

Fatality during cargo operations on board *Johanna C* Songkhla, Thailand 11 May 2016

SUMMARY

On 11 May 2016, the chief officer on board the UK registered general cargo ship *Johanna C* fell from a large steel cargo unit that was being repositioned in the vessel's forward hold. The chief officer was moved ashore and taken to a local hospital by ambulance, but he died shortly after arrival.

The investigation identified that:

- It was inherently unsafe and unnecessary for the chief officer to stand on top of the cargo while it was being lifted; the risks of standing on a load under tension were not recognised.
- The chief officer lost his balance and fell onto the deck following the sudden and unexpected movement of the cargo and/or its lifting slings as the cargo was lifted.
- The sudden and unexpected movement of the cargo and /or its slings was possibly due to the slings slipping from their intended positions.
- The crew's response following the chief officer's fall was immediate and positive.

Following the accident, Carisbrooke Shipping Ltd, *Johanna C*'s manager, has prohibited its crews from standing on loads under tension. The Maritime and Coastguard Agency (MCA) has also taken action to include the dangers of standing on loads being lifted in its Code of Safe Working Practices. In view of the action taken, no recommendations have been made.

Image courtesy of Marc Piche, www.shipspotting.com



Johanna C

Extract from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 – Regulation 5:

“The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of such 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 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, 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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FACTUAL INFORMATION

Narrative

Johanna C arrived in Songkhla, Thailand during the morning of 10 May 2016. Cargo discharge commenced in the afternoon and was completed at 0355¹ the following morning. The vessel's crew and shore stevedores then prepared to shift 400 tonnes of heavy steel crankshaft webs (**Figure 1**) and 506 tonnes of steel pipes from hold No 2 to hold No 1 (**Figure 2**). The cargo transfer was necessary to put the vessel on an even keel draught of 5.5m in readiness for its next port, Xinhui, China.

The crankshaft webs each weighed between 37 and 46 tonnes, which meant that between 8 and 10 units needed to be transferred. *Johanna C*'s master agreed with the vessel's charterer that shore stevedores would transfer the pipes and that the vessel's crew would transfer the crankshaft webs. He and the chief officer, Laur Marin, reportedly conducted a risk assessment for the cargo shift, but they did not record it.

Between 1035 and 1800 on 11 May 2016, stevedores transferred the steel pipes from hold No 2 to hold No 1. As the transfer neared completion, *Johanna C*'s master briefed the vessel's duty crew members on the shifting of the crankshaft webs. The briefing included the method, sequence, safety and roles. The master emphasised the importance of slinging each crankshaft web at equal distances either side of the mark indicating its centre of gravity (**Figure 3**).

At 1915, *Johanna C*'s crew started to move the crankshaft webs. The bosun and an ordinary seaman (OS) were in hold No 2, the chief officer and the third officer were in hold No 1 and the master was on the quayside accompanied by two OSs. Two ABs operated the vessel's deck cranes. The crew were dressed in boiler suits, with hard hats and safety shoes. The holds were illuminated by internal lighting and the deck and quayside were floodlit.

