The Nautical Institute
Mariners' Alerting and Reporting Scheme
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Providing learning through confidential reports – an international cooperative scheme for improving safety

MARS 201156

Short-loading due to ignorance of dock water allowance

A bulk carrier was intending to load maximum possible cargo (summer loadline). Throughout the loading operation, the dock water density was consistently measured by the Chief Officer to be about 1.013. However, much to the surprise of the terminal, the Master discontinued the loading when the vessel reached her summer draught and declined to load any more cargo. It was also established that the vessel intended to sail direct to the discharge port and no bunkering en route was planned. The Master and the chief officer seemed to be ignorant about applying dock water allowance so that the vessel could sail from the terminal at a draught deeper than the permitted maximum sea draught. In order to defend any future claim against short-loading or deadfreight, the terminal obtained a signed declaration from the Master stating that he did not want to load any more cargo, and the ship sailed about 600 tonnes short, undoubtedly reducing the voyage profit.

MARS 201157

Safe carriage of direct reduced (or sponge) iron (DRI)

Edited from Steamship Mutual Risk Alert 23

At least two serious casualties involving ships loaded with DRI, both resulting in loss of the vessels and one with loss of lives, have occurred in the last decade; the *Ythan* (2004) and the *Adamandas* (2003) which was deliberately sunk by the French authorities with cargo and bunkers onboard (investigation report available at http://www.beamer-france.org/BanqueDocument/pdf_81.pdf). In the case of the *Ythan*, the explosions resulted from the reaction between the vessel's cargo of Hot Briquetted Iron (HBI) Fines and the moisture contained in the cargo at the time of loading.

At the time of the two incidents, the IMO Code of Safe Practice for Solid Bulk Cargoes (the BC Code) categorised two types of DRI, namely hot moulded briquettes or hot briquetted iron, subsequently redesignated as DRI (A), and pellets, lumps etc, subsequently redesignated as DRI (B). The DRI/HBI fines cargo could not in reality be categorised as either (A) or (B) under the Code and the expert advice was to treat it as the more dangerous and reactive type of DRI (B).

In view of these and other incidents, the International Maritime Solid Bulk Cargoes Code (IMSBC Code) superseded the BC Code from 01 Jan 2011. The new requirements in relation to the carriage of DRI (A), (B) and (C) can be summarised as follows:

DRI (A): Briquettes, hot moulded

◀ Figure 1: DRI (A), Briquettes, hot moulded (also referred to as iron ore briquettes, briquetted iron ore)

- A maximum moisture content of 1%;
- Cargo is to comprise essentially of whole briquettes. Fines of less than 6.35 mm size and dust are limited to 5%;
- Concentration of hydrogen to be measured throughout the voyage. If it exceeds 25% of lower explosive limit (LEL), appropriate precautions are to be taken;
- Surface ventilation only shall be conducted as necessary. When mechanical ventilation is used, the fans shall be certified as explosion-proof and shall prevent spark generation;
- Wire mesh guards shall be fitted over inlet and outlet ventilation openings.

DRI (B): Lumps, pellets, cold moulded briquettes

Figure 2: DRI (B), Lumps, pellets, cold moulded briquettes ▶

- Average particle size is limited to 6.35mm to 25mm. Fines of less than 6.35mm and dust are limited to 5%;
- Loading conveyors are to be dry;
- Prior to loading, an ultrasonic test or another equivalent method with a suitable instrument shall be conducted to ensure weather-tightness of the hatch covers and closing arrangements;
- Moisture content must be less than 0.3% and must be monitored during loading;
- Any cargo that has already been loaded into a cargo space and which subsequently becomes wetted, or in which reactions have started, shall be discharged without delay;

- Carriage is only permitted under an inert gas blanket;
- The ship shall be provided with the means to reliably measure the temperature at several points within the stow (eg thermocouples buried at various locations within the cargo with remote readouts), and to determine the concentrations of hydrogen and oxygen in the cargo space atmosphere on voyage whilst minimising the loss of the inert atmosphere;
- Oxygen concentration shall be maintained at less than 5% throughout the voyage;
- The ship shall be provided with the means to ensure that the requirement to maintain the oxygen concentration below 5% can be achieved throughout the voyage. The ship's fixed CO_2 fire-fighting system shall not be used for this purpose. Consideration must therefore be given to providing vessels with the means to top up the cargo spaces with additional supplies of inert gas, having regard to the duration of the voyage;
- The ship shall not sail until the Master and a competent person are satisfied that:
  - All loaded cargo spaces are correctly sealed and inerted;
  - The cargo temperatures have stabilised at all measuring points and are less than 65°C;
  - Concentration of hydrogen in the free space has stabilised and is less than 0.2% by volume;
  - Oxygen concentration is and can be maintained at less than 5% throughout the voyage.

DRI (C): by-products, fines

Figure 3: DRI (C), by-products, fines

- Average particle size is less than 6.35mm, and there are to be no particles greater than 12mm in size;
- The reactivity of this cargo is extremely difficult to assess due to the nature of the material that can be included in the category. A worst-case scenario should therefore be assumed at all times;
- Carriage requirements are largely identical to those for DRI (B), including the 0.3% limit on moisture and carriage under an inert gas blanket.

More detailed information about the carriage requirements is given in the IMSBC Code. It should be noted that it is necessary to comply with all of the relevant provisions of the Code.

MARS 201158

Contact damage during ship-to-ship (STS) operation

An oil tanker under our management was approaching an anchored 'mother vessel' on her starboard side in order to perform a STS operation. The weather conditions were ideal and adequate fendering was deployed by both vessels. The mother vessel was riding to her starboard (same side as her 'working' side) anchor, which is contrary to OCIMF STS guidelines. The 4th edition of ICS/OCIMF publication *STS Transfer Guide Petroleum* item 6.3 Manoeuvres with one ship at anchor states 'For such operations, one ship anchors in a pre-determined position using the anchor on the side opposite to that on which the other ship will moor'.

During the approach, the mother vessel suddenly began to yaw. It is suspected that the use of the starboard anchor accelerated this turning movement. An urgent order was given to the tug to pull the vessels apart, but this sudden stressing of the towline resulted in it parting and the vessels coming into contact. The tug was made fast and again ordered to pull our vessel clear, but, due to high tensile loads, the towline parted for a second time, resulting in multiple contacts between the two vessels. Both vessels suffered minor damages. Subsequently, a fresh approach was successfully made and the STS operation was performed without further incident.

Root cause/contributory factors

1. Non-compliance with OCIMF STS guidelines;
2. Unexpected yaw by anchored mother vessel;
3. Inadequate planning and misjudgment by the pilot;
4. Insufficient supervision/reaction by the Master;
5. Tug's bollard pull information was not recorded in Pilot Card;
6. Towlines parted at critical stages of the operation.

Impact/potential impact arising from incident

1. Damage to property / cost of repairs;
2. Commercial issues with charterers due to Condition of Class imposed, off-hire for execution of temporary repairs;
3. Loss of reputation with charterers / oil majors;
4. Potential for crew injury;
5. Risk of oil spill with attendant fire and pollution risks.

Corrective/preventative actions

1. The company's STS risk assessment/training/familiarisation/briefing procedures have been revised, drawing from experience gained from this incident;
2. The Pilot Card has been amended to provide a field for maximum bollard pull of tug(s);
3. Significantly stronger tug lines will be supplied to all vessels for STS operations.

Lessons learnt

1. The Master should always closely supervise the pilot or berthing master and not hesitate to quickly correct any decision that may put the vessel, her crew or cargo at risk;
2. For STS operations involving an anchored vessel, the anchor opposite the 'working' side should always be used;
3. The heading of the anchored STS vessel must be confirmed to be steady during the approach. The approach must be quickly aborted by both vessels if any yaw is detected;
4. The strongest lines must be used for tug lines so that they can bear the high loadings of emergency corrective handling;

5. There are some critical stages of the STS approach for which particularly thorough planning is essential to ensure a low risk operation; these include the angle of approach, the distance between vessels and the time and location when vessel's headway should be taken off. All these must be discussed in detail with the pilot before commencing the approach.

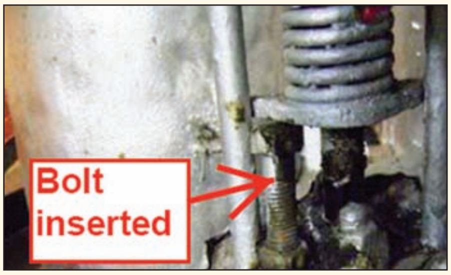
▲ Contact occurred when mother vessel (black hull) yawed to starboard during approach

▲ Close up view of damage to sheerstrake and upper deck railings on own vessel

MARS 201159
Quick-closing valves (QCVs)

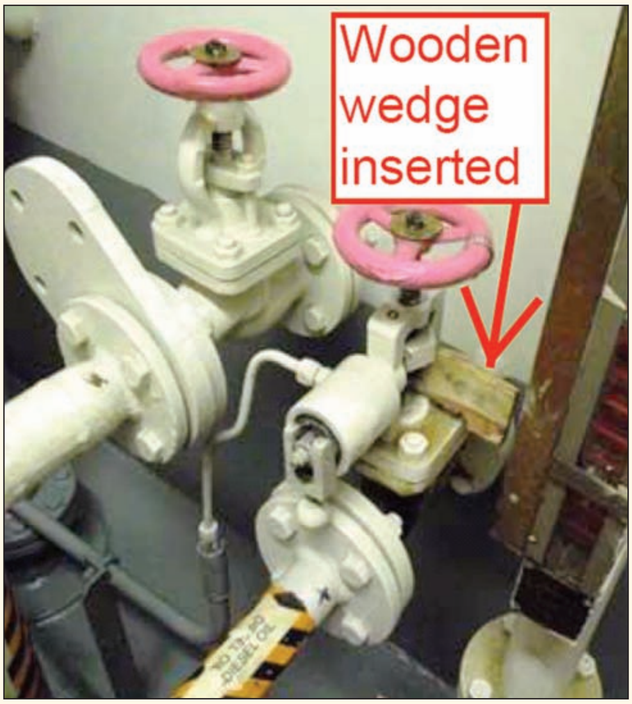
Official report edited from USCG Safety Alert 01-11, http://homeport.uscg.mil

QCVs are positive shutoff valves that are designed to isolate oil tanks in the event of a fire and also prevent fuelling of a fire in circumstances where system piping and components are compromised. These valves are designed to be remotely operated, and are also capable of being operated and reset locally. Inoperable QCVs can put the vessel and its crew at greater risk in the event of a fire and it is absolutely critical that they operate correctly, are properly maintained, and ready for use at all times. Adequate knowledge, training, instructions and stocks of replacement spares must be provided to ship's staff to ensure the reliability of the remote operating arrangements. Intentionally blocking or disabling these valves (as shown in the following photographs) is unacceptable under any circumstance.



◀ QCV disabled by inserting a bolt (Note: The bolt is partly painted, indicating it has possibly been there for some time.)

QCV disabled ▶ by tying the counterweight with wire



▲ QCV disabled by inserting a wooden wedge

MARS 201160
Testing of quick-closing valves (QCV) caused blackout in TSS

A small gas tanker was on a loaded coastal voyage. Prior to arrival at the discharge port, the chief engineer and a company superintendent who was on board to carry out an inspection of the vessel, planned to test the operation of QCVs in the fuel oil (FO) and diesel oil (DO) tanks. At about 11:30, both the chief engineer and superintendent positioned themselves near the FO service tank and ordered the tripping of the tank's QCV from the remote emergency control station. After confirming proper closing, the QCV was manually opened and reset. It was then decided to break for lunch. At about 12:40 hrs, when one hour's notice of arrival had been given by the bridge, the Chief Engineer returned to the engine room. At the time, the vessel was proceeding along the traffic separation scheme in the outer approaches to the destination port. At 12:55 hrs, No. 1 generator engine suddenly stopped, causing a blackout and loss of propulsion and steering. The Master broadcast a safety message on VHF and arranged to display Not Under Control (NUC) signals. Immediately, No. 2 generator engine was started manually and was taken on load, but after about 15 minutes, this generator also stopped. On investigating the problem, the chief engineer found the QCV of the DO service tank was in the closed position. He quickly opened and reset the valve in the correct position, but the common outlet line that supplied the fuel pumps of both generators had entrained air and had to be purged with diesel oil. After about 20 minutes, both the generators and main engine were restarted, the vessel proceeded slowly to the anchorage and await an escort tug.

Root cause/contributory factors

1. During the testing of the FO tank QCV, the DO tank valve was also inadvertently activated without the testing team noticing, resulting in the interruption of fuel supply to the generator engine;

2. There was no risk assessment / briefing / tool box meeting prior to the test;

3. The Master was not informed about the planned QCV test.

Corrective/preventative actions

1. Safety alert sent out to all vessels, giving specific instructions with reference to the testing of fuel oil and diesel oil QCVs with instructions to ships' staff to discuss this incident at the next on board safety meeting;

2. Safety Management System (SMS) amended to prohibit the testing of QCVs when vessels are underway;

3. Technical superintendents to prepare and circulate a QCV testing schedule to the fleet;

4. Signs to be placed on both FO and DO service tanks and in vicinity of activation point outside the engine room, warning crew of the risk of blackout if QCVs are shut;

5. Chief Engineer's standing orders and handover notes to include specific instructions on QCVs and danger of their unintended operation when crew is engaged in tasks near activation points.

MARS 201161

Mini-tsunami wrecked gangway

On a pleasant evening in the 1980s, our large LPG carrier was 12 hours away from Port Said, and scheduled to join the southbound Suez Canal convoy the next day. At sunset, there was a slight sea with clear skies and good visibility and the forecast promised calm conditions. The Chief Officer and I were relaxing on the bridge discussing plans for the impending arrival and canal transit. The crew had just finished rigging the starboard accommodation ladder. They left it suspended outboard, fully rigged and secured horizontally at main deck level, ready to be lowered for the pilot next morning. Suddenly, our conversation was interrupted when the ship's stern began to rise and we were overtaken by a single, huge swell that rolled past the ship just above deck level, the crest breaking on to the main deck on both sides. I estimated the height of the rogue swell to have been about seven metres.

The accommodation ladder was lifted bodily, torn off from its fixtures and was dumped on the upper deck as a twisted heap of metal. Fortunately, the crew had just entered the accommodation and had secured the doors. It was a very expensive and embarrassing incident. A telex to head office reporting the damage caused by a rogue swell was, I suspect, treated with some scepticism, until the pilot who boarded us in the morning confirmed that the previous evening, such a wave had entered Alexandria harbour and damaged some ships alongside. Later, we learned that a strong under-sea earthquake had occurred the previous evening. It is thought this tremor generated the mini-tsunami which wrecked our gangway – and also saved my face in Head Office!

I was reminded of Conrad's quote 'I have known the sea too long, to believe in its sense of decency'.

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Everyone makes mistakes or has – or sees – near misses. By contributing reports to MARS, you can help others learn from your experiences. Reports concerning navigation, cargo, engineering, ISM management, mooring, leadership, design, training or any other aspect of operations are welcome, as are alerts and reports even when there has been no incident. The freely accessible database (http://www.nautinst.org/mars/) is fully searchable and can be used by the entire shipping community as a very effective risk assessment and loss-prevention work planning tool and as a training aid.

Reports will be carefully edited to preserve confidentiality or will remain unpublished if this is not possible.

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