Australian Government
Australian Transport Safety Bureau

Fire on board *BBC Xingang*

Newcastle, New South Wales, 11 December 2017

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Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

Addendum

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Fire on board *BBC Xingang*

What happened

At midnight[1] on 10 December 2017, the multi-purpose, general cargo ship *BBC Xingang* (Figure 1) berthed at Mayfield number four berth in Newcastle, New South Wales. The cargo to be discharged comprised containers and 'project cargo', which consisted of large structures of various shapes and sizes. Some of the cargo had gel-coated surfaces that could be easily damaged, and these components were covered with cloth for protection during transport.

Figure 1: *BBC Xingang*

Source: Tropic Marine Images, Shipspotting.com

Sea fastenings (or stoppers) were used to secure the project cargo during sea passage. The stoppers were metal brackets welded to the ship's deck, and they needed to be removed before the cargo could be discharged. To remove the stoppers, oxy-acetylene cutting and gouging techniques were required.

In preparation for removing the stoppers, the chief mate and deck crew had reviewed the ship's risk assessment for hot work and completed the ship's hot work permit. The master had notified Newcastle port of the intended work and a hot work audit report had been completed by a port representative.

At about 0600 on 11 December, a work team, including a site supervisor and a boilermaker, from a local engineering firm (Varley) boarded the ship. This team had a current Varley Job Safety and Environmental Analysis (JSEA) for hot work to remove stoppers on board ship and had completed a Varley hot work permit.

At 0630, the chief mate convened a safety meeting involving the Varley boilermaker and relevant crewmembers. The process of removing the stoppers was discussed along with the safety measures and procedures to be followed. Hot work requirements, including the hot work permits and risk assessments, were reviewed. Individual duties, including that of the fire watch, were explained and assigned. The ship's crew were responsible for providing firefighting equipment (such as extinguishers and hoses) and controls such as the fire watch.

The work commenced in the number two cargo hold tween deck.[2] In preparation for the hot work, gaps between the tween deck pontoons were filled and covered with fire blankets (made from woven fibre and leather) to stop sparks from falling onto the cloth-covered cargo in the lower hold (Figure 2).

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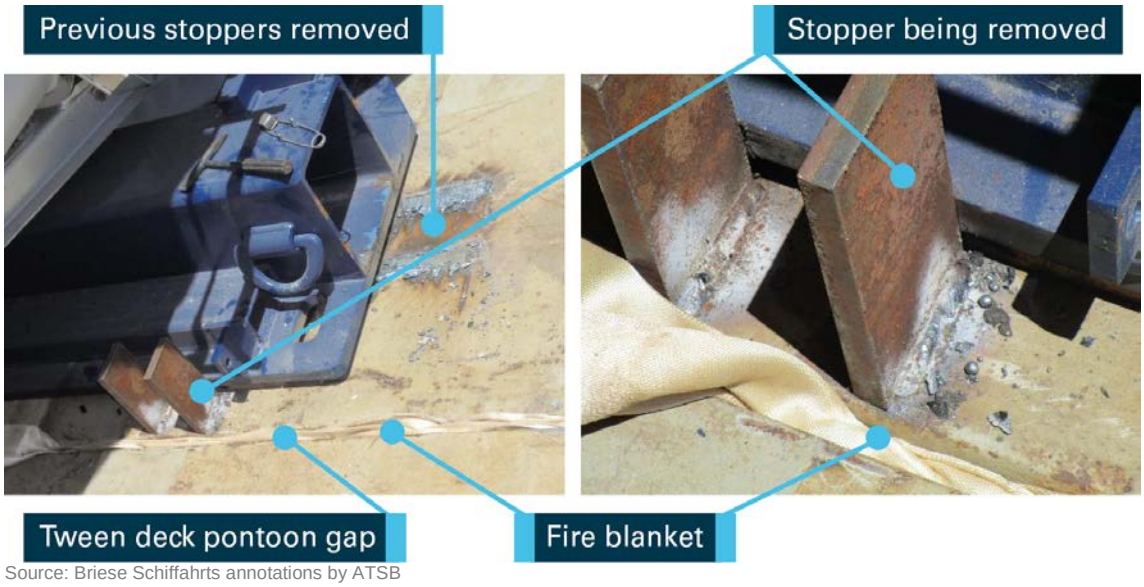
1 All times referred to in this report are local time, Coordinated Universal Time (UTC) + 11 hours.

