MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

ACCIDENT REPORT

LESS SERIOUS MARINE CASUALTY | REPORT NO 14/2012 | JUNE 2012

Serious injury to a chief officer
CAMERON
Crosby Channel, Liverpool
21 November 2011

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SUMMARY

At 1150 UTC on 21 November 2011, the chief officer on board the Briggs Marine Contractors Limited (BMC) mooring vessel *Cameron* was seriously injured when he was crushed against a 'mushroom' air vent by a 6 tonne (t) navigation buoy. The buoy was being re-positioned on the working deck using the vessel's crane. The chief officer suffered pelvic injuries and was hospitalised for almost 1 month.

The MAIB investigation identified that:

- the chief officer had moved into a hazardous area
- there was no person in charge, or overseeing the movement of the buoy
- the risks associated with moving the buoy had not been identified or assessed, and
- regulatory requirements regarding lifting operations were not fully met.

The accident occurred only 8 months after a crewman was fatally injured on board BMC's landing craft *Forth Guardsman.* In view of the similarities between some of the contributing factors in the accidents on board *Forth Guardsman* and *Cameron*, a recommendation has been made to BMC aimed at improving the safety of deck operations on all of the company's vessels.

Image courtesy of Scott Hutchinson

FACTUAL INFORMATION

Background

Cameron, a mooring vessel operated by BMC, was engaged in buoy maintenance operations in the Port of Liverpool. The buoy operations were conducted in daylight hours only, with a maximum of two operations per day during the winter months. Method statements for the recovery and laying of buoys were provided by BMC and *Cameron* had carried out approximately 120 buoy operations during 2011.

Cameron's working deck ran the full length of the vessel. Her crane had a 12 metre operating radius and a safe working load of 10t, and was situated on the vessel's starboard side. A maximum of two buoys were carried on deck.

Narrative

At 0800 on 21 November 2011, *Cameron* departed her berth in Liverpool. The wind was south-easterly force 3, and the sea was slight. From 0945, the vessel was anchored close to the Beta buoy in the River Mersey's Crosby Channel **(Figure 1)**, to enable the buoy to be recovered and replaced. On deck were the chief officer, chief engineer, and the three able seamen. Although the chief officer was nominally in charge of deck operations, the chief engineer was the more experienced officer and it was he who took charge of recovering and replacing the Beta buoy.

By 1145, the replacement of the Beta buoy had been completed and the chief engineer left the deck and went to the bridge via the engine room. The crew remaining on deck recovered *Cameron*'s anchor and then began to tidy the working area in readiness for the next buoy recovery operation. As part of this process it was necessary to move the recently recovered Beta buoy, which weighed 6t, from aft of the crane on the vessel's starboard side, to an area between a pile of mooring chain and a 'mushroom' air vent close to the guardrail on the vessel's port side **(Figure 2)**.

With one able seaman (AB) operating the crane, the crane hook was connected to lifting stops around the buoy. The crane then lifted the buoy several centimetres off the deck and then moved it in an arc towards the port side. Occasional instructions were given to the crane operator by one of the other ABs, but no dedicated signaller was nominated. The chief officer followed the buoy at a close distance. The third AB was tidying the aft part of the deck and did not assist with moving the buoy.

