Gard Loss Prevention Circulars
Compilation of Loss Prevention Circulars

Introduction
The Gard loss prevention updates that are regularly sent to Members and clients are divided into three different categories:

- Gard alerts - which contain important and timely information relevant to the maritime industries, mostly provided by external parties such as correspondents, local experts and different international organisations and authorities.

- Loss prevention circulars - that contain important lessons learned for the maritime industries, mostly based on internal knowledge gained by Gard’s claims departments, and based on trends and claims cases.

- Case studies for onboard safety meetings - these describe typical incidents onboard a vessel. The case studies are based on actual cases from the Gard claims database, and focus on risk assessment and identifying the contributing factors that led to an incident.

This booklet contains a collection of Gard’s Loss Prevention circulars in English. It is a compilation of what Gard considers to be the most important and relevant circulars published during the period 2000 to December 2013. They are reproduced here for Members and clients, to be read as part of our ongoing effort of knowledge sharing and loss prevention.

The compilation may be used for individual studies, as part of training schemes, or covering individual topics in safety meetings, onboard risk assessments or education. Additional copies for distribution to ships or training centres can be obtained from Gard AS.

This compilation is updated on a regular basis. The aim is to organise relevant circulars in a practical and useful format. In this regard, we welcome comments and suggestions from our readers.

For a complete list of all our loss prevention circulars, please visit our website at www.gard.no.

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Terje Paulsen
Vice President, Loss Prevention
Gard AS
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The VDR loop function may offer an option to retain data the hardware malfunction. malfunction of the system, however, in some cases, we have experienced that the VDR alert function was not triggered by the hardware malfunction.

The VDR loop function may offer an option to retain data from a longer period of time than the 12 hour window required by the IMO performance standard. By adjusting this default the Master has an increased opportunity to preserve the data. Masters should be reminded that the records will be overwritten within the implemented time frame if the data is not promptly saved.

Data saving and retrieving challenges
In one recent case a large container vessel ran aground. On grounding, the “save” button on the VDR was pressed in accordance with the procedures, but three days later, when a shore technician was contracted to extract the VDR data recordings, it was found that the data had never been saved. It also turned out that the master was not familiar with the VDR and that he had never saved data before. The relevant VDR data from the incident had been lost.

In general Gard has experienced that lack of understanding and limited in-depth knowledge of the equipment often lead to loss of VDR data even where the equipment is in full working order. Where the VDR information has been successfully preserved, the retrieving and downloading of the data often offers a challenge. Most VDRs require a manufacturer’s technician to attend in order to download the data. The fact that there are numerous manufacturers and various model types requiring different software versions to be able to view the data make it difficult to retrieve the information and data. VDR systems also have a built-in alarm function that is automatically triggered in the event of a malfunction of the system, however, in some cases, we have experienced that the VDR alert function was not triggered by the hardware malfunction.

The VDR overwriting data. Retrieval can always be done at a later stage.

Failure to retrieve VDR information may lead to counterparty allegations that might have been prevented and/or proceeded against in a less costly manner had it not been for the lack of VDR evidence. However, the emphasis should be on stopping the VDR overwriting data. Retrieval can always be done at a later stage.

Footnotes
1 See Gard News 191, August/October 2008: VDR data – Lost before it is found?  I more
2 VDRs are required to maintain a record of all data for a minimum of 12 hours, although
Class often requires 24 hours and many manufacturers provide a longer period, after which time the information will be overwritten.

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Loss Prevention Circular No. 12-10

Limitations of a vessels’ anchoring equipment

Gard has seen an increasing number of cases involving lost anchors, and from class societies we learn that as many as one anchor per 100 ships is lost annually. The reasons for loss of anchors and chain are many, and include lack of seamanship and inadequate maintenance, but also instances of the chain and anchor breaking, leaving a question mark as to the quality of such parts as provided by the manufacturers.

In Gard, about one in 200 ships a year has an anchor related claim. Most of these are due to the loss of anchors at designated anchorages where the authorities require the lost items to be removed, thus resulting in a “wreck removal” case. The more serious and very costly cases are when a vessel starts dragging its anchor in bad weather, and where this leads to collisions with other vessels, groundings and loss of the ship, or to damage to cables and pipelines on the seabed.

Strength and limitations of anchoring equipment
The rules for anchoring equipment, the grade, length and size of chain, number and weight of the anchors, the strength of the chain stoppers and the power of the anchor windlasses and the brakes, are established by the class societies. They can be found in the rules of the individual societies, or in the unified rules of IACS, the International Association of Classification Societies. It is important to be aware that these are minimum requirements, and to know the assumptions made in the calculations.

For each vessel the class society will calculate an Equipment Number by using a formula, where the displacement of the vessel, the breadth of the ship and the height from the summer load waterline to the top of the uppermost house, as well as the profile view area of the hull, superstructures and houses above the summer load waterline are included. Thus, the forces on the ship by wind and from the water on both the front and the sides are taken into account. The formula is based on an assumption that the speed of the current may reach 2.5 m/sec, and wind speed of 25 m/sec, which represent quite high forces, but it is also assumed that the vessel can use a scope between 6 and 10, the scope being the ratio between length of chain paid out and water depth. However, large ships at deep anchorages do not have sufficient chain onboard to reach scopes of such magnitude.

If a ship is at anchor in ballast condition, the Master should also bear in mind that wind forces acting on his ship may be much larger than the calculations have accounted for, as larger ship side areas are now exposed, while the measurements entered in the formula was taken from the summer load water line. Vessels in ballast will also be more vulnerable if they have to move away in bad weather, as both the steering and the propulsion may be affected.

Class societies make it clear that the use of the anchoring equipment is only for the temporary mooring of a vessel, within a harbour or a sheltered area, when awaiting berth, tide, etc. It is particularly emphasized that the equipment is not designed to hold a ship off a fully exposed coast in bad weather or to stop a vessel from drifting. The anchoring equipment, as designed in accordance with the class rules, will only hold the vessel in good holding ground, while the holding power is significantly reduced in poor holding ground.

Recommendation
If a vessel is anchored in an area exposed to weather, it is necessary to have a policy as to when to leave. There have been cases when Masters have been under commercial pressure not to leave the anchorage, and disasters have happened because the Master was tempted “to wait and see until the morning”, although the weather forecast was bad. In making his decision whether to stay or to leave, the Master should also be aware of the limitations of his anchoring equipment. Some Masters may not have full knowledge of these limitations, however, they are laid down by the class societies in their rules for calculating the dimensions, weights and strengths of the anchoring equipment.

With the mentioned limitations in mind, it can be seen from cases of ships dragging anchors in bad weather that Masters have at times placed too much trust in their vessel’s anchoring equipment. Today’s weather forecasts are usually very reliable and Masters should more often choose to weigh anchors and go out to sea in time if heavy weather is forecast.

The full text of the rules for anchoring equipment can be found in the document “Requirements concerning mooring, anchoring and towing”, by searching the web pages of the International Association of Classification Societies: www.iacs.org.uk, or directly in www.iacs.org.uk/ v/unifiedrequirements/ur_a_pdf148.pdf.

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Ocean towage of new building hull

Introduction
Gard has seen an increasing number of incidents occurring during ocean towage of hulls from construction yard to outfitting site. The incidents are mainly caused by the loss of towage connection, followed by an inability to re-establish the tow before perilous situations arise and consequential stranding occurs. We have occasionally seen that a lack of experience, combined with incomplete risk assessments and planning, together with pressure to transport the hull to the outfitting site as quickly as possible, has resulted in decisions being made which have lead to the necessary precautions not being taken. Winter tow may involve additional problems and delay, e.g. winter tugs in ice conditions. The warranty towage survey with regards to weather and ensuring safe towage are also at times disregarded to hasten delivery.

Responsibilities and command
Who is in control of contracting the tug, the owner, sub-contractor or insurer? The party contractually obliged to transport the vessel will most likely be responsible for contracting the tug and will be responsible for any liabilities arising out of the tow. A shipbuilder's all inclusive price for a vessel implies that it carries the contractual liability for delivery to the fitting out site.

Even though the tow may be considered a “dead ship”, the Master of the tug is always in command and has the final word in respect of the safety of the tug and tow. Owners' representatives cannot override the decisions of the tug master. Lines of communication should be established with contractors/insurers and any information regarding the tow, communicated to them.

Contractors and yard issues
In our experience there are differing practices among tug operators, and these should be considered when selecting a candidate for the towage operation. The type of contract entered into could also affect the outcome of any incident arising during the towage operation. The tug master's and crew's previous experience of ocean towing is essential.

Gard has also seen that yards frequently place additional equipment and sections onboard vessels, hence additional time must be used on repeat surveys, fastening and recalculations of stability. Due considerations should also be given to any possible sub-contractors that may be involved in the way of steerable tugs, harbor tugs, etc. in order to conduct the voyage in a safe manner.