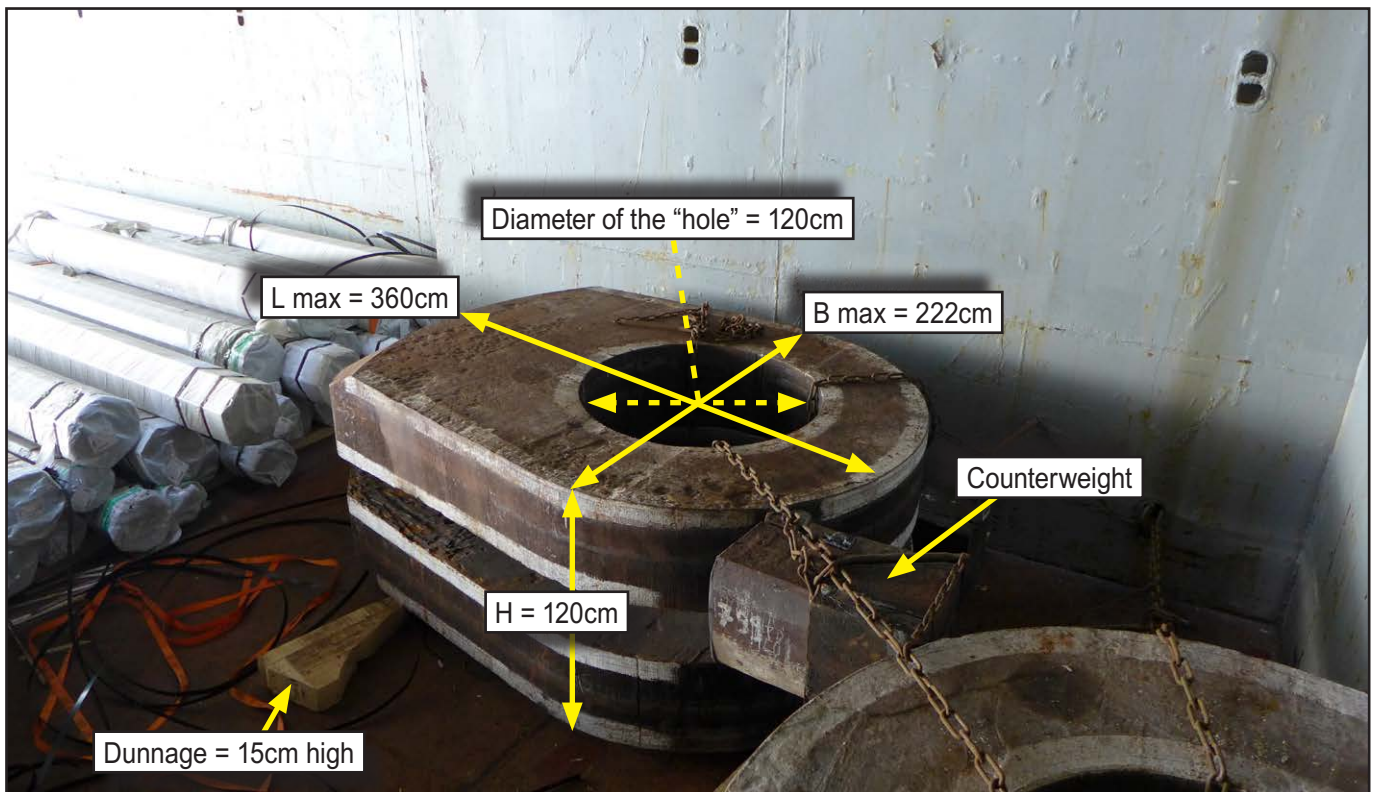


Figure 1: Crankshaft web dimensions

¹ All times are UTC (+8)

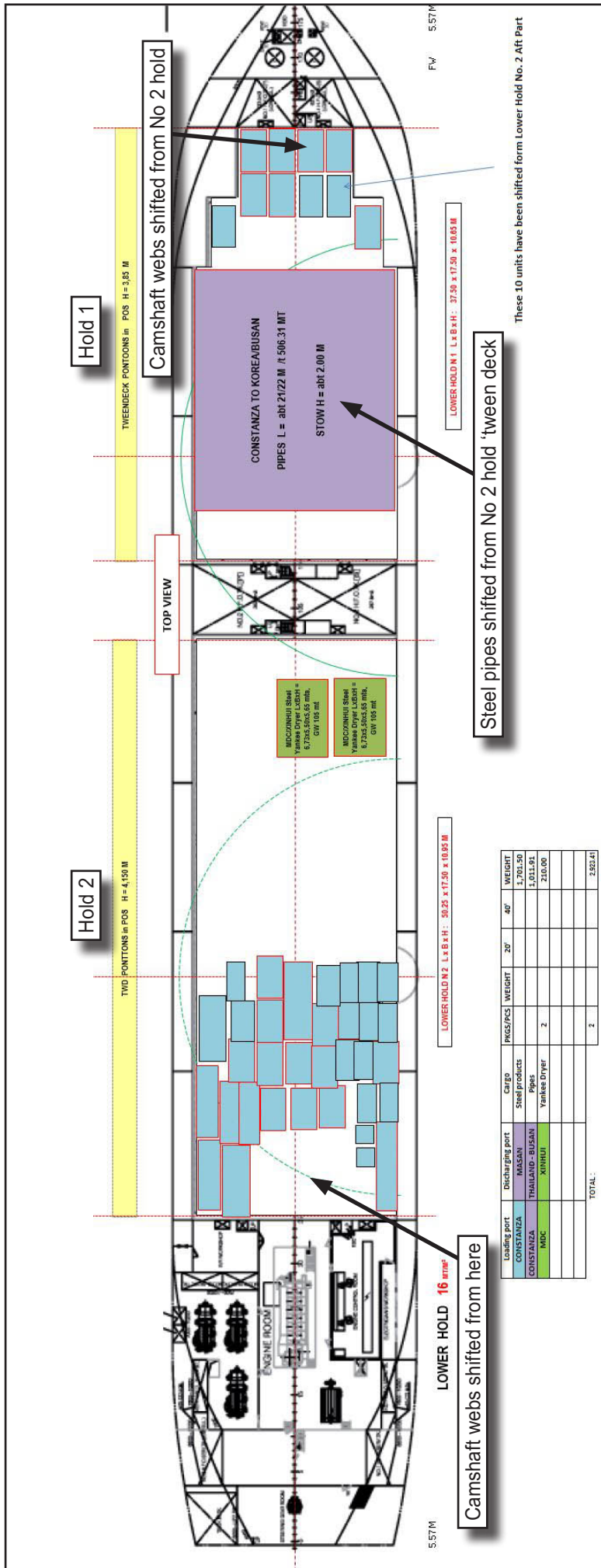


Figure 2: Cargo stowage plan for departure Songkhal

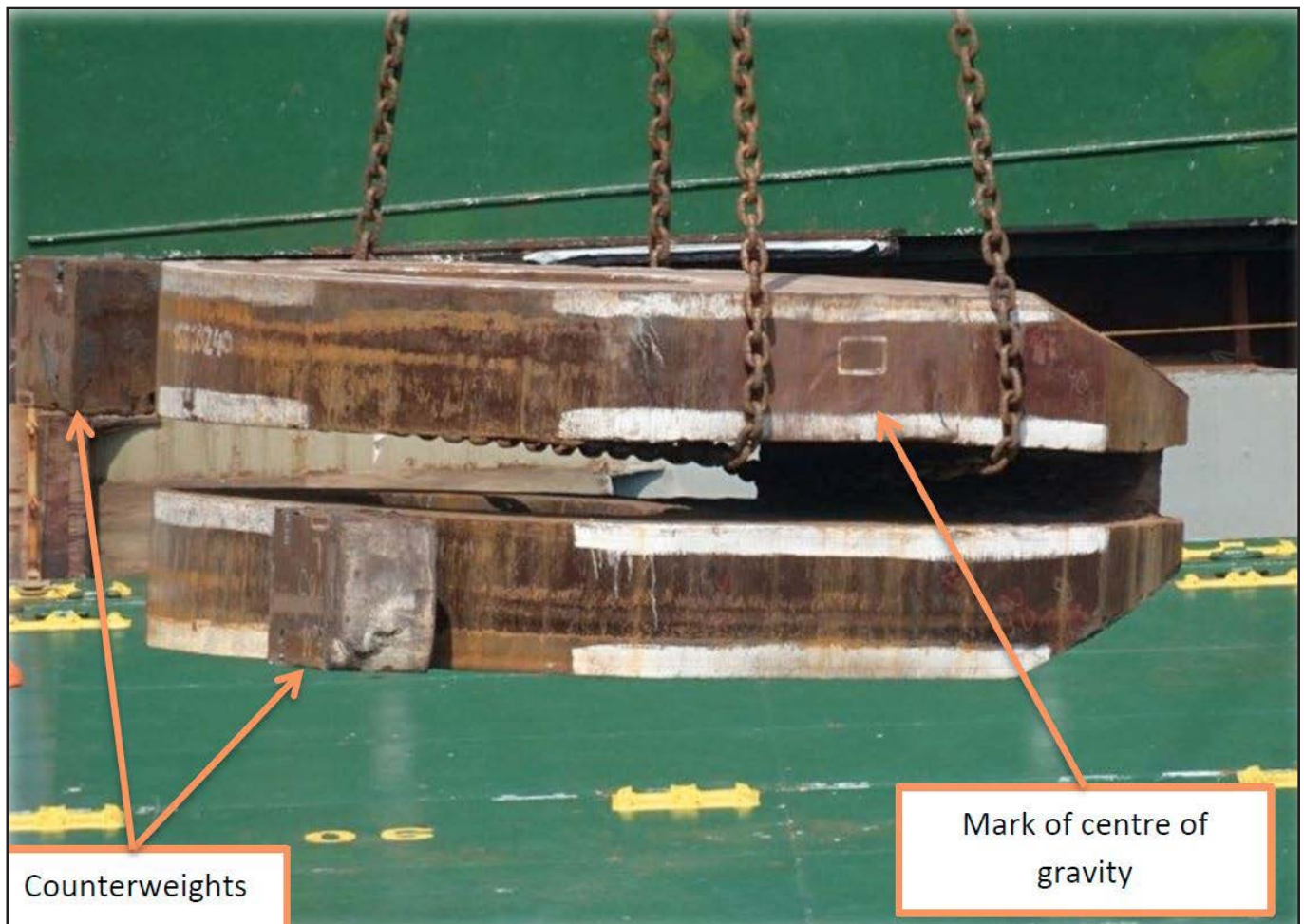


Figure 3: Crankshaft web being discharged (chain slings)

The crankshaft webs were lifted in turn from hold No 2 by the aft crane. Two 12m endless webbing slings were used to secure the cargo to the crane's hook. Each crankshaft web was landed on the quay, where the slings were transferred to the forward crane's hook. The crankshaft webs were then lifted by the forward crane and lowered onto 15cm high pieces of wooden dunnage in the forward end of hold No 1. After six crankshaft webs had been transferred, the third officer in hold No 1 changed places with one of the OS ashore. An engineer and an oiler also went to hold No 1 to rig welding equipment that was to be used to affix lashing points.

Shortly after 2230, the ninth crankshaft web was lowered into hold No 1 but it did not land square to the hold's port side bulkhead as intended (**Figure 4**). The crane driver slackened the slings but the chief officer quickly informed him via hand-held radio that the crankshaft web needed to be repositioned.

At approximately 2238, the chief officer climbed onto the top of the ninth crankshaft web. He held one of the slackened slings with his right hand (**Figure 5**) and instructed the crane driver by radio and then by hand signals to heave up slowly. Meanwhile, the OS held the slings on the inboard side of the crankshaft web to prevent them from moving out of position.

As the slings tensioned and the crankshaft web started to lift, the web and/or one of the slings jolted suddenly. The OS, engineer and the oiler in the hold heard a loud noise and saw that the chief officer had fallen into the hole in the centre of the crankshaft web.

The engineer immediately alerted the master and crane driver via his hand-held radio. The crane driver slackened the slings and the OS climbed onto the crankshaft web. The chief officer was lying on his left side with his knees bent (**Figure 6**). He was semi-conscious and bleeding around the nostrils. The OS climbed down into the hole in the crankshaft web to attend to him.