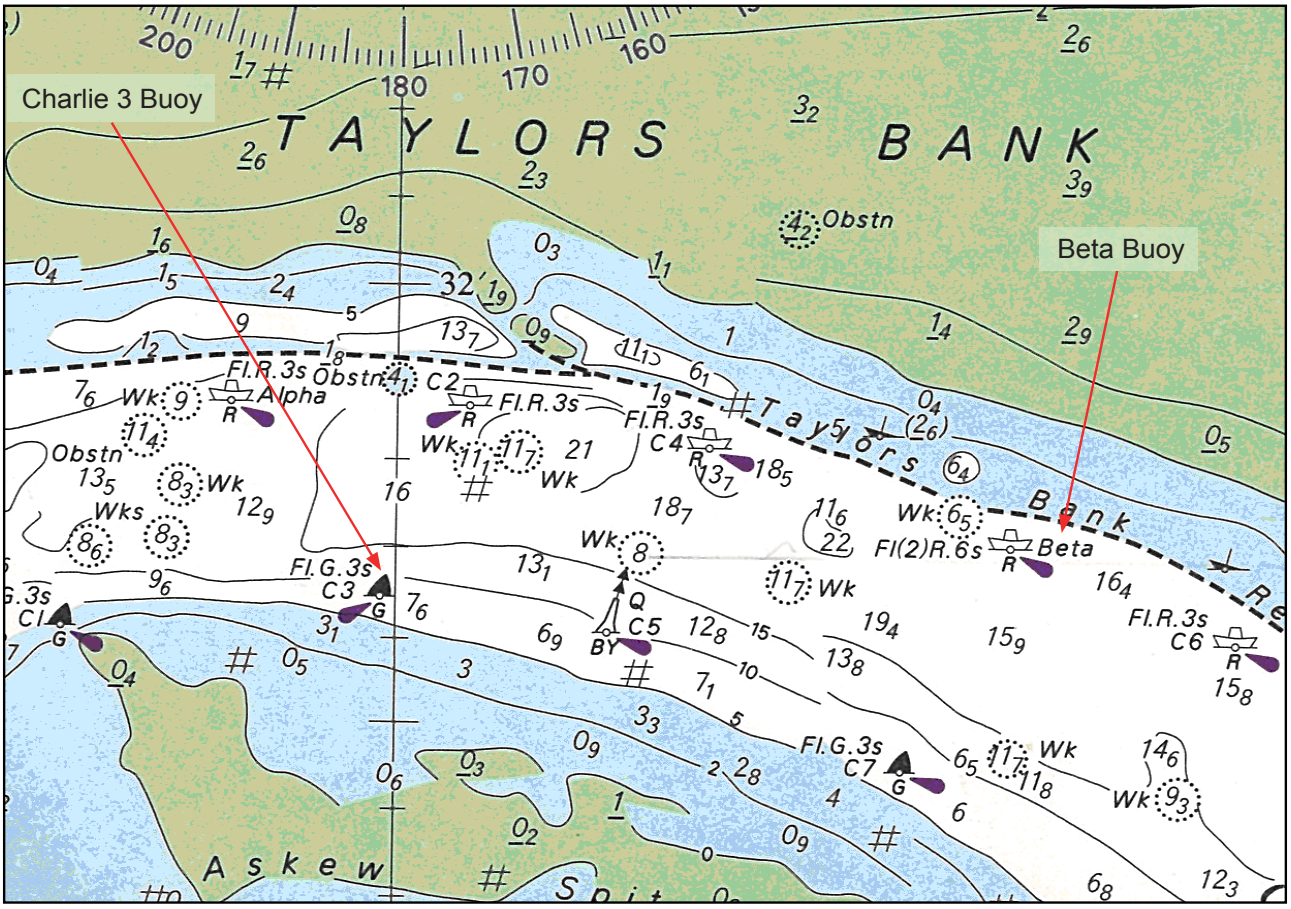

Figure 1: Crosby Channel - River Mersey

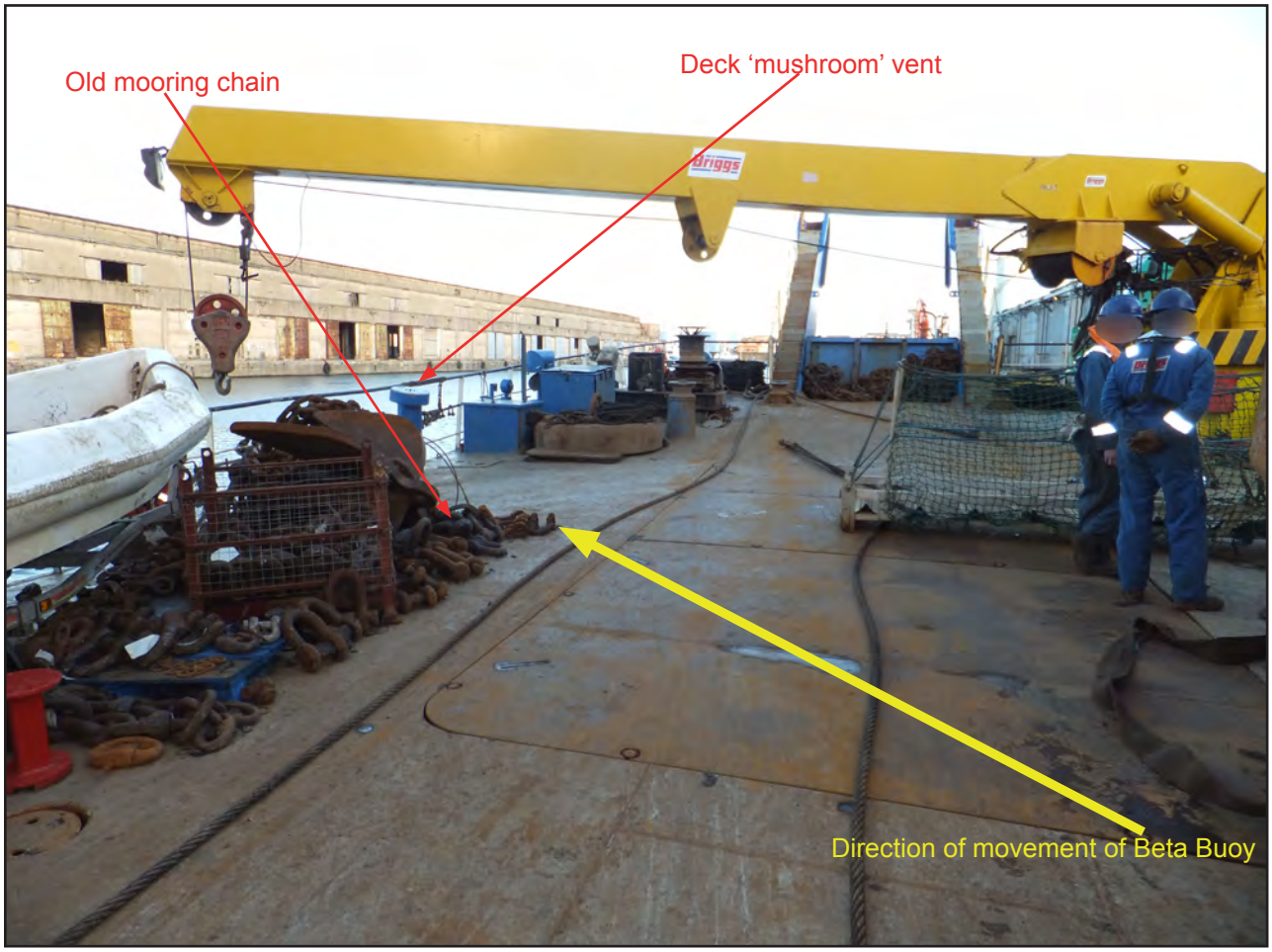

Figure 2: Working deck - Looking forward

As the buoy neared its intended position, the lifting operation was stopped to enable the chief officer and the AB giving instructions to the crane operator to place wooden bearers on the deck where the buoy was to be positioned. Having picked up two short lengths of timber, the chief officer passed one of the timbers to the AB, who was standing on the inboard side of the buoy.

The crane operator then shouted "*coming right*" to indicate that he was about to use the crane to move the buoy further forward in order to clear the chain pile. At about the same time the chief officer moved to a position between the buoy and the 'mushroom' vent to put the wooden bearer under the outboard side of the buoy. However, the chief officer's movement was not noticed by the crane operator, who was focused on the crane wire and the buoy. At 1150, the crane moved the buoy about 30cm further forward, trapping the chief officer between the buoy and the 'mushroom' air vent **(Figure 3)**. The chief officer screamed with pain, and the crane operator immediately moved the buoy inboard, whereupon the chief officer collapsed to the deck.