Warranty survey
A Warranty Clause should be inserted in the contract with the tug operator with preferably one or several named surveyors who should be entrusted to undertake the warranty survey for the intended towage, a survey which should include the tug, the tow and the equipment. The warranty surveyor is appointed by the insurer but the costs thereof are covered by the assured.

The warranty survey must be completed prior to departure, and any recommendations given by the surveyor must be carried out before the convoy is allowed to depart. If anything happens to the convoy en route and a port of refuge is requested, the warranty surveyor should revisit the convoy in order to reconfirm the condition of the tug and tow. Any deviation from or shortcomings from the observations made by the warranty surveyor may influence insurance cover to the extent that insurance is void.

Risk assessment and planning considerations
When conducting towage during adverse weather tug power, endurance (bunker capacity), the need for sufficient bollard pull and power, weather routing, reporting and passage planning – including a port of refuge plan – should be considered. It is important to select a tug based on size (length and displacement), especially during winter towing. Bollard pull is not the only criteria.

Consideration should also be given as to whether the equipment onboard the tug is old, whether all certificates are within date, that the towing wire and shackles etc. are in good condition and that the emergency towing wire is in an acceptable condition and correctly installed.

For the unmanned tow, safe access to the object is important and maintaining the same and, when possible, inspect the tow for her structural integrity (no accumulation of water). In order not to loose the object when a tow is parted from the tug a transponder could be considered put on board the tow. In addition, the tow should be well lit and when passing areas with heavy navigation it is advisable to broadcast navigation warnings with information about the length between tug and tow.

The tow should be trimmed by stern to improve course stability, and the rudder should be secured amidships. Among the shaft problems which may arise are shaft not connected to main engine, bracket fastening, lubrication of the stern tube, shaft alignment and securing of propeller. The tow to be equipped with emergency towing gear/bridle for use if main towing gear breaks.

Recommendations
When a dead ship is towed there is no-one present to represent the owner, thus if any mishap occurs there is an urgent necessity to dispatch a member from the management to look after the owners’ interests. Those involved should also ensure that the warranty surveyor’s recommendations are met and that any recommended weather conditions/window is adhered to.

The choice of tug operator and tug may have a future impact on the bottom line, and owners/builders (contractors) should ensure that prudent choice is made as far as manning, past record, and presence in the market is considered, to name a few of the issues. Compliance with recommendations made by the warranty surveyor should be adhered to forthwith, including use of external assistance such as additional tugs, pilot, or riding crew.

1 Reasons for wire damage could be: (1) wires were not handled with care, (2) wires snapped due to chafing on the stern of the tugs, (3) the wires and wire-protectors were not well-monitored, (4) the crew was too late refreshing the touch point of the wire on the stern, (5) lack of knowledge of slacking of the wire in relation to the water depth, (6) the wires were touching the seabed which was covered with obstructions, (7) the crew failed to haul in the wires on time, so contact with the seabed could not be avoided, and (8) crews were too late paying out the towing wire or reducing speed when excessive forces came on the wire (weather, tug).
2 Class is not concerned with the towing process unless specifically instructed to undertake a “Warranty survey”. Members should therefore be aware of the different roles and responsibilities of the class surveyor and the warranty towage surveyor. Even though the hull is fully approved by Class, water tightness, leaking valves, hatches, tanks etc is may not inspected by Class.
3 BIMCO Tow Hire or Towcon and similar.
4 Warranty towage survey is a survey to ascertain that tug and tow are equipped and manned for the intended voyage and shortcomings have to be attended to before departure is granted.

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Loss Prevention Circular No. 16-09

Anchoring within Malaysian waters off Singapore

Earlier this year we addressed the problems of anchoring in congested areas off Singapore. In this circular we address the problems encountered when anchoring within Malaysian waters off Singapore. So far, three vessels covered by Gard have been arrested and fined for not having notified Malaysian authorities of their arrival and anchoring outside the outer port limits of Tanjun Pelepas and Johor ports and for non-payment of light dues.

It is well known that there are no “international waters” outside Singapore waters; ships are either in Singapore, Malaysia or Indonesia. When anchoring off Malaysia, it should be borne in mind that Malaysian territorial waters extend 12 nautical miles from the baseline, if not limited by other State boundaries.

Amendments to The Merchant Shipping Ordinance 1952 Section 491B of the Malaysian Merchant Shipping Ordinance 1952 stipulates which ships must notify the Director of Marine of activities within Malaysian waters. The Director may impose terms and conditions including fees on the activities permitted. The owner, master or agent of the ship may be found guilty of an offence, as well as risking a fine of MYR 100,000 or imprisonment for up to two years, for contravening the ordinance.

The Marine Department of Malaysia has recently amended the Merchant Shipping Ordinance to also include vessels engaged in activities such as:

a. Laying up
b. Welding and other hot works
c. Anchoring in non-anchorage areas
d. Any form of underwater operations

The Marine Department of Malaysia advises that notification to the Director of Marine can be made at the nearest port office during normal working hours.

As for the payment of Light Dues, this is regulated by Act 250, Federation Light Dues Act 1953, which states that “every ship which in the course of a voyage enters any port or place within Peninsular Malaysia, other than ships exempted, shall pay light dues as prescribed.”

Risk of fines

It should be noted that once vessels have been arrested for non-payment of light dues, it can be rather expensive to obtain their release. A rate of Registered Net Tonnage x MYR 0.20 X 10 has been levied as a penalty. Authorities may request a bond of MYR 50,000 issued by a local registered bank, prior to releasing the vessel. The Marine Department appears to prefer to deal with a local registered shipping agent rather than with a P&I Club representative, and will only accept a Letter of Undertaking from shipping agents while waiting for security guarantees to be issued by a bank, which may take up to five working days.

Recommendations

Fines for non-payment of harbour dues etc. are not covered by Gard Rule 47 and are therefore outside the P&I cover. Our advice to Members and clients entering Malaysian Territorial Waters is to arrange for notification of arrival and the payment of dues through a Malaysian shipping agent.

Footnotes

1 Gard Loss Prevention Circular No. 11-09: Dangerous anchoring in the Singapore area.
3 MYR = Malaysian Ringgit.
6 Additional information can be found at Marine Department Malaysia www.marine.gov.my/
Loss Prevention Circular No. 11-09

Dangerous anchoring in the Singapore area

The Maritime and Port Authorities of Singapore (MPA) recently called a meeting with representatives of the P&I Clubs to discuss particular problems of dangerous anchoring in the Singapore area.

Vessels not anchoring within Singapore port limits are, for commercial reasons, opting to anchor in outer port limit areas (OPL). The East and West OPL areas used for anchoring are, however, rather narrow spaces situated between the port limits and the traffic separation scheme (TSS) through the Singapore Strait. These areas are becoming very congested, being popular with owners for the purposes of bunkering, taking supplies, change of crew, repairs or just waiting for cargo operations. Due to the congestion, some anchored vessels are straying into the TSS, and are thus violating the International Regulations for the Prevention of Collisions at Sea (COLREG). The MPA states that vessels in breach of COLREG Rule 10 (g) by anchoring in the TSS are being reported to their respective flag administrations. It appears from the vessels having been reported, that Singapore authorities also seem to report vessels anchored in Precautionary Areas for being in breach of COLREG.

When it comes to bunkering at Singapore, and the tendency to bunker in OPL areas, it should be noted that the risks factors concerning both bunker quality and quantity have been considered higher in OPL areas than from suppliers operating within the much more regulated port limits. There are also two bunker anchorages in the western sector of the Singapore Port, located conveniently close to the TSS, where vessels of 20,000 GT and above, staying less than 24 hours, may take bunkers at reduced port dues. Vessels other than gas tankers and chemical tankers, with a draft of 11.5 meters or less, may also be exempted from compulsory pilotage at these bunkering stations.

The MPA has also pointed to several instances of damage to subsea cables by incorrect anchoring and has alerted the P&I Clubs to this problem. When a vessel is anchoring too close to charted cables and pipelines, the owners of the cables/pipelines are informed of the vessel’s particulars, to enable them to make a claim against the vessel, should any damage occur. OPL is a “loose” term, but the Eastern OPL is considered bound to the north by Johore Port limits and to the south by the westbound TSS. It should be noted that this 5 mile long area is very narrow and there are several submarine cables running the length of it.

We have also been advised that the MPA is in discussion with Malaysian and Indonesian port authorities, in order to reach an agreement for vessels anchoring in the TSS, or damaging subsea cables and pipelines, to be penalised by the State having jurisdiction over the area.

The problem of congestion of vessels off Singapore is not easy to solve, but there is always the possibility of seeking designated anchorages inside Singapore port limits. Vessels should not anchor in the TSS or Precautionary Areas, and care should be taken not to anchor too close to subsea cables and pipelines. Claims for damage caused by anchoring in way of cables and pipelines, or by dragging anchors across such equipment are very costly to the Club.