2 The tween deck is a deck located about mid depth in the cargo hold. It consists of pontoons, which are removable steel structures running the full width of the hold (about 17 m), about 7 m long and 0.8 m deep.

Figure 2: Worksite showing stoppers, after the incident



Source: Briese Schiffahrts annotations by ATSB

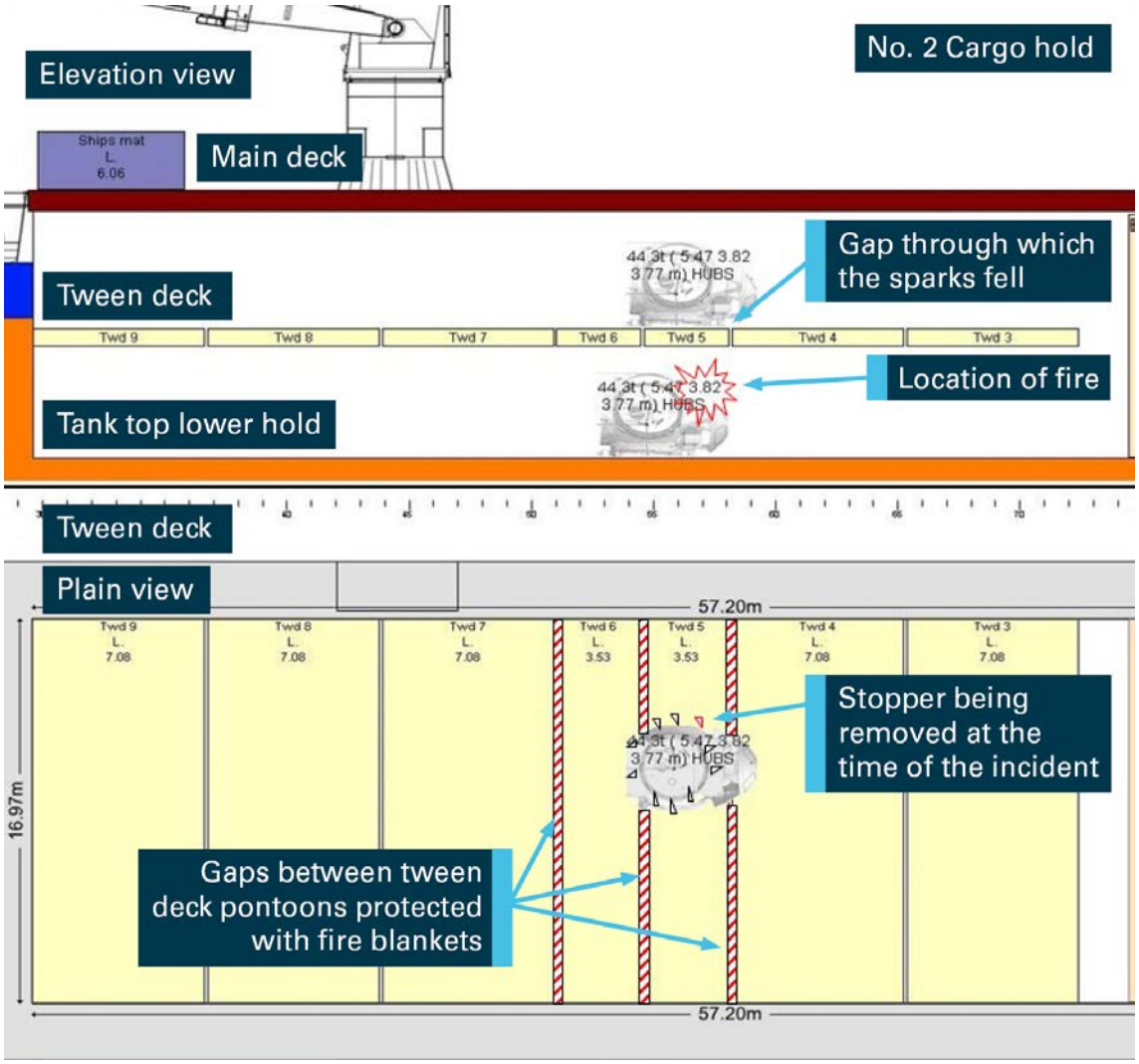
The fire watch consisted of two crewmembers in contact via VHF radio, one on the tween deck and the other in the lower hold. A small diameter fresh water hose was laid out and a makeshift water spray extinguisher readied for immediate use in the lower hold. Cargo in the lower hold was covered with the transport cloth but was not covered with fire blankets.