The master quickly requested assistance from Liverpool Vessel Traffic Services (VTS); he also informed Liverpool coastguard. A lifeboat was despatched with a doctor on board; a rescue helicopter was also tasked to assist. *Cameron* headed towards Liverpool and was met en route by the lifeboat at 1223. The doctor examined the chief officer, who was then winched on board the rescue helicopter and taken to hospital.

The chief officer had suffered crush injuries to his pelvic region which required surgery to insert metal pins into his hip. He remained in hospital for almost 1 month.

Risk assessment and toolbox talks

A risk assessment of buoy maintenance operations was last carried by the vessel's crew on 9 November 2011. The assessment identified hazards during the deployment and recovery of buoys and moorings. Hazards associated with moving a buoy across the deck were not identified.

In a toolbox talk conducted before the vessel sailed on 21 November 2011, the master briefed *Cameron*'s crew that the Beta buoy was to be recovered and a replacement laid in its place, and that Charlie 3 buoy **(Figure 1)** was to be recovered, inspected and re-laid. The master also briefed the crew on the expected environmental conditions, the anchor that would be used when alongside the buoys, and the importance of the crew being safety conscious for themselves and for each other.

Figure 3: Beta buoy on deck

Crew

Cameron's crew comprised the master, the chief engineer the chief officer and three ABs. All of the crew were British except the chief officer who was Polish. The crew worked a 1 month on, 1 month off routine. They all were well experienced in buoy handling and recovery operations and could individually take on any of the roles and operate the machinery required by these tasks.

The chief officer was 35 years old and had worked for BMC intermittently since 2004, first as an AB and then as a second officer on board *Forth Guardsman*. The chief officer passed a Marlins English test in 2007 and he first joined *Cameron* in July 2009. His duties on board the mooring vessel required him to take charge of deck operations. He was also the safety officer and had participated in a 2-day practical and written risk assessment course in August 2011, which was organised by BMC. However, he had not completed the practical assessment module of the course syllabus.

Previous accident

On 13 March 2011, an AB on board the BMC vessel *Forth Guardsman* was trapped between a mooring wire and the ship's guardrail during a mooring operation. The weight of the wire could

not be released quickly enough, and the AB was pulled over the guardrail and into the sea. Although he was recovered from the water, he died from his injuries. The MAIB investigation[1] found that *'insufficient manpower had been assigned for the mooring operation, some risks had not been identified properly, seamanship practices on board were poor, the AB had stood in an open bight which closed around him, and emergency communication procedures were inadequate.'* It also found that the vessel's chief officer was directly involved in the mooring operation and did not notice the developing hazard because he was concentrating on securing a mooring shackle.

The actions taken by BMC following the accident included:

- Reminding its crews to adhere to the guidelines on mooring operations contained within the Maritime and Coastguard Agency's (MCA) Code of Safe Working Practices for Merchant Seamen (CoSWP).
- Commencing a comprehensive review of vessel procedures.
- Implementing a review of its risk assessment procedure and introducing a company-wide training programme for operational personnel on conducting effective risk assessments, method statements and toolbox talks.
- Adapting its monthly directors' visits to company vessels to include an audit of the toolbox talks on board.

ANALYSIS

Entrapment

The chief officer's injuries were sustained when he was crushed against the 'mushroom' air vent by the navigation buoy. The chief officer was standing very close to the buoy and the vent when the crane operator moved the buoy towards him. The crane operator warned the other deck crew that he was going to move the buoy further forward, and was not aware that the chief officer was standing between the buoy and the vent. However, the chief officer either did not hear or did not understand the implications of the crane operator's warning that he was about to move the buoy further forward. As soon as the buoy started to move, the chief officer had insufficient space in which to attempt to move clear.

Roles and Responsibilities

Although the chief officer was nominated to be in charge of operations on the main deck, due to his greater experience the chief engineer had effectively fulfilled this role during the recovery and replacement of the Beta buoy. However, once the chief engineer had left the main deck, responsibility for the safety and oversight of deck operations rested unambiguously on the chief officer. However, when the buoy was being repositioned, the chief officer became physically involved in the operation. Although he only 'walked' the buoy across the deck and prepared the wooden bearers, these actions were sufficient to prevent him from maintaining effective control over the way the task was being conducted and from overseeing the actions of the other deck crew.

The crew on *Cameron* were engaged in very similar operations each day and were very familiar with, and practised in, buoy maintenance operations. They had also worked with each other for some time, and all were capable of undertaking the various tasks required. A degree of role interchange and informality was therefore to be expected. Indeed, given the small number of crew working on the deck, it would have been unreasonable for the chief officer not to be drawn to some degree into several of the manual tasks that were required to be completed.

However, the chief officer's involvement in handling the buoy across the deck, along with the crane operator's compliance with the AB's instructions one minute and then taking independent action the next, strongly indicates that the responsibilities of the deck crew had become unclear and undefined. There was no person in overall charge and there was no dedicated signaller. On this occasion, the blurring of the roles and responsibilities of the deck crew resulted in a lack of communication and co-ordination that were causal to the chief officer's injuries.

Regulation and guidance

The deck crew were trained and experienced in lifting operations, but when moving the buoy across the deck aspects of the guidance provided

[1] Fatal injuries to a crewman during mooring operations on *Forth Guardsman*, south of Jura on 13 March 2011 (Report number 16/2011)

in the CoSWP[2], which was referred to in other risk assessments held on board, were not followed. In particular, CoSWP advises:

> *21.12.1 Every lifting operation must be –*
>
> *(a) properly planned;*
>
> *(b) appropriately supervised; and*
>
> *(c) carried out in a safe manner.*

Also, the conduct of the lifting operation did not fully meet the requirements of the Lifting Operations and Lifting Equipment Regulations 2006 (LOLER), that state:

> *The employer shall ensure that adequate and effective procedures and safety measures are established to ensure the safety of workers during lifting operations, in particular ... Measures are taken to prevent the load striking anything or any person*

Guidance provided by the MCA on the application of this requirement states:

All reasonable measures should be taken to ensure that any load cannot:

- *Strike and injure someone – the simplest way to achieve this is by ensuring no-one is close enough for this to happen and is prevented by barriers or some other method, from moving into a position where this could happen.*

In this case, the chief officer was crushed between the buoy and the mushroom vent as he placed a wooden bearer on the deck, just as the crane operator moved the buoy further forward. It is clear that had the operation been properly considered and planned, the wooden bearers could have been pre-positioned, therefore negating the need for any of the crew to be close to the buoy as it was manoeuvred into position.

In addition, with both the chief officer and the AB engaged in positioning the wooden bearers beneath the buoy, it had been left to the crane operator to determine the most suitable position in which to set the buoy down on the port side of the deck. Although the crane operator could see most of the deck area, his attention was focused on the buoy, the crane wire, operating the crane, and placing the buoy in the limited space available, and he did not notice the chief officer move between the buoy and the vent. The crane operator was also unaware that his warning, that he was about to move the buoy, had not been heeded. Such lack of co-ordination and effective communication would have been less likely if the chief officer had maintained more of a supervisory role instead of being actively involved in the operation and/or a dedicated signaller had been nominated.

The safety of deck operations

Cameron's crew appeared to be well prepared to conduct buoy maintenance operations. Method statements for the laying and recovery of buoys had been provided and were being followed, risk assessments had been completed for these activities, and toolbox talks were given to the crew before the start of each day's work. However, it is evident from the circumstance of this accident that the crew's approach to safety lacked rigour.

In particular, the hazards of moving a heavy buoy across the deck, which was a regular occurrence and considered to be a 'housekeeping' task, were not identified through risk assessment. Also, the toolbox talks mainly focused on the work schedule; no mention was given to the hazards to be avoided, or any emphasis on the control measures to be used. Although it was expected that the deck crew would take on different roles during a working day, a reminder of the specific responsibilities that accompany key roles such as the supervisor, crane operator, and signaller (if used) would have been appropriate.

It appears that the repetitive nature of the buoy maintenance operations, possibly combined with a 'can do' attitude of the closely knit deck crew, led to a degree of complacency. Although the master reminded the deck crew of the need to look out for the safety of themselves and each other, before the vessel sailed, the dangers of walking and working close to the suspended buoy, and moving into the easily identifiable and known 'pinch point' between the buoy and the air vent were accepted by the chief officer.

There are several similarities between this accident and the fatal accident on board *Forth Guardsman* that had occurred 8 months previously. In particular, both of the chief officers were unable to effectively supervise the task being conducted due to their direct physical involvement, both accidents resulted from persons putting themselves into a hazardous area, and in both cases key risks were not identified. The actions taken by BMC following the fatality on board *Forth Guardsman*

[2] Code of Safe Working Practices for Merchant Seamen. ISBN 9780115532078

were positive, but from the circumstances of the subsequent accident on board *Cameron*, it is evident that some of the actions have not been as effective as intended, and that more needs to be done to improve the safety of deck operations on board BMC's vessels.

CONCLUSIONS

- The chief officer had moved into a hazardous area when he was pinned against the air vent by the 6t buoy.
- The chief officer's involvement in moving the buoy prevented him from effectively supervising the actions of the other deck crew.
- The blurring of the roles and responsibilities of the deck crew resulted in a lack of communication and co-ordination.
- The deck crew did not fully adhere to several aspects of the regulations and guidance relating to lifting operations when moving the buoy across the deck.
- The hazards associated with moving the buoy around the deck had not been identified through risk assessment, and the toolbox talks conducted were not sufficiently effective.
- Similarities between this accident and the fatal accident on board *Forth Guardsman* in March 2011 indicate that more needs to be done to improve the safety of deck operations on board BMC's vessels.

ACTION TAKEN

Briggs Marine Contractors Ltd has:

Issued a Safety Notice notifying its fleet of the circumstances of this accident, which includes:

> *All deck crane operations must be in control of the Officer on deck. No movement of loads should be done unless the officer or the crane operator has a clear line of sight of the area where the load is to be placed.*
>
> *The deck officer should ensure that all deck crew are aware of the movements intended on deck before any loads are moved this will involve clear verbal communications.*
>
> - *Crane operators must STOP the operation if they lose sight of any deck crew*
> - *Clear and understood communications between deck crew on all deck operations*
> - *Loads not to be walked whilst being moved unless using guide ropes*
> - *Known pinch points to be clearly marked and all crew to be familiar of their locations.*
> - *Daily Toolbox talks held before deck operations commence.*
> - *Deck housekeeping must be addressed every day*
> - *Lifting operations contained within the Code of Safe Working Practices must be adhered to.* [sic]

RECOMMENDATIONS

Briggs Marine Contractors Ltd is recommended to:

2012/121 Introduce measures to improve the safety of deck operations conducted on board its vessels, by ensuring that:

- All tasks are appropriately planned and briefed
- Supervising officers and ratings maintain an objective overview of the work being undertaken
- Risks associated with lifting operations are identified, assessed, and have appropriate control measures in place, and
- All crew are familiar with, and adhere to, applicable regulations and guidance.

SHIP PARTICULARS	
Vessel's name	*Cameron*
Flag	UK
Classification society	Not applicable
IMO number	9008495
Type	Mooring vessel
Registered owner	Briggs Marine Services
Manager(s)	Briggs Marine Contractors Ltd
Construction	Steel
Length overall	40.93m
Registered length	33.83m
Gross tonnage	507
Minimum safe manning	Not applicable
Authorised cargo	Not applicable
VOYAGE PARTICULARS	
Port of departure	Liverpool
Port of arrival	Liverpool
Type of voyage	Coastal
Cargo information	Navigation buoys
Manning	6
MARINE CASUALTY INFORMATION	
Date and time	21 November 2011 at 1150
Type of marine casualty or incident	Less Serious Marine Casualty
Location of incident	Beta buoy, Crosby Channel, Liverpool
Place on board	Main working deck
Injuries/fatalities	Injury to chief officer
Damage/environmental impact	None
Ship operation	Buoy maintenance
Voyage segment	Transit
External & internal environment	Wind: south-easterly force 3 Sea state: slight
Persons on board	6