There have been a number of contact damages between ships at anchor in OPL areas during recent months, mostly in the East area. For anchoring in congested areas, full alertness is required and anchoring at night should be avoided if possible. In locations such as the congested Singapore OPLs, wind and tidal currents must be considered; an anchor watch should be kept at all times and the engine at the ready. For the time being, when anchoring off Singapore, the key message is extreme caution.

For further information on anchoring in general please see the following Gard publications
Gard News 193 What if... ? - Planning for the unexpected before an emergency develops
Gard News 177 Anchoring - Getting into a safe haven or into a potential disaster?
Gard Loss Prevention Circular No. 14-08: Anchoring and deteriorating weather conditions
Damage to fixed objects when manoeuvring in confined waters

Gard has recently seen a noticeable increase in cases involving significant contact damage to fixed objects by vessels manoeuvring in confined waters, mostly within port. Fixed objects include berths, docks, locks and shore side equipment such as cranes. The contact damage has resulted in some very large claims for the repair and/or loss of use of such objects. These incidents also risk harming people and the environment (e.g. pollution from breached oil tanks), and the ship itself is often left with expensive repairs and loss of trading time.

Outlined below are five of the most common factors, in Gard's experience in cases involving contact damage to fixed objects in confined waters:

1. Prevailing and forecast conditions not properly assessed
The cumulative effect of wind, sea, current and tidal conditions on the ship may not have been fully appreciated. As a result of the above factors the vessel can experience difficulties in manoeuvring in a controlled fashion and within safe parameters. Insufficient allowance has been made for the forces acting on the ship. These can easily turn out to be greater than expected and beyond the capabilities of the ship and, due to the unforeseen effects of the prevailing and/or forecast conditions, insufficient tugs would have been employed to handle the vessel. There are instances where manoeuvrings in confined waters should be deferred until conditions have improved. This also includes cases of reduced visibility.

2. Unfamiliarity with the ship's manoeuvrability
A pilot will know the local waters best, however, the master is more familiar with his vessel's manoeuvrability. Due to the rotation of crew, familiarity with the ship's own manoeuvring systems can be lacking, and, as technology and computerisation is becoming ever more prevalent, training may be needed to ensure that crew members are familiar with the vessel's systems. It is important to include information as to the vessel's manoeuvrability in the master/pilot information exchange before the commencement of the pilotage. The effect of changes in the vessel's draft, trim and windage characteristics must also be taken into consideration when discussing the vessel's manoeuvrability.

3. No agreed manoeuvring plan
Just how the vessel will manoeuvre when in close proximity to fixed objects is often not planned and/or agreed in advance within the bridge team and/or with the pilot. This not only concerns the location that the vessel is proceeding to/from, but also other fixed objects which the vessel will pass within critical close proximity. Often, insufficient time is invested in advance to consider how the vessel can be expected to behave, given its manoeuvring characteristics and the prevailing conditions. The closest points of approach are often not calculated as are critical bearings, transits and ranges to assist in determining the limits of the safe manoeuvring parameters.

4. Poorly executed manoeuvre
Even the best ship handlers occasionally get it wrong, although it is perhaps surprising how very wrong in some cases. Excessive speed is a common factor as is pilot error and the bridge team can be reluctant to intervene when the pilot is clearly making mistakes. Communication with tugs, terminals and mooring crews leading to misunderstandings has also been a contributory factor. Even where a manoeuvring plan is agreed, prevailing circumstances can require the plan to be changed and there may be little time to react to new situations. In particular, changes in wind conditions and the movements of other vessels often create problems. In a number of cases it appears that aborting the manoeuvre to try again has not been considered or has been left too late.

5. Loss of manoeuvring capability
The loss of engines, propulsion, steerage, or thrusters is, perhaps surprisingly, a less common factor than those mentioned above. There are instances where such a loss has occurred immediately before/after manoeuvring systems have been, or are due to be, repaired or overhauled. Unfortunately, during these periods of increased risk, additional precautions appear not to have been taken. Pre-sailing and pre-arrival checks on manoeuvring systems are important, especially after a long ocean passage or stationary period. Less obvious factors involve squat and/or interaction. Although a loss of manoeuvring capability will inevitably make contact avoidance more difficult, exercises and drills can be used to test back-up systems, including use of the ship's anchors. Having something in reserve is important, but being able to put that reserve to effective use is equally important.

Recommendation
It is better to abort the manoeuvre and make a second attempt than to fail on the first. During drills, exercises and tests of equipment prior to arrival, the Master should ensure that the crew is able to respond at any time to an emergency situation related to manoeuvring. Tasks should be properly defined and assigned to qualified personnel, and the Master should ensure that the company procedures are fully understood by everybody involved. Effective and clear communication is important. The Master should closely monitor the manoeuvres and should not hesitate to comment, give advice, or even abort an approach if he is uncomfortable with the situation.

See also “Bumps and scrapes can be costly!” from Gard News 183.
Some shipowners have sought to standardise equipment across vessels in their fleet and to always assign senior officers to the same class of vessel.
See also “Master/pilot exchange of information” from Gard News 154.
See also Loss Prevention Circular no. 04-00: Pilot on the bridge - Role, authority and responsibility.

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Loss Prevention Circular No. 14-08

Anchoring and deteriorating weather conditions

Introduction
Gard has recently seen several severe incidents where anchored vessels have ended up dragging their anchors. The purpose of this circular is to highlight some of the issues surrounding anchoring operations in adverse weather conditions.

Experience from casualties
It is inevitable that vessels may be required to anchor off shore at more exposed anchorages whilst waiting for a berth to become available. The vessels may be at such an anchorage for days or even weeks and will be exposed to wind and waves. One of the most important factors identified during the analysis of the incidents is the importance of making the appropriate decisions in time when the weather is deteriorating. Seafarers are often taken by surprise by deteriorating weather and fail to prepare their vessel for such a situation. Several important lessons can be learned from the two incidents described below.

Collision at anchorage
A bulk carrier (vessel Alpha) recently collided with another bulk carrier (vessel Bravo) while dragging its anchor in strong winds. The two ships were anchored at an exposed off shore anchorage.

During the morning in question, a southerly weather front came through the anchorage – changing the wind direction from off- to onshore. At 0900, the OOW on board vessel Alpha noticed that the ship was dragging the anchor. The master was informed and he decided to weigh anchor and depart the anchorage at 0913.

However, vessel Alpha’s crew encountered difficulties in weighing anchor. During the anchor retrieval process the vessel drifted towards vessel Bravo, which was anchored to the north.

At 0935 vessel Alpha pitched heavily, resulting in the propeller coming clear of the water and the main engine being shut down by the overspeed trip. Vessel Alpha’s main engine was restarted; however, it was too late to avoid a collision and at 0939 the vessel collided with vessel Bravo. The two ships moved apart and then made contact a second time before vessel Alpha finally made its way clear of the other vessel.

The following causes contributed to this incident:
(1) The ships in the anchorage were anchored too close to each other.

(2) Vessel Alpha’s OOW did not use all available means while keeping anchor watch. This lead to him failing to identify the change in the ship’s position until 40 minutes after the ship had begun to drag its anchor. The decision to leave the anchorage therefore came too late.
Vessel Alpha’s master did not increase the scope of cable laid out, either prior to or on the day of the incident despite the weather reports and the changing weather conditions at the anchorage.

Grounding following dragging of anchor
A strong gale passed through an exposed anchorage in the southern hemisphere, producing 50 knot south easterly winds and 7 metre waves. The gale created dangerous and difficult conditions at the anchorage, particularly for lightly ballasted large bulk ships with limited manoeuvrability.

The day before the incident occurred there were 56 ships at anchor waiting to enter the port. In response to the forecast gale force winds two ships decided to depart the anchorage. Later that day and during the night further ships put out to sea. By the next morning there were only 9 ships out of the original 56 left at the anchorage. At least 3 ships experienced difficulties in manoeuvring or were dragging their anchors during that morning.

One ship was driven ashore by the weather and grounded. Another had great difficulties manoeuvring whilst only 0.7 nm away from the shoreline and nearly ran aground. A third ship was unable to weight anchor and dragged towards the shoreline.

The investigation undertaken by The Maritime Authority of NSW found that the grounding of the bulk carrier resulted from a series of erroneous judgements and decisions made by the master. The most significant being:

1. The master’s failure to realise the potential impact of the weather forecast for the anchorage for that particular day;
2. An initial decision to ride out the gale force winds at anchor; and
3. A decision not to ballast the ship for heavy weather.

Recommendations and Lessons Learned
A good anchor watch should always be maintained and main engines should always be available for use when at exposed anchorages. Weather conditions may deteriorate at short notice.