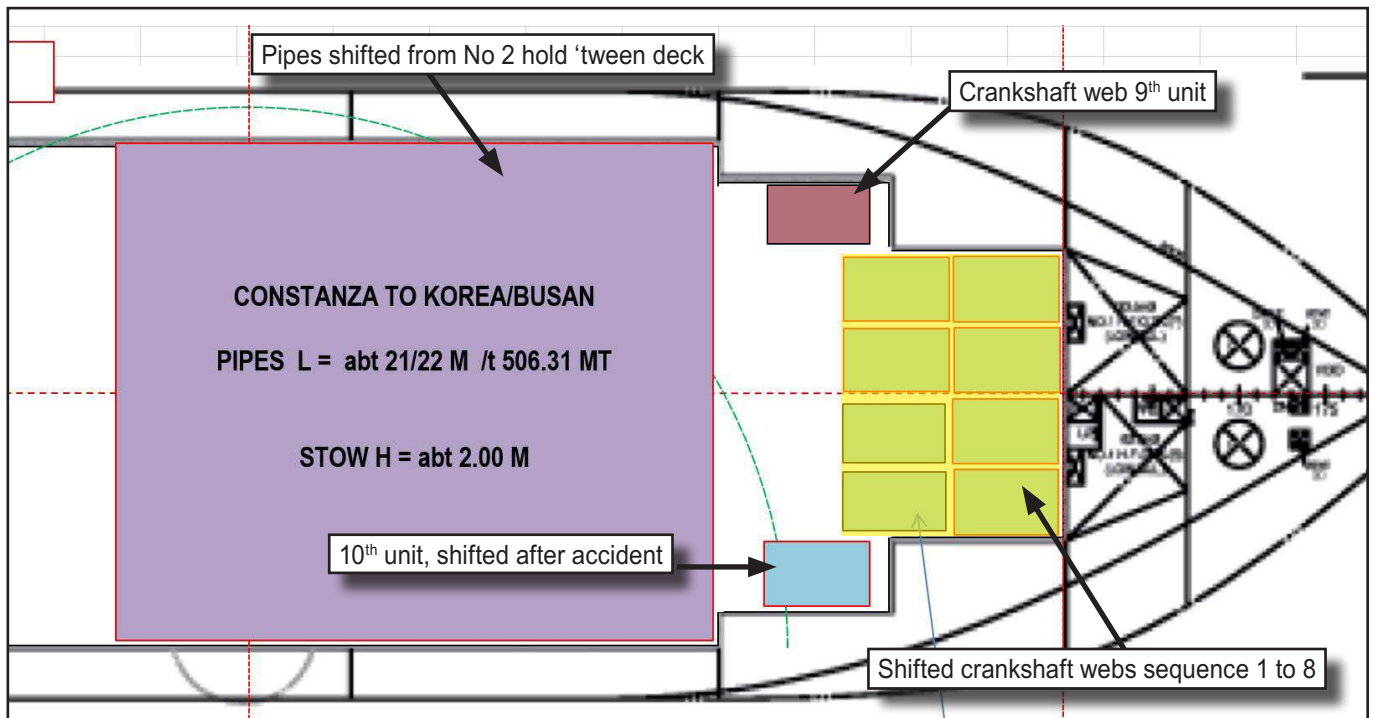


Figure 4: Disposition of cargo in hold 1



Figure 5: Position of chief officer prior to fall (simulation)



Figure 6: Position of chief officer after fall (simulation)

The master and the third officer returned on board. At 2240, the master arranged for an ambulance to attend. At the same time, the third officer roused the second officer and collected a first-aid kit and an oxygen bottle from the ship's hospital. The second and third officers went to hold No 1 where they checked the chief officer's injuries and gave him oxygen. The chief officer complained of severe pain in his right side and that he was unable to feel or move his right arm. He also had difficulty breathing. In readiness for the arrival of an ambulance, the second and third officers lifted the chief officer from inside the hole in the crankshaft web and laid him on a stretcher.

An ambulance arrived at the vessel at 2315. The chief officer was strapped in to the stretcher and lifted onto the quay by the forward crane. The chief officer was unstrapped from the stretcher and transferred into the ambulance on the ambulance's gurney. The ambulance driver was not accompanied by a paramedic so the second officer accompanied the chief officer to the hospital.

The ambulance departed at 2322 and the journey to hospital lasted approximately 25 minutes. During this period, the chief officer continued to experience difficulty with breathing, and he complained of sharp pains in his left side. The oxygen bottle provided in the ambulance was empty and the chief officer became unresponsive.

The second officer checked his vital signs and commenced cardiopulmonary resuscitation, which was continued by medical staff on arrival at the hospital. The chief officer was declared to be deceased at 0105 on 12 May 2016.

A hospital report concluded that the chief officer died as a result of '*presumed bleeding and pneumothorax² in the right chest cavity*'. Broken ribs, a broken humerus, lacerations and contusions were also noted to be among his injuries.

² MAIB note. A *pneumothorax* refers to a collection of air in the pleural cavity (between the lung and the chest wall) resulting in collapse of the lung on the affected side.

Crankshaft web position

The position of the crankshaft web immediately after the chief officer fell is shown at **Figure 7**. The aft end of the crankshaft web was closer to the ship's side than the forward end. The mark that indicated the web's centre of gravity was painted only on the lower half and towards the aft end of the side closest to the vessel's port side.



Figure 7: Position of crankshaft web post-accident

Vessel

Johanna C was a UK registered general cargo ship that was built in 2009. The vessel was managed by Carisbrooke Shipping Ltd, a privately owned shipping company based in Cowes, UK. Carisbrooke Shipping Ltd managed a fleet of over 65 dry cargo and multi-purpose vessels that ranged in size from 3000 to 20000 DWT³.

Johanna C had been on time charter to Varamar Ltd., based in Cyprus, since 12 March 2016. The vessel's first port of loading under the charter was Constanta, Romania. The vessel subsequently loaded general cargo in the Mediterranean for discharge in India and the Far East. The crankshaft webs were loaded in Constanta for discharge in the Republic of Korea.

Crew

Johanna C had 15 crew on board, all of whom held the STCW⁴ certificates of competency required for their positions on board. The crew also met the Convention's requirements concerning hours of work and rest.

The chief officer, Laur Marin, was 59 years of age and a Romanian national. He was also the vessel's safety officer, and had joined *Johanna C* on 3 April 2016. It was his first time on board the vessel and his first contract with Carisbrooke Shipping Ltd. He had previously worked on board multi-purpose general

³ Deadweight tonnage

⁴ International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended

cargo and bulk ships and had served as a chief officer for 7½ years. Laur did not hold a valid medical certificate but it is reported that he was not suffering from any medical conditions or taking prescribed medicines.

The master was 55 years of age and a Polish national. He had served as master on board a variety of Carisbrooke-managed vessels over the previous 17 years and he had joined *Johanna C* with the chief officer on 3 April 2016.

The OS in hold No 1 was 28 years old and a Filipino national. He had previously worked on board other Carisbrooke vessels and had joined *Johanna C* in Singapore on 7 May 2016 along with the third officer and the AB who operated the forward crane. The AB crane drivers were embarked specifically for cargo operations.

It was common practice for the crew on board Carisbrooke-managed vessels to be used to shift cargo. Provisions in the Charter Party allowed the crew to undertake additional work at supplementary pay rates unless prohibited by local labour rules.

Lifting equipment

Johanna C was fitted with two fixed pedestal-mounted cargo cranes with a maximum safe working load of 80 tonnes. The luffing and hoisting winches were housed within the body of the crane and were electro-hydraulically controlled. The operator controls were of the joystick type and had variable speeds. Valid test and inspection certificates for both cranes were held on board.

The two 12m endless synthetic webbing slings used to transfer the camshaft webs into hold No 1 (**Figures 5 and 7**) had a marked working load limit of 30 tonnes. The slings had been supplied as new in Turkey on 24 March 2016 and had not been used before 11 May 2016. No test certificates for the slings were held on board. Following the accident, the slings were found to be in good condition with no cuts or abrasions.

Cargo operations

Carisbrooke Shipping Ltd re-issued its safety management system and ship operating manuals in December 2015. With regard to onboard responsibilities, the SMS manual required a master, among other things, to:

Satisfy himself that all cargoes are properly loaded, stowed, lashed, carried, maintained and discharged in compliance with the requirements of the Charter Party.

Johanna C's operating manual provided detailed instructions intended to ensure the safe conduct of cargo operations. These included:

It is of critical importance that lifting operations for project cargoes⁵, including heavy pieces, are planned properly. Detailed plans should be made jointly by the Master, a Company representative (i.e. Loading Master) and a Charterer's and/or Shipper's representative. A Cargo Superintendent (Super Cargo) and the carrier's P&I surveyor may also in some cases be involved at the planning stages, although most commonly involved in the loading and lashing.

Detailed information of the cargo should be provided, including a description, its gross weight and principal dimensions. Where required, information such as gross weight and centre of gravity should be marked on each individual unit and clearly visible to the crew and stevedores involved in the handling of said cargo. Careful assessment should also be made of the arrangements at both the load and discharge port.

⁵ MAIB note. 'project cargo' was defined in the manual as a term used to broadly describe large, heavy, high value and critical pieces of equipment for transportation in Company ships [sic]

All lashing materials shall be accompanied by approval and/or inspection certificates and be checked prior to every use to confirm they are of appropriate strength, design and condition for the cargo being secured.

The Master shall conduct a full Risk Assessment before allowing any heavy lifting operations to start.

It must be ensured that the loading and discharging of heavy lift cargoes are conducted only during daylight and in suitable weather conditions to minimise the risks associated with handling heavy lifts during hours of darkness.

The ship's crew should be clearly instructed and authorised to stop any lifting operations, if they have any safety concerns.

The Company has a dedicated Loading Master ashore who is available to assist and support the Master with any cargo that may be loaded. [email address supplied].

Code of Safe Working Practices

All UK registered vessels are required to carry the Code of Safe Working Practices for Seafarers, 2015 edition (COSWP), which is published by the Maritime and Coastguard Agency. The COSWP draws attention to the requirement for safe operation in the use of lifting equipment and includes:

19.11.1 Every lifting operation must be:

- subject to risk assessment;*
- properly planned;*
- appropriately supervised; and*
- carried out in a safe manner.*

19.11.4 No person should be lifted except where the equipment is designed or specially adapted and equipped for that purpose, or for rescue or in emergencies.

19.11.7 Loads should, if possible, not be lifted over a person or any access way, and personnel should avoid passing under a load that is being lifted.

19.20.1 Except under the conditions required by paragraph 19.20.2, no lifting equipment shall be used for lifting persons unless it is designed for the purpose.

28.4.4 Loads being lowered or hoisted should not pass or remain over any person engaged in any work in the cargo space area, or over means of access. Personnel should take care when using access ladders in hatch squares whilst cargo operations are in progress.

With regard to working at height, COSWP states:

17.1.1 Anyone working in a location where there is a risk of falling may be regarded as working at height. This includes undertaking work inside a tank, near an opening such as a hatch, or on a fixed stairway.

ANALYSIS

The fall

The chief officer's fall down the hole in the crankshaft web onto the deck was almost certainly caused by his loss of balance when the web and/or lifting slings jolted as the slings were tensioned. As no defects or deficiencies were found with the lifting slings or the crane's operation, the sudden and unexpected movement must have been caused by other factors, such as the slings not being correctly positioned either side of the web's centre of gravity mark.

The slings were slackened only a few centimetres after the ninth crankshaft web was landed, but this could have been sufficient for them to move out of position with respect to the centre of gravity mark. As the mark was on the lower half of the web's outboard side (**Figure 7**), it would not have been visible to the OS who was standing on the inboard side. It would also have been difficult to see when viewed from above as the aft end of the web was close to the ship's side. If the slings were incorrectly positioned when they were tensioned, the load would have become un-balanced. As a result, the likelihood of at least one of the slings slipping and causing the crankshaft web to drop at one end would have increased significantly.

Unsafe practice

Standing on top of the crankshaft web, which was 1.35m above the deck and being lifted, was inherently unsafe and unnecessary. The web could either have been re-hoisted and re-landed without any change in work method, or it could have been secured where it landed, albeit slightly askew from its intended position. The chief officer's decision to reposition the web indicates that he wanted to complete the task as planned. However, that he took it upon himself to direct the repositioning from the web top shows that the risks of standing on a load under tension were not recognised. Alternatively, if they had been, they were either ignored or accepted.

The OS, the engineer and the oiler in the hold, and the AB operating the forward crane had the opportunity to challenge the chief officer when he stood on the crankshaft web and instructed it to be lifted. However, they did not do so. Like on board many cargo ships, working on top of the cargo was seen as a routine practice. Consequently, although *Johanna C's* operating manual required the vessel's crew "to stop any lifting operations, if they have any safety concerns", they probably had none.

Furthermore, although: the shifting of the crankshaft webs occurred during darkness; the risk assessment for the task was not recorded; the master did not seek the advice of the ship manager's loading master; and, the slings had no certification of test. However, none of these deviations from the onboard procedures is likely to have influenced or impacted on the chief officer's actions. The hold was well lit, the chief officer participated in the informal risk assessment, the method of transfer worked and the slings did not fail. Nonetheless, the general lack of adherence to cargo procedures, which was probably influenced by a 'can-do' attitude and the attraction of financial reward, is of concern.

Code of Practice

The hazards associated with lifting operations and working at height are comprehensively covered in the COSWP. However, although the Code highlights the dangers of standing under or near a hoisted load, it does not specifically warn against standing on top of a load being lifted. Given the circumstances of this case, the inclusion of such a warning is warranted.

Post-accident actions

The response of *Johanna C's* crew to the chief officer's fall was immediate and positive. The chief officer was semi-conscious and, although he was lying in a very awkward position, this did not delay his initial survey and treatment. The chief officer's removal from inside the crankshaft web and his transfer to the quay using the ship's crane was also well considered and appropriate.

CONCLUSIONS

- The chief officer lost his balance and fell into the hole in the crankshaft web as a result of the web's and/or its lifting slings' sudden and unexpected movement.
- The sudden and unexpected movement of the crankshaft web and /or its slings was possibly due to the slings slipping from their intended positions.
- Standing on top of the crankshaft web was inherently unsafe and unnecessary.
- The risks of standing on a load under tension were not recognised.
- Deviations from the vessel's onboard procedures related to cargo operations were not contributory.
- The crew's response following the chief officer's fall was immediate and positive.

ACTION TAKEN

Carisbrooke Shipping Ltd has:

- Following its own safety investigation, issued a Fleet Memorandum emphasising the importance of following onboard procedures and safe working practices. Among other things, the areas covered in the memorandum included:
 - Risk assessments
 - Travelling on top of loads
 - Proximity to slings and loads under tension
 - Work for third parties.

The **Maritime and Coastguard Agency** has:

- Drafted amendments to the Code of Safe Working Practices for Seafarers, 2015 edition, that include the dangers of standing on top of a load being lifted. The draft amendments will be considered at the Code's next planned review in early 2017.

RECOMMENDATIONS

In view of the actions already taken, no recommendations have been made.

SHIP PARTICULARS

Vessel's name	<i>Johanna C</i>
Flag	United Kingdom
Classification society	Bureau Veritas
IMO number/fishing numbers	9430131
Type	General cargo and containers
Registered owner	Carisbrooke Shipping (CV14) B.V.
Manager(s)	Carisbrooke Shipping Ltd
Year of build	2009
Construction	Steel
Length overall	138m
Gross tonnage	9530
Minimum safe manning	10
Authorised cargo	General cargo and containers

VOYAGE PARTICULARS

Port of departure	Singapore
Port of arrival	Songkhla
Type of voyage	International
Cargo information	General cargo
Manning	15

MARINE CASUALTY INFORMATION

Date and time	11 May 2016
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	Songkhla, Thailand
Place on board	Cargo hold number 1
Injuries/fatalities	1 fatality
Damage/environmental impact	None
Ship operation	Loading/unloading
Voyage segment	Alongside
External & internal environment	Dry and humid with an air temperature of 30°C. It was dark. The cargo hold was illuminated by internal lighting; the deck and quay were floodlit.
Persons on board	16