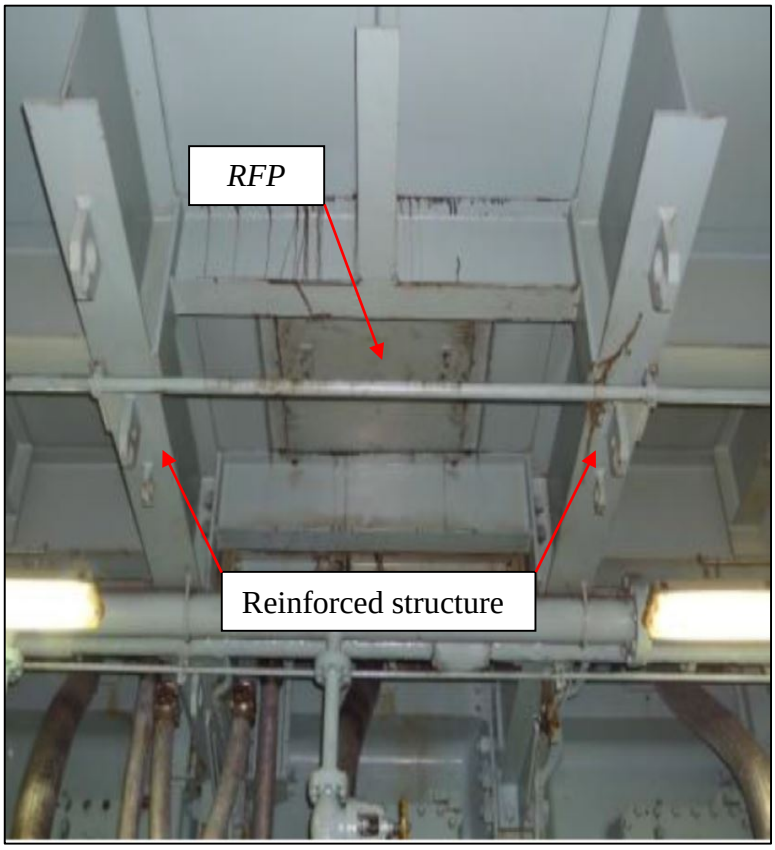

Figure 3: Supporting framework underneath the *RFP* (looking upward)

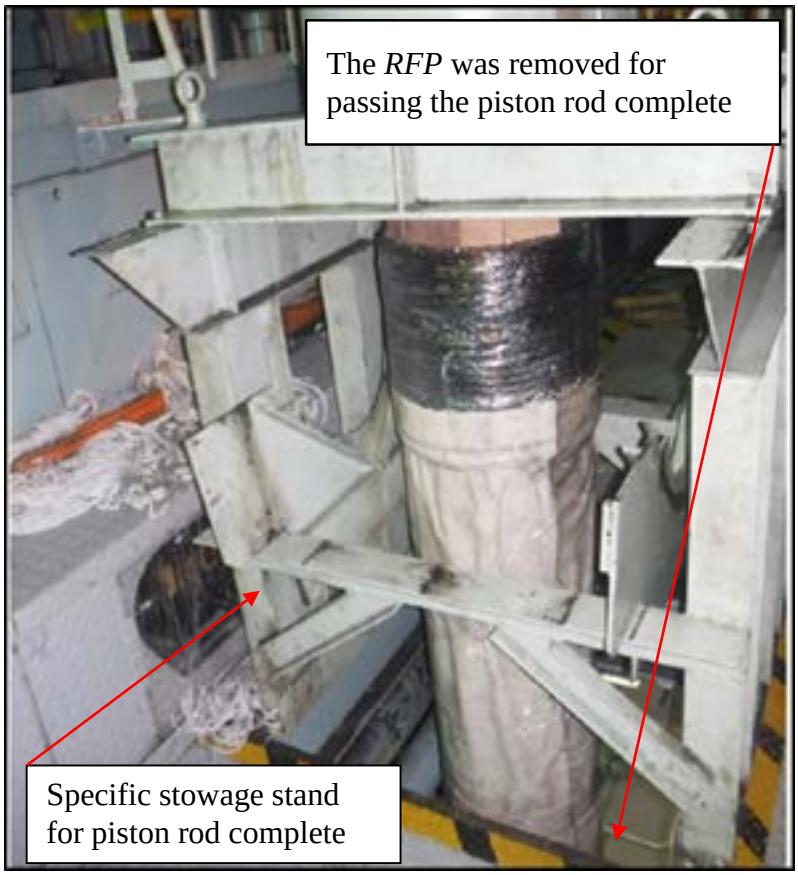

Figure 4: Specific stowage stand for piston rod complete with the *RFP* removed

5.8 As stated in the above paragraph, the *RFP* was the access for the piston rod complete to pass through but was not meant for the use as a landing place to support heavy object such as the exhaust valve which was about 3 tonnes in weight. Placing the exhaust valve on the *RFP* would undoubtedly deform the *RFP* causing the exhaust valve overbalanced and toppled.

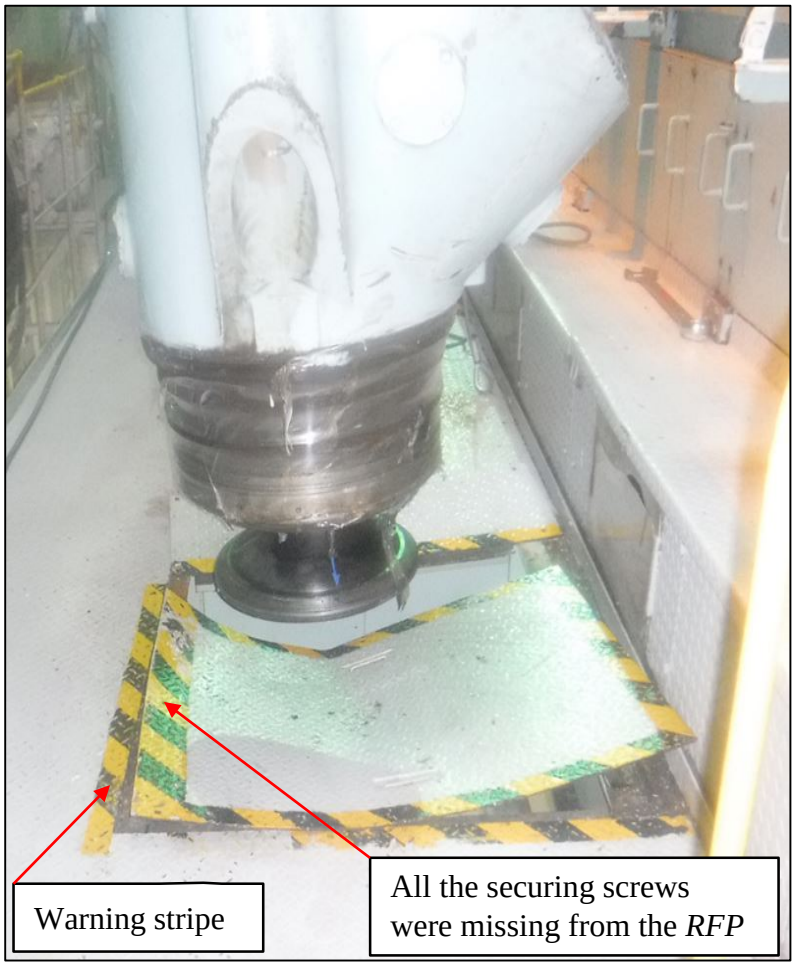

Figure 5: The deformed *RFP* with exhaust valve illustrated on it

The housekeeping of the engine room

5.9 The requirement of the "*Code of Safe Working Practice for Merchant Seafarers*" states that "*Floor plates and handrails should be secured in place on completion of the work being undertaken*"[1].

5.10 In compliance with the requirement mentioned in paragraph 5.9 above, a good housekeeping practice should be maintained to secure *RFP* in place so as to maintain a safe working environment all the time. However the investigation revealed that the securing screws of the *RFP* were missing. If the *RFP* had been firmly secured to the platform by screws, the deformation of the *RFP* when loaded by the exhaust valve might not be so severe and therefore might help to lessen the chance of the exhaust valve being toppled.

[1] Code of Safe Working Practices for Merchant Seafarers , Chapter 20 Work on Machinery and Power Systems, Paragraph 20.2.25

Working alone

5.11 The investigation also revealed that when the exhaust valve was landing onto the engine room platform, the fitter was standing at a position without much room to retreat in emergency (Figure 6). Should the fitter work in group with the second engineer, he might be given with prior warning of not standing at a position with limited room to escape in emergency.

Figure 6: Illustration of the standing position of the fitter

Risk assessment

5.12 The risk assessment for the receipt of heavy machinery parts was not conducted. Safety aspects were not assessed or addressed in the toolbox talk, such as the arrangement or safety measure(s) in consideration when placing heavy machinery parts temporarily on the engine room floor; personal awareness of avoiding to stand in dangerous location; working in pair for better communication, etc.

6. Conclusions

6.1 At about 1529 hours on 17 August 2016, a fatal incident happened to a fitter on board *the vessel* at the Western Anchorage No. 3, Hong Kong.

6.2 When the second engineer was busy in securing an exhaust valve on its stowage stand, the fitter alone handled the transfer of another exhaust valve into the engine room. The fitter placed the exhaust valve (about 3 tonnes in weight) on a *RFP* in the engine room, and released the hoisting hook. Soon after the hoisting hook was released, the exhaust valve toppled and crushed the fitter at his left side abdomen causing serious injury. The fitter was rushed to hospital but was declared death on arrival.

6.3 The investigation identified that the main contributory factor to this incident was due to the *RFP* being overloaded by the exhaust valve. The 6 mm thick *RFP* was designed as an access cover for piston rod complete and was not meant for the use as a landing platform to support an exhaust valve of 3-tonne weight. As a result of the overloading, the *RFP* deformed thus toppled the exhaust valve crushing the fitter to death.

6.4 The following safety issues were also identified:

(a) the crew should be assigned to work in group rather than leaving to handle the exhaust valve transfer operation alone; and

(b) the toolbox talk made neither any discussion nor risk assessment about the operation of the receipt of heavy machinery parts.

7. Recommendations

7.1 The management company of *the vessel* should issue a safety circular to inform all masters, officers and crew of the findings of this investigation, and remind them : -

(a) to carry out proper risk assessment and / or toolbox talk in order to identify any potential safety hazards and implement appropriate safety measures to eliminate the risk of dangers when handling heavy machinery parts; and

(b) to maintain good housekeeping of the engine room in accordance with the *"Code of Safe Working Practice for Merchant Seafarers"*, i.e. floor plates or gratings should be properly secured.

7.2 A Hong Kong Merchant Shipping Information Note should be issued to promulgate the lessons learnt from the incident.

8. Submission

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

(a) the ship management company and the master of *the vessel*; and

(b) the Ship Safety Branch of the Marine Department, Hong Kong.

8.2 At the end of the consultation, there was no comment received from the ship management company, master of *the vessel* and the Ship Safety Branch of the Marine Department.