The following are important factors when at anchor:

- Regular position checks using all available means including visual aids, GPS, ECDIS and radar
- The time available to react based on the limitations of the anchorage and nearby hazards
- The weather forecast
- Communication watch and registration of information received from shore
- The level of experience of the bridge team
- The load limitations of the anchoring equipment

In the event that rapidly deteriorating weather is forecast, the Master must make timely decisions whether to:
- Take on heavy weather ballast before conditions deteriorate
- Deploy an extra anchor
- Pay out more anchor cable
- Weigh anchor and depart the anchorage
- Slip the anchor cable if necessary
- Call for tug assistance
- Monitor the situation and let the vessel drag in a controlled manner through the anchorage.

Recent incidents indicate that deteriorating weather conditions are an increasing challenge to the crew. Gard would like to emphasise the importance of detailed planning and risk assessment of the operation when vessels are anchoring. Knowledge of the ship’s manoeuvring characteristics and the particulars of the anchorage are very important. It is also important to continuously evaluate the changes in the situation and if necessary to change the initial plan.
Moored vessels breaking out from their berths

Introduction/Incidents
Gard has investigated several P&I and H&M incidents involving moored vessels breaking out from their berths, following a recent increase in the frequency of such incidents. The consequences of these incidents range from personal injury, significant contact damage to the vessel including ranging and grounding damage, damage to adjacent vessels, shore/terminal structures to pollution damage to the environment. The majority of these incidents occurred during periods of adverse weather, with high winds acting on vessels with large windage areas.

Wind speeds recorded in the above incidents ranged from 63 km/h to 120 km/h (Beaufort force 7-12), although in one case the actual wind speed was estimated to have been much higher due to the funnelling effect of container stacks ashore. In many cases additional mooring lines were deployed in anticipation of high winds, ultimately to no avail. In one case the vessel moorings were even supplemented by shore lines with load monitoring, however, the vessel still broke free due to excessive loads on the lines, seemingly as a result of abnormal tidal flow caused by restricted under keel clearance. Even tugs could not prevent her from ultimately grounding. In another case, the vessel did get tugs to hold her alongside the berth, only to stand them down prematurely. The second time the vessel came off the berth she grounded resulting in substantial bottom damage.

Ports around the world have various berth layouts and mooring facilities and are exposed to different wind, tidal and swell conditions. It is important that the Master takes into consideration the key critical aspects of any given port along with the vessel's characteristics, in order to ensure that the vessel is adequately moored to withstand the anticipated mooring forces, even in normal conditions. It is equally important that the Master is ready to take extra precautions to keep the vessel alongside in adverse weather, tidal and swell conditions and is ready and able to vacate the berth safely when conditions make it difficult for moorings to cope.

Risk Assessments
Whilst incidents of this nature may involve reports of defective mooring equipment or lack of attention to moorings, investigations suggest that in many incidents a proper risk assessment was not undertaken. It is recommended that appropriate risk assessments are carried out, taking into consideration the vessel's characteristics, type, size, trading pattern and the prevailing weather conditions. Factors to be taken into consideration include, but should not be limited to, the following:

Examples of wind, tidal, swell and weather related factors
- Wind loads exerted onto a vessel's superstructure and hull above the waterline, which can form a large proportion of the total load on the mooring system depending on the moored vessel's location and characteristics.
- Wave loads on a vessel, which can vary depending on the vessel's response to waves of varying periods and heights. Of special concern are moorings in relatively shallow water depths, in low tide and high wave conditions. These conditions can lead to violent vessel behaviour at the moorings (breaking waves, excessive motions, snatch loads etc.) and in extreme cases, loss of under-keel clearance in wave troughs for larger, deeper draft vessels.
- Forces resulting from steady currents in combination with other loadings, especially at low water levels in breaking wave conditions, which can also exert substantial loads on a ship's mooring system.
- The effect of wind against tide or current and the effect of a change in tide direction on moorings.
- Tidal surges before, during and after storms, which may be well away from the area in which the vessel is berthed, causing unusually large tidal ranges and lower than expected water levels.

Examples of port/berth related factors
- Characteristics and history of the port and berth and any unusual occurrences.
- Peculiar features of the berth such as overhanging berthing arrangements, obstruction by gantry cranes, wind funnelling effects from shore structures.
- Design/type, position, quality and adequacy of shore mooring equipment, including storm moorings and fenders, and of tugs.
- Exposure at the berth to wind, tide and swell conditions.
- Delay in the availability of shore mooring equipment, mooring gangs, pilots and tugs etc. in normal as well as emergency situations.
- Proximity of other vessels and hazards in the vicinity of the berth.
- Effect of passing vessels on vessels moored alongside.
- Availability of storm bollards, which may not be useable during cargo operations if moorings restrict working on the berth.
- Port/terminal procedures in the event of extreme conditions and their suitability.

Examples of vessel related factors
- Size/type of vessel, notably the windage area (including windage area due to cargo or containers if applicable) and the related effects of the same with changes in wind, tidal and swell conditions.
- Design/type and condition of mooring equipment, its limitations and weaknesses.
- Suitability of the mooring pattern - number of lines, lengths, angles and leads and the ability to maintain even tension on the lines.
- Manning level/crew availability for normal as well as adverse weather conditions.
• Weather forecast and warnings - reliability and frequency.
• Readiness of engines, thrusters, anchors and power on deck.
• Availability, condition and readiness of additional moorings.

**Conclusion**

It is recommend that the Master carries out a proper risk assessment for the different mooring conditions and loadings to suit their specific vessel characteristics and mooring location in normal as well as adverse weather conditions. The Master is encouraged to be proactive in requesting information from the port, pilots and agents and in establishing how warnings will be broadcast by the port. However, he should not rely wholly on information from other parties. In the event that deteriorating conditions are forecast, the Master should make timely decisions to ensure that the vessel is brought to a state of immediate readiness. Amongst other things the Master will want to ensure that, before conditions become extreme, the vessel is fully manned, is appropriately ballasted for heavy weather (with due regard to under keel clearance at the berth and in the port), has engines ready, and is in close contact with the terminal and port authorities in relation to timing and availability for stoppage of cargo operations, deployment of additional (storm) moorings, and for tugs, pilots etc. Most importantly, the Master will need to decide whether to remain alongside or depart from the berth to sea or a safe anchorage. It is worth bearing in mind that additional precautions such as extra mooring lines may not prevent a ship from breaking free from her moorings.

Last, but by no means least, it is also worth remembering that mooring stations can be very dangerous places in bad conditions, hence another good reason not to delay departure from the berth until it is dangerously late.

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2 For example, some winch brakes are designed to render under excessive load to avoid the dangers of parting lines. OCIMF recommends that the winch brake be set at 60% MBL (Minimum Breaking Load) of the mooring line. If the winch starts to render then the design conditions are being exceeded. See Intertanko commentary on winch brake settings at: http://www.intertanko.com/templates/intertanko/issue.aspx?id=40247

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Loss Prevention Circular No. 02-06

Navigation through the entrances to the Baltic Sea

This circular is based on a recent letter received from The Danish Maritime authorities highlighting the increased number of navigational accidents in Danish waters, and Gard’s own experience with similar accidents in the same area.

As members and clients are aware, IMO resolution MSC.138 (76) provides recommendations on navigation through the entrances to the Baltic Sea, namely the Great Belt (Route T) and The Sound. The recommendations include the use of pilots for certain types of ships in high traffic density waters. The purpose of IMO resolution MSC.138(76) was to provide those responsible for the operation of ships with recommendations on safe navigation through the entrances of the Baltic Sea with the objectives to ensure safety, prevent human injury or loss of life, and to avoid damage to the environment, in particular the marine environment, and to ships and their cargoes.

In a letter to the International Group of P&I Clubs, the Danish Maritime Authority has drawn the shipping industry’s attention to IMO resolution MSC.138 (76) and indicating that a number of ships are disregarding the recommendations. According to a safety study conducted by the Danish Maritime Authority, during the period from 1st January 2002 to 30th June 2005 alone, 22 ships grounded in the Great Belt and none of these ships had a pilot on board at the time.

The Danish Maritime Authority letter illustrates and emphasises that it is highly recommended to utilise the expertise and local knowledge of pilots, and that as a minimum, vessels sailing through the Great Belt or The Sound follow IMO’s recommendation on navigation through the entrance of the Baltic Sea.

Denmark has also launched a procedure whereby all vessels entering Danish waters without ordering a pilot in accordance with the IMO recommendation will be contacted in order to draw their attention to the recommendations on the use of pilots. When a ship does not comply, the master will be informed that Denmark finds it inconsistent with safe navigation practices and procedures to neglect an IMO recommendation. These ships will be reported to the maritime authority in the ship’s flag state.

The following documents are available at www.gard.no under News in the Loss Prevention section:

- The Danish Maritime Authority Letter.
- IMO resolution MSC.138(76)
- Intertanko model charterparty clauses in recognition and support of IMO res MSC 138(76).

General information on Pilotage in the Baltic can be found at the Baltic Pilotage Authorities Commission website at: http://www.balticpilotage.com and http://www.pilotage.dk

Vessels to which the IMO recommendations do not apply are advised to navigate with extra caution through the entrances to the Baltic Sea, i.e. the Great Belt (Route T) and The Sound.