At 1015, the boilermaker began removing the stoppers. The work site was overseen by ship's crewmembers, the port captain[3] and the Varley site supervisor. The port captain asked that sparks be directed away from the cargo to protect the component surfaces. This request, in some cases, resulted in the sparks being directed toward gaps between the tween deck pontoons.

The work continued as expected and, at 1100, the boilermaker stopped to relocate to the next stoppers on the tween deck. As part of checking the new work area, he lifted a fire blanket and could see small flames and smoke in the lower hold through the gap in the tween deck pontoons. He immediately raised the alarm. The lower hold fire watch was notified on the radio. At the time he was notified he was not near the area directly under where the work was being conducted. After moving to the relevant area, he quickly extinguished the fire using the water hose and water spray. Figure 3 shows the location of the work site and the fire in the ship's hold (elevation view and plan view).

[3] A senior official appointed by the ship's owners to oversee cargo handling and associated work including the fitting or removal of cargo securing arrangements such as stoppers.

Figure 3: Number 2 cargo hold, elevation and plan views of worksite



Source: Briese Schiffahrts with annotations by ATSB

An inspection of the work site following the fire identified that molten metal and other hot material produced by the hot work had burned through the fire blankets. This hot material fell onto the material covering the cargo in the lower hold, resulting in the fire. As a result of the fire, the material covering the cargo was damaged and some surface blemishes were apparent on the cargo itself (Figure 4). No other damage was reported. Subsequent inspection of the cargo covering material found it to be 100 per cent polyester transport cloth with a maximum rated temperature of 200 °C.

Following the fire, all work to remove the stoppers was suspended and the incident was reviewed. Procedures and safety measures were reassessed during a meeting of ship's crew and the shore contract team. The cutting procedure was amended to direct the sparks away from deck openings and containment of sparks around the work area was improved. Further, additional filling material was added to holes in the tween decks used for removable hand rails, and the lower hold fire watch was directed to monitor the area directly below the work rather than the general vicinity. Work resumed at 1315 and continued to completion without further incident.

Figure 4: Cargo covering material and cargo surface damage

Source: Briese Schiffahrts

BBC Xingang

BBC Xingang is a multi-purpose, heavy lift, general cargo ship registered in Antigua and Barbuda. The ship was built in 2013 by Tianjin Xingang Shipbuilding Heavy Industry, China and classed with DNV GL.

The ship has an overall length of 125.8 m, a moulded breadth of 22.0 m and a deadweight of 8,970 t at its summer draught of 7.60 m. The multi-purpose ship can carry containers and/or general cargo. It has two cargo holds with tween decks. Two 350 t capacity cranes are mounted on the port side and can be used in combination to lift loads up to 700 t.

At the time of the incident, *BBC Xingang* was owned by Briese Schiffahrts 'Hatshausen', operated by BBC Chartering & Logistics and managed by Briese Schiffahrts, all of Germany.

Previous incidents

The ATSB has, on two previous occasions, investigated fires on board Briese Schiffahrts managed vessels in Australian ports.[4] On both occasions the fire was started during hot work to remove sea fastenings. In the *BBC Baltic* fire, flammable cargo coverings were also found to have ignited. The damage caused was considerably more than that sustained on *BBC Xingang*.

As a consequence of the previous incidents, Briese Schiffahrts had completed significant safety actions, which were in place at the time of the current fire. These included improved shipboard procedures, risk assessments, permits to work, safety meetings and provision of equipment such as fire blankets and mats.

Safety analysis

The task of removing sea fastenings, originally welded in place to prevent movement of the cargo during the sea voyage, involved hot work, cutting and gouging techniques. This hot work produced sparks, globules of molten steel of various sizes and other hot material. To protect the sensitive

[4] In 2012, investigation 293-MO-2012-002 involving *BBC Baltic*. In 2008, investigation 245 involving *BBC Islander*.

surfaces of the cargo, the debris produced by the hot work was directed away from the cargo and more toward gaps/holes in tween deck pontoons.

The work area and the gaps/holes in the pontoons were protected by fire blankets. However, the molten metal produced was of sufficient size and intensity to burn through the protective fire blankets and fall onto the cargo stowed in the deck below. This cargo was covered with transport cloth to protect it during transport but was not protected from the hot debris by covering with fire blankets. Transport cloth is made of 100 per cent polyester and will ignite if directly exposed to fire. As a consequence, when the hot material fell onto the unprotected transport cloth it resulted in the fire.

A fire watch was present in the lower hold but had not been directed to closely monitor immediately below the work site. Therefore, the fire watch was not in position to immediately react when the molten metal fell from above. It was only when the flames and smoke were observed by the boilermaker that the response was initiated and the fire extinguished.

Despite the safety actions taken after previous fires, flammable cargo coverings were again ignited during sea fastening removal on this occasion. Careful consideration must be given to the use of such materials. Prior to hot work, cargo coverings should be carefully assessed and adequate protection against damage or fire due to hot material should be provided.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

The fire on *BBC Xingang* started during the oxy-acetylene cutting and gouging removal of sea fastenings. Molten metal and other hot material produced by this work burned through protective fire blankets in place around the site, and fell onto unprotected cargo below.

- The cargo stowed below the work site was covered with flammable polyester material which had not been adequately identified and protected prior to the work commencing.
- A fire watch was present in the lower hold but had not been directed to closely monitor immediately below the work site so was not in position to quickly react when the molten metal fell from above.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety actions in response to this occurrence.

Briese Schiffahrts

On board *BBC Xingang*, replacement fire blankets were obtained and a safety meeting convened to discuss the incident. This meeting, attended by all ship's crewmembers, discussed the circumstances of the incident, reviewed relevant existing fleet circulars, reviewed the risk assessment and went through procedures and processes relating to this work and the role of the fire watch.

Varley

Varley advised the ATSB that it had:

- reviewed and updated the Job Safety and Environmental Analysis (JSEA) to implement added control measures for hot work
- amended work procedures to:

- improve coordination and communication between vessel management and third party contractors regarding expectations of fire watchers and firefighting equipment prior to starting work
- ensure inspections are conducted on all cargo and materials in lower holds, prior to starting any hot work in the tween decks
- ensure that if suspect items are found in the lower hold that communications with work teams and site management include focus on safety expectations and hot work controls
- include using heat proof tape to cover gaps in the tween decks with fire blankets added on top
- use fire blankets to protect items in the lower hold.

BBC Chartering

BBC Chartering advised the ATSB of the following safety action:

- gaps/holes in the tween decks will be covered by fire resistant tape in addition to other measures such as using fire blankets to protect areas below hot work.

Vestas

Vestas advised the ATSB that as part of cargo handling guidance, storyboards explaining safety measures to be taken while welding, cutting and grinding are shared with vessel owners, carriers, and freight forwarders contracted for the carriage of Vestas cargo.

Safety message

Ship fires due to hot work to remove sea fastenings are a constant danger. The continuing incidence of hot work related fires during the removal of sea fastenings highlights the importance of maintaining vigilance throughout the entire process. This is especially important if this is a regular task and is at risk of becoming routine. Procedures and practices along with the equipment available for completion of the task need to be reviewed and assessed and used as appropriate.

Hot work requires the implementation of comprehensive risk controls and procedures. These should include, but not be limited to, detailed, task-specific appraisals, risk and hazard assessments, work permits and pre-work toolbox meetings. Ultimately, the responsibility for the implementation of these controls rests with the ship, in consultation with third parties if involved. This is especially important when shore labour is employed to complete the work and multiple organisations' work requirements and procedures are involved.

General details

Occurrence details

Date and time:	11 December 2017 - 1101 (UTC + 11)	
Occurrence category:	Incident	
Primary occurrence type:	Fire	
Location:	Mayfield number 4 berth, Newcastle, New South Wales	
	Latitude: 32° 53.6' S	Longitude: 151° 46.0' E

Ship details

Name:	*BBC Xingang*	Year built:	2011
IMO number:	9508483	Gross tonnage:	8,255
Flag State:	Antigua & Barbuda	Length overall:	125.80 m
Classification society:	DNV GL	Moulded breadth:	22.00 m
Owner(s):	Briese Schiffahrt 'Hatshausen'	Summer draught:	7.60 m
Manager:	BBC Chartering & Logistics	Main engine(s):	MAK 7M43C, 6,300 kW

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.