A guide to navigation in Danish waters can be found at: http://www.frv.dk/en/ifm/navigation/navigation_ntdw.htm
Loss Prevention Circular No. 02-04
Winter season in the northern Baltic Sea

The 2002/2003 winter season was the worst on record since the winter of 1987. Our statistics appear to indicate that the preceding relatively mild winters may have lulled seafarers into a false sense of security. How this and future winters will unfold remains to be seen, but shipowners and operators would be well advised to ensure that their seagoing personnel are well aware of the planning, preparation and care required while navigating in ice.

Approximately 30% of all averages which occurred in connection with navigation in ice in the Baltic Sea during the past winter season, were collision cases. This is a substantial number and leads us to again remind shipowners of the issues involved.

The most common cause was collision between vessels in an ice convoy. Under normal circumstances blame has been apportioned equally between the colliding vessels. Otherwise, in determining liability, emphasis was placed on:
- How the watch keeper had been alerted by the vessels involved,
- How vessels ahead and abaft had been warned by the vessel which was stuck or slowed down in the ice,
- Distances kept between the vessels, and of course
- The ice situation in general.

In some collision cases, and in particular when an assisting icebreaker is involved, the case may be settled on a “knock-for-knock” basis. This means that both parties cover their own cost of repairs. The same principle may also be used or agreed upon between the parties, when two merchant vessels, assisting each other when navigating in ice, are involved in a collision. However, the above “knock-for-knock” practice is only used in “standard” cases caused by difficult ice conditions. If gross negligence or other similar causes are involved, other methods of apportioning blame will be used.

Analysis of the collision cases shows that the vessels involved are very often blamed for not complying with the applicable rules; The International Regulations for Preventing Collisions at Sea, 1972 (COLREGS 72), and the Finnish/Swedish “Rules for Winter Navigation”.

The Finnish/Swedish “Rules for Winter Navigation” are endorsed by Germany, Denmark and the Baltic States. In addition to directing navigation during the winter period in Finland and Sweden, these Rules set the standard for ice navigation in the Baltic, including navigation in ice in conjunction with icebreakers in the majority of the Baltic.

For further details about the “Rules for Winter Navigation” please see the Finnish Maritime Authority’s home page at http://www.fma.fi/e/functions/icebreaking/

Navigation when the vessel is part of a convoy is a risky operation, and the crew must be alert and maintain a proper lookout at all times. It is essential that all relevant regulations are properly complied with. Breach of COLREGS 72, especially the below mentioned rules, appears to be the most common cause of collisions:

- Rule 5 – Proper look out
- Rule 6 – Safe speed
- Rule 7 – Risk of collision
- Rule 8 – Action to avoid collision
- Rule 13 – Overtaking vessel
- Rule 17 – Action by stand-on vessel
- Rule 27 (a) (i) – vessel not under command (stopped) to show two red lights

The Finnish/Swedish “Rules for Winter Navigation” require

(a) Strict watch keeping both visually and especially by radar and immediate notification by VHF radio when loss of speed is experienced.

(b) In case of stoppage:
- Immediate signalling in case of failure of other means of communication
- Immediate engine manoeuvring
- Immediate rudder manoeuvring

Recommendation

When navigating in ice or in the vicinity of ice, shipowners must ensure that their onboard personnel are well aware of the regulations governing such navigation. Furthermore, masters must be advised of the requirement to ensure proper compliance with the governing regulations and also of the utmost care required in order to promote safe navigation.

This circular has been produced with the valuable assistance of former Hull Claims Manager, Captain John Hammarén in Finland.
Loss Prevention Circular No. 10-01

Operations in extremely cold climates

Introduction

Operations in extreme cold environments are perhaps the most demanding and challenging that a vessel and her crew may experience. The extreme cold reduces the crew’s efficiency considerably. In addition, sensitive deck-mounted equipment and pipelines are often at risk of damage if precautions are not taken in time. There is also the risk that ice damage to vessels may result in oil spills.

Damage related to extreme cold and navigation in ice occurs every year. They are more frequent at the beginning of a cold period, and vessels entering such waters infrequently are more exposed than other vessels. Extreme cold causes damage to cargo, vessel equipment and injuries to the crew, while navigation in ice causes damage to the hull, propellers and/or rudder.

An article in Gard News issue No. 127 outlined guidelines to prevent cold weather damages to vessels and their equipment. Gard Services has also tried to obtain information based on experiences gained by shipowners operating in extreme cold environments on a frequent basis. The following list is not meant to be exhaustive, but should serve as a reminder, as temperatures in the Northern Hemisphere are again very low.

Deck mounted equipment

- Frozen pipelines are perhaps the most common damage that occurs. The pipelines should be properly drained well in advance. Do not forget fire hoses and couplings, which in some cases may become inoperative if not properly drained. Exposed piping should be insulated to prevent freezing where necessary.
- Periodically purge air lines on deck to remove water condensation.
- Fresh water piping systems are particularly at risk of freezing. Consider circulating water in the fresh water piping system.
- Deck-mounted winches and other sensitive equipment should be covered to avoid icing from freezing spray. Hydraulic equipment should also be started several hours before use, in order to achieve proper oil temperatures on hydraulic hoses before they are exposed to high pressure. In some cases it is recommended to keep the equipment going constantly.
- Consider stowing mooring ropes and pilot ladders below deck to prevent freezing and reduce the chances of ice build up.
- If possible, ballast tanks should be filled with water with a high salinity (and consequently lower freezing point). Furthermore, to avoid freezing of the air pipes, the ballast level should be dropped. Frozen air pipes may cause severe damage both to tank structure and pumps alike.
- All spare electricity should be used to heat the accommodation and compartments exposed to the ice and cold (fore peak, etc.). Keep doors closed to retain the heat.
- Engine ventilators may in some cases be turned off (but remain open) to avoid freezing of sensitive equipment in the engine room.
- Ice on deck should preferably be removed with wooden ice mallets, to avoid damage to the hull paint coatings. It is also recommended to keep sufficient stocks of glycol and salt to remove and prevent ice build up.
- Safety equipment should be checked frequently, including safety hand lines, if rigged.
- Move anchors periodically in order to prevent chains and winches from freezing.
- Alterations in speed and/or course should be considered to reduce the effects of freezing spray.
- Deck and navigation lights can easily be damaged by the cold and ice, and should be checked frequently to ensure they remain in proper working order.

Cargo holds

Several types of cargo are exposed to contamination from water and low temperatures and in some cases this may increase the condensation problem.

- If cargo ventilation (if installed) is used, snow and moist cold air may lead to condensation and should not be blown into the cargo holds.
- When cleaning the holds, keep the use of water to an absolute minimum. Sweep holds properly in advance of using water. Use pre-heated water whenever possible. Prevent dirty water from aggregating and freezing by removing excess water in locations where freezing could occur.

Crew

- Low temperatures reduce the crew’s physical ability, effectiveness, and can impair judgement. Proper clothing is therefore essential to maintain crew safety and awareness.
- Review rotation of watches for crewmembers working in excessively cold areas to ensure exposure is kept at a minimum.
Navigation in ice
- A considerable amount of information on ice conditions and navigation in ice is available on the Internet. For example:
  - [http://www.natice.noaa.gov/home.htm](http://www.natice.noaa.gov/home.htm) provides global and regional sea ice analyses and forecasts from the United States National Ice Center;
  - [http://www.cis.ec.gc.ca](http://www.cis.ec.gc.ca) provides information about ice conditions in Canada; and
  - [http://fram.nrsc.no/CEO_Training/Present.htm](http://fram.nrsc.no/CEO_Training/Present.htm) provides general information on ice conditions in the Baltic region.
- Local meteorological stations are more than willing to share important information when contacted. Ice charts are also received on the weather facsimile receiver.
- Instructions from icebreakers and local authorities should be carefully followed. If you are taking shortcuts and are caught by the ice it may be difficult to receive timely assistance.
- The effect of current on ice should not be underestimated. If you are caught in the ice with the current in an unfavourable direction, this may expose the vessel to collision, grounding or other types of contact damage.
- Reversion of propellers in ice should be done carefully and controlled to avoid damage to the rudder and propeller blades. It may be advantageous to run the engines ahead to wash away ice around the propeller and rudder before attempting to run astern, which again should be kept to a minimum to avoid the rudder or propeller being exposed to solid ice.
- Especially in ballast condition, the cooling water inlets may be chocked with ice. This can subsequently lead to a loss of cooling water. Engine crew must be properly briefed and made aware in order to avoid such situations.
- For vessels with high air draft or exposed rigging, icing can affect the stability of the vessel. Therefore, vessels may need to lay bye and remove ice with mallets or other suitable tools.

The shipyard
- If the vessel is at the repair yard or dock, the vessel's crew should check all items at risk of cold damage, and not leave this to the yard or sub-contractors.
- If the vessel is at the repair yard as a result of damage, and additional damage is incurred due to extreme cold whilst at the yard, the additional damages will be subject to a separate claim and will in many cases, be below the applicable deductible. This applies to both hull and machinery and loss of hire.

Bunkers
- If the vessel is at the repair yard or dock, it is imperative that all heavy fuel oil bunkers are kept heated above 20 degrees centigrade to ensure that it retains the proper viscosity.
- Whilst at port or at the repair yard in locations with an extremely cold climate, it is imperative that heavy fuel oil bunkers remain properly heated at all times in order to retain enough viscosity to be pumpable and to be used. If the fuel oil is not kept at the proper temperature, it could take days before it is heated sufficiently to be used and, will thus delay the sailing of the vessel.
Improper implementation of manufacturers’ service letters

Background
Over the years Gard has seen a number of claims that could have been avoided if instructions and recommendations in manufacturers’ service letters had been properly implemented in a ship’s on board Planned Maintenance System (PMS). In some of the cases it appears that shipowners’ and operators’ shore organisations have not distributed the service letters to all the ships in their fleet. In other cases we find that the letters have been forwarded to all ships but since accompanying instructions on implementation and follow up are missing, the required changes have not been implemented on board. Failure to implement changes and recommendations introduced in manufacturers’ service letters may in some cases have serious consequences for the safety of the crew, the environment and the ship. The purpose of this circular is therefore to remind shipowners and operators of the importance of establishing clear company procedures where all service letters are reviewed and relevant changes and actions are entered in the company’s planned maintenance system for the applicable ships.

Gard’s experience
In one of Gard’s recent cases the cause of engine damage was found to be improper tightening of connecting rod bolts. During the incident investigation it was established that the engine manufacturers’ required retightening check after 200 hours of operation had not been carried out by the crew since this instruction, distributed in a service letter, had not been implemented in the ship’s own PMS. The investigation concluded that the retightening of the bolts would most likely have prevented the engine breakdown. In another recent case the auxiliary engine suffered a piston fatigue breakdown only 120 running hours after a routine overhaul. Also in this case the investigation revealed that the ship’s Technical Manager/Shipowners had not updated the PMS to include a set of instructions and procedures issued in a service letter from the manufacturer, a letter which was issued and distributed at least one year before the incident occurred. The repair costs in this case exceeded USD 130,000.

Both of the above cases demonstrate the importance of the Technical Managers/Shipowners having proper procedures in place to timely implement manufacturers’ service letters and instructions onboard.

Regulatory requirements and implementation
The IMO ISM Code states that “development, implementation and maintenance of all instructions and procedures to ensure safe operation of the ship and protection of the environment in compliance with relevant international and Flag state legislation shall be a part of the ship’s safety management system (SMS)” (ISM Code Section 1.4). Furthermore, it states that the shipowner is responsible for “establishing procedures to ensure that the ship is maintained in conformity of the provisions of the relevant rules and regulations and with any additional requirements which may be established by the company” (ISM Code Section 10).

Recommendations
• Gard recommends the Technical Managers/Shipowners establish firm internal procedures in the company’s Quality Management System (QMS) to ensure that all applicable manufacturers’ service letters and instructions are reviewed and implemented in the ships PMS. Applicable manufacturers’ service letter’s and instructions, including managers’ recommendations, should also form part of the handover notes between the on board senior management.
• In case there is a change of ship’s Technical management/Shipowner, always contact the manufacturers to ensure that the ship’s PMS is up to date with the latest changes and recommendations.
Oil contamination of marine boilers

Introduction
The malfunction and breakdown of marine boilers are not new issues although it is well known that only a very thin layer of oil on the surface of the boiler tubes can cause local overheating and possible damage to the boiler. Gard has recently seen a number of claims involving boiler damage caused by the presence of oil in the boiler feedwater system. In several cases, where a minor oil leakage has been discovered by the crew, the boiler has been blown down from the bottom instead of surface blowing resulting in a boiler totally covered with oil. During cleaning after repairs, the oil has not been properly removed from the boiler or from the feedwater piping system which again has led to cracks and an associated loss of integrity in high heat transfer areas.

Many of the reported incidents have led to expensive and time consuming repairs including cleaning of the feed water system and renewal of the boiler tubes. The purpose of this circular is therefore to remind shipowners and operators of the importance of proper boiler operation and maintenance, and to highlight the relevant control measures for preventing, and where necessary handling, oil leakages into the feedwater system.

Recent cases
The most common sources of oil contamination are leaking heating coils in fuel tanks and fuel heaters or lube oil heaters. In one recent case it was alleged that fuel oil had been detected in the hotwell which had come from a leak in the fuel oil purifier heater a few weeks earlier. The defective heater was replaced with a new spare and the hotwell was cleaned. The boilers were then put back in operation. A few weeks later the crew noticed a low-level-alarm in the hotwell tank and further investigation revealed water leaking inside the furnace. Opening of the boiler revealed several cracks in way of the fire tubes.

In another case an excessive amount of HFO was discovered in the hotwell. No oil detection alarm sounded since the alarm had been disconnected due to problems with the detection system in the observation tank. During the inspection it was discovered that the feedwater system was completely polluted by oil, and as the common circulating pump was running, this also included the exhaust boiler. The investigations also revealed a feedwater leak into the flame chamber, due to a crack in the wall panel in the auxiliary boiler, and some broken pin tubes due to local over heating. The cause of the feedwater contamination was found to be a broken heating coil in one of the HFO tanks. The heating coil had been renewed during the previous dry-docking, and further inspections revealed that the coil had been mounted with some pipe clamps missing and as a result, vibration had caused the breakdown of the heating coil. The shipowner decided to take the vessel off-hire for a complete cleaning of the feedwater system and retubing of the defective pipes in the auxiliary boiler.

Consequences
Issues such as disconnection of the oil detection alarm for the hotwell may lead to major damage. The breakdown may have been avoided if the alarm had been working and the situation would no doubt have been discovered at an earlier stage. The most dangerous type of water contamination is heavy fuel entering the steam or condensate from a leaking heating coil or heat exchanger. If the problem is not discovered in time, the boiler can be completely destroyed by overheating due to reduced water flow and minimised heat transfer/cooling of the boiler tubes. The immediate effects range from foaming and carry over in oil fired boilers to the malfunction of boiler water level controls and even protective shutdown devices. More severe oil contamination may lead to a collapse of the heat transfer rate through the boiler steel, which contributes to a higher metal temperature than the design value.1

Preventive action
The following practices and preventive measures should be considered in order to avoid extensive damage due to oil contamination:

1. Alarms, monitoring systems and automatic safety shutdown functions should be tested regularly to ensure that they function properly. Safety alarms and automatic shutdown functions must never be bypassed.

2. If the boiler plant is, nevertheless, operated with bypassed faulty safety shutdown functions, a continuous visual watch should be kept on the water level and any potential oil contamination in the hotwell tanks.

3. Filters installed in the hotwell tank must be replaced regularly or as required. As small amounts of oil cling to the filter material, it is important that the filtering material is carefully monitored and replaced as necessary.

4. Ensure that the oil detecting device in the hotwell tank (if fitted) is working properly.

Corrective actions
If there is a suspected oil leakage into the feedwater system, carefully examine and hydro test all relevant heating coils, heat exchangers and other potential leak sources in the steam/condensate system in order to identify the origin of the leakage. Be aware that there could be more than one leakage. The following practices and corrective actions should be considered when oil is discovered:

1. If oil is observed in the hotwell it is recommended to check whether a dark oily film contaminates the boiler water level glasses inside. If so, do not blow down the boiler from the bottom; just surface blow several times. If the boiler is...
bottom blown, it will become totally covered in oil.

2. After repairs, the piping system, heating coils, pumps, hotwell and heaters have to be cleaned of all the remaining oil. Manufacturers’ recommendations and procedures for cleaning should be followed.

3. The boiler must not be started up again until an oil-free feedwater supply is guaranteed.

Recommendations
To prevent boiler damage caused by the presence of oil in the boiler feedwater system, Members and clients should follow manufacturers’ recommendations and highlight the above preventive and corrective actions in their procedures. Furthermore, it is recommended to:

- Encourage the crew to report any accidental damage so that it can be inspected and/or repaired as necessary and as soon as possible.
- If repairs on the steam and heating system have been carried out during yard stay, proper inspections should be conducted to ensure that heating coils are properly mounted according to class requirements.

Footnotes
1 According to DNV, even a thin film of oil or a deposit as thin as 0.5 mm on the water side can easily increase the metal temperature on the furnace side from a design value of 250°C to well above 600°C under normal operating conditions on an auxiliary boiler rated at 7 bar (DNV Technical eNewsletter, 2 October 2012, «Oil Contamination of Marine Boilers»).
Dangers of power-operated watertight doors

Background
Over the years Gard has seen several accidents related to power-operated watertight doors on board ships. Such doors are fitted in watertight bulkheads of ships like cruise vessels, ro-ro passenger vessels, ferries, large supply ships, special purpose ships, etc., and are electrically or hydraulically operated. On the lowermost decks doors are often hydraulically operated, closing with a force of two tons. People have been killed or severely maimed by such doors. There is often an element of fault by the affected person in such accidents, as the strict procedure for passing through these doors may not have been followed. Other issues which may affect their operation are lack of proper maintenance, the crew has not been properly trained nor received specific instructions on how to operate the doors, and SOLAS regulations and guidance are not followed.

The purpose of this circular is to stress the importance of the correct operation of watertight doors in order to maintain the vessel’s survivability during emergencies involving water ingress, but also to foster awareness of the risk to crew passing through these doors during their everyday operation of the vessel.

Operational requirements for watertight doors
The bulkheads in which such doors are fitted are required to be watertight in order to save the vessel should water enter the hull, following a collision or grounding. Regulations for the subdivision of ships are found in SOLAS, and so are the regulations concerning power-operated watertight doors.

SOLAS requires as few watertight doors as possible in subdivision bulkheads, regarding them as a certain risk, but it has become relatively easy, depending on the policy of the flag state, to obtain a relaxation, so it is not uncommon for ships to have 30, 40, 50 or more watertight doors. If a ship is at risk of being flooded, these doors must be closed. Doors can be closed from the bridge or they can be opened and closed on location. When the ship is at sea, in principle all such doors must be in a closed position. Under certain circumstances, however, some doors may be allowed to be opened at sea. Although the regulations are quite strict, the practice on board is often found to be more relaxed, and we have seen ships with a number of doors open during voyage, a bad habit.

The bridge may need to close all watertight doors in an emergency, but must also be assured that no one is trapped within a compartment. Doors can therefore always be opened locally and, if the vessel suffers a blackout, there must be stored energy within the door for three movements. In addition, it is possible to pump the door open with a manual pump.

The current SOLAS regulations apply to vessels built after 1 February 1992. The regulations demand that a number of safety measures be built into the operational system of the doors. There must be a diagram on the bridge showing the location of each door; with indicator lamps for open and closed doors: red for open and green for closed. The logic is that an open door represents a danger to the ship, thus a red light. There must also be a master mode switch, which has two positions: “Local control” and “Doors closed”. That switch must always be in “Local control” mode, unless there is an emergency or the system is being tested.

Gard’s experience
We have noted that people often pass through watertight doors before they are fully opened, a dangerous habit in itself and which can easily result in a casualty if the master mode switch is placed in “Doors closed”. The door will then immediately start to close when the local operating handle is released. A door will also go to closed position if there is a fault, as the system will give priority to the safety of the ship.

We have noted that some vessels built before the current SOLAS regulations entered in force do not have a master mode switch on the bridge, but only push buttons for opening and for closing the doors. There may be red and green indicator lamps for the door positions, but often no definition of what the colours mean. Older vessels therefore run the risk of having doors opened in error instead of closing from the bridge in an emergency.

Doors have a flow valve in the hydraulic system to regulate the speed of their movements. The SOLAS regulations require the doors to close in a minimum of 20 seconds and a maximum of 40 seconds when operated locally. Reports from accidents often reveal that the flow valve has been set for the door to close much faster, obviously by crewmembers finding that doors take too long to open and close. Such tampering is of course very dangerous and contrary to regulations. Unfortunately the flow valve is not always well protected but it should be.

Recommendations
SOLAS regulations for “Subdivision and stability” and for doors in watertight bulkheads are found in Chapter II. Part B-4, Regulation 22 requires all doors to be kept closed at sea, but makes some exceptions. For passenger ships the IMO Circular MSC.1/Circ.1380 “Guidance for watertight doors on passenger ships which may be opened during navigation” contains a useful checklist for determining if a door may be open during navigation.
In summary, ship management and crew members should bear in mind the following concerning watertight doors:

- Be aware of the risks posed by steel doors closing with a power of 2 tons.
- Know the regulations for such doors, read the instructions and follow them.
- For older vessels, bring the bridge control panel in line with current SOLAS regulations. A red indicator lamp should mean an open door, and doors should not be able to be opened from the bridge.
- Be aware of the dangers to local users if the master mode switch is set to “Doors closed”.
- Do not walk through a door in motion. If items are to be carried or pulled through a watertight door, ask for assistance.
- Do not tamper with alarm bells, operating levers and speed controls of doors.
- Maintain doors in good condition, they are there to save the ship in an emergency. Have regular servicing carried out by the door manufacturer.
- Keep doors closed at sea.

Gard News 207 contains four articles addressing the problems and risks associated with power-operated watertight doors. A number of incidents are referred to in the articles and contain useful learning points for ship operators. The Gard News articles are available on gard.no.
Fixed CO₂ fire-extinguishing systems - consequences of delayed release

Introduction
One of the most commonly used fire-extinguishing agents in ships’ engine rooms is carbon dioxide (CO₂). CO₂ gas has excellent fire-extinguishing capabilities and is relatively inexpensive, but may pose a serious risk to personnel as it primarily extinguishes fires by reducing the available oxygen in the atmosphere. In addition to concerns about the safety hazard to personnel, Gard also has concerns as to how the final outcome of a fire can be influenced by the type of extinguishing system used. With CO₂ systems, the period between detecting a fire and releasing the gas often seems quite long. Unclear evacuation and mustering procedures combined with the crew’s worries about the lethal effects of CO₂ can cause unnecessary delays in release – or as experienced in one of Gard’s recent cases, no release at all. Minor fires have been allowed to escalate and cause severe and costly damage to ships and their equipment, in some cases also injury and loss of life due to extensive smoke development.

Unless the crew fully understands the functionality of and limitations associated with CO₂ systems, they may not be sufficiently confident and prepared to provide timely and effective emergency response during a fire. The purpose of this circular is to raise awareness of the inherent risks of fixed CO₂ fire-extinguishing systems; highlight limitations in their method of application when used in ships’ engine rooms, and stress the importance of proper procedures and training for their use on board.

Safeguarding against risks to human life
The concentration of CO₂ above certain levels in fire-fighting applications is a major concern amongst fire safety regulators. Some safety regulators even prohibit the use of CO₂ as a fire-extinguishing agent in spaces where personnel has access during normal operation; one such example can be found in the safety regulations applicable to the offshore oil and gas industries in Norway. 2 The IMO Safety of Life at Sea (SOLAS) Convention does not prohibit the use of CO₂ in systems protecting a ship’s engine room, or other spaces where crew has access during normal operation. But the risks to personnel are clearly recognized and SOLAS calls for various safeguards, such as two separate and interlocked controls, pre-discharge alarms and time-delays, to protect personnel in the engine room. SOLAS does not, however, allow portable CO₂ extinguishers to be placed in the accommodation spaces on board ships, due to the associated risk to personnel. 3

Ensuring timely and effective emergency response during a fire
Emergency response to engine room fires can be better organised and carried out more efficiently if the crew is properly trained in the safe use of the ship’s fire-extinguishing systems. The time it takes to make a decision to release the fixed fire-extinguishing system is considered to be one of the most critical factors during emergency response and main concerns related to use of CO₂ as the extinguishing agent in ships’ engine rooms can be summarised as follows:

Delayed release: For the typical engine room fire involving flammable liquids, it is important to introduce the required quantities of CO₂ quickly to limit the escalation of the fire. Investigations reveal that evacuation, muster and head counts during engine room fires often take longer than expected because “the crew was running around and was difficult to count”. 4

Engine room not properly sealed prior to release: The extinguishing capabilities of gas can be compromised if the integrity and tightness of the boundaries of the protected space are not sound. On more than one occasion, the effectiveness of a CO₂ system has been limited by excessive leakage of gas through open or improperly closed doors, vents or ventilation ducts.

Limited availability of fire-extinguishing agent: The quantity of CO₂ gas available on board ships is normally limited to that required for a single discharge into a protected space. Limited availability of fire-extinguishing agent: The quantity of CO₂ gas available is normally limited to that required for a single discharge into a protected space.

Premature re-entry into and ventilation of the engine room after release: The re-entry into the engine room following a fire where gas has been used involves perhaps one of the most dangerous aspects of fire fighting. CO₂ has limited cooling effect and the temperature of equipment and structures in the engine room may be very high, in particular if the time it took to release the fixed fire-extinguishing system was long. Firefighters or crew entering the space too soon, thus allowing entry of oxygen-rich air, can cause the fire to reignite.

Risk assessment
SOLAS allows the use of fixed fire-extinguishing systems applying either gas, foam or water to protect ships’ engine rooms. Some agents perform better than others in a particular application and all have some limitations that have to be dealt with when extinguishing fires. Gard’s advice to shipowners with newbuilding programmes is therefore to carefully evaluate the pros and cons of all commercially available fire-extinguishing systems prior to specifying the desired system. The safety of the crew should always be prioritised and the inherent risks of a CO₂ system, and the limitations in its method of application, should be taken into account. As far as performance is concerned, systems using “equivalent gases”, like halocarbon or inert gases, or water mist, are all comparable to CO₂, but factors to be considered in the risk assessment and selection process are:

• Other available gas systems are less harmful to people than CO2 but some, e.g. halocarbon gases, may create life-threatening by-products during the fire.
• All gas systems, not only CO₂, are vulnerable to the integrity/tightness of the boundaries of the protected space; they are usually limited to a single discharge and they have limited cooling effects.
• Water mist systems can be brought into action faster than gas systems since it is not necessary to close openings, shut down ventilation or evacuate the space before release.
• The time needed to extinguish fires with water mist can be longer than for gas, but water mist also cools the space and controls smoke in the process. An unlimited water supply is also usually available.
• True gas systems provide “three-dimensional protection”, while the effectiveness of water mist systems can be affected...
by the size of the fire, degree of obstruction of the fire, ventilation and the layout of the protected space.

**Recommendations**

For shipowners specifying and operating CO₂ systems, Gard strongly recommends fostering awareness of the hazards related to their use - through detailed and unambiguous procedures, proper training and prescribed maintenance. Some ships have extensive quality and safety management systems but lack sufficient details to assist the crew in dealing with an emergency situation such as a fire. The following is recommended:

- Regular fire drills should be as realistic as possible.
- Emergency response procedures should contain sufficient details to assist the crew in dealing with all stages of the emergency and should cover:
  - actions to be initiated prior to release of CO₂,
  - instructions for holding/cool down times before re-entering and ventilating the space,
  - lines of communication, both on board and with relevant shore organizations.
- Evacuation and mustering procedures should include a simple but reliable system for head-counts in order to avoid any misunderstanding concerning the whereabouts of crew.
- Manuals, piping schematics, instruction placards and labelling of the CO₂ system must be in accordance with the actual installation.
- The person tasked to release the system must be a person designated in the muster list.
- Maintenance procedures for the CO₂ system should include manufacturers’ recommendations and should be based on the IMO guidelines (MSC.1/Circ.1318).
- Periodic servicing of the CO₂ system should be carried out by authorised service suppliers.
- Regular inspections should ensure that evacuation routes and exits in the engine room are clearly marked and kept free from obstructions at all times.
- The dangers of CO₂ must be continuously stressed and training and experience transfer between crew should create a common understanding of the functionality, limitations and hazards associated with the ship’s specific CO₂ installation.

Common for all ship fire fighting systems are the requirements imposed by SOLAS Reg.II-2/10 statement of purpose: “to suppress and swiftly extinguish a fire in the space of origin.” Yet, experience shows that the inherent risks of a fixed CO₂ fire-extinguishing system, and the need for evacuation of a ship’s engine room prior to discharge, often cause substantial delays in its release.

**Footnotes**

1 Gard has previously addressed the risks to human life associated with the use of CO₂ as a fire-extinguishing agent on board ships, see article “Lack of air” in Gard News 179.
2 See Sec.20.4 in NORSOK S-001 concerning technical safety on board offshore installations, a standard referenced by the Norwegian Petroleum Safety Authorities.
3 See SOLAS Reg.II-2/10 “Fire Fighting” and the IMO Fire Safety Systems (FSS) Code Ch.5 “Fixed gas fire-extinguishing”.
4 See also article “Fire safety in the engine room” in Gard News 170.
Introduction

Fuel-related engine breakdowns are not a new problem. Between storage and combustion, the fuel must be transferred, heated, filtered and purified in order to meet the engine manufacturer’s specifications. Depending on the quality of the fuel delivered on board, this can be a complex process and Gard regularly sees engine breakdowns and operational problems caused by poor fuel quality or poor fuel treatment on board. The bulk of such engine breakdowns arises from the use of heavy fuel oil (HFO) and the number of cases where engine damage is caused by catalytic fines seems to be in the majority. Gard has also seen engine problems caused by mixing of incompatible fuels and filters clogged by sludge.

The purpose of this circular is to remind ship owners and operators of important issues regarding fuel handling and treatment on board and to highlight the importance of structured training of crew members to prevent operational problems and engine damage.

Changes in rules and regulations

The drive towards the use of low sulphur fuel oils (LSFO)¹ is causing fuel refining processes to change, sometimes resulting in lower quality HFO being delivered to ships. More blending of different oil components to optimise sulphur content may create side effects such as instability, incompatibility, ignition and combustion difficulties and an increase in the levels of catalytic fines. The need for frequent changeovers between different types of fuels clearly increases the opportunity for errors. Therefore, it is very important that the crew be familiar with the properties of the fuel supplied and the limitations of the particular ship’s fuel treatment plant.

Gard has issued a series of recommendations previously but, because of changes in rules and regulations influencing both the quality of available fuel and the operating procedures on board, it is important to reiterate some of this guidance. Below is a summary of Gard’s advice on fuel handling and treatment on board. It is considered especially important to emphasise this advice to new crew members and junior engineers. For further information and additional details on practical cases and important learning points, please see the Loss Prevention Compilation: “Bunkers and bunkering”.

Fuel oil storage and tanks

Even if fuel is within specification, problems can arise at the very first stage of storage. Build-up of sediment inside the tanks can cause contamination of new fuel and mixing of different batches of fuel can lead to unstable fuel. Important precautions are:

- Regularly clean storage and settling/service tanks. Large particles will settle in the tanks and these particles can be whisked up during rough weather and supplied to the separators, sometimes in concentrations above the limits set out in ISO 8217.² Cleaning of fuel oil tanks is often only performed during scheduled yard stay and the implementation of routines for more frequent cleaning should be considered.

- Regularly drain settling/service tanks to remove water and sludge, preferably on a daily basis.

- Place new bunkers into empty tanks whenever possible. Be aware that mixing of two stable fuels does not guarantee a compatible mixture and the sediment potential can increase drastically after mixing.

- If mixing cannot be avoided, carry out tests to ensure that the two types of fuel are compatible. Use a fast, reliable and recognised testing service to analyse fuel samples and avoid using the new fuel until the analysis results have been reviewed. Carefully adhere to the recommendations provided with the results from the test laboratory.

- Where time is a critical factor but there are doubts about the compatibility and sediment potential of a mixed fuel, carry out the simple on-board test (test kits for this purpose should be available on board) as a minimum, and avoid using the mixed fuel during critical operations or when navigating in restricted areas.

- Consider if bunkering upon entering a port is an option (draft, cargo, timing, etc., permitting) instead of when leaving a port. This will allow analysis of the new fuel to be available prior to leaving port, which of course is the ideal situation.

Fuel oil separation

Even if the HFO received complies with the requirements of ISO 8217, operational problems can arise if the treatment plant and in particular the HFO separators are not properly operated and maintained. In order to efficiently reduce the level of catalytic fines and other impurities present in the fuel, such as rust, sand, dust and water, separator manufacturer’s recommendations should be followed. Important precautions are:

- Keep the HFO inlet temperature at 98°C. The efficiency of the separators is dependent on the inlet temperature of the fuel and even a small reduction in temperature will reduce the quality of the separation. Some commonly observed causes of failures are leaking heating coils, wrong set points for temperature sensors and defective monitoring systems.

- Use the correct flow ratio and gravity disc. The longer the fuel is in the separator, the better the cleaning of the fuel oil will be. For separators without gravity discs, it is recommended to always use all available HFO separators and to run them in parallel, with a corresponding feed rate. If the separators are of the manual type with gravity discs, they must be operated in series with a purifier followed by a clarifier, but with the lowest possible flow. On this type of separators, the use of correct gravity discs is crucial and the discs have to be changed depending on the density of the fuel used.

- Maintain the separators according to manufacturer’s instructions and, as far as practically possible, use manufacturer’s approved parts only. In addition, the separators should be checked by the manufacturer’s service engineers at regular intervals. One commonly observed causal factor for failure is incorrect assembly of the separators after cleaning.

- Verify the efficiency of the separators and the cleanliness of the service tank by sampling the fuel in the system before and after the separators and as close to the engines as possible. Send the samples in for analysis by a recognised
laboratory. Verification of separators should be carried out at least once per year.

**Fuel changeover**

Ships that trade between areas with different sulphur limitations should have detailed changeover procedures. Insufficient knowledge of the actions required in a given situation may result in engine failure, so changeover procedures should be practised before entering restricted waters, especially in ships that do not perform fuel changeovers on a regular basis. The risk of incompatibility when mixing HFO and low sulphur distillates, or even marine gas oil (MGO), can be high and requires increased awareness.

**Conclusion**

For the safety of the crew, ship and cargo, and to minimise costs and periods off-hire caused by engine breakdowns, it is important that ship owners and operators focus on the quality of fuel handling and treatment on board. All engine crew must receive proper and regular training and it is particularly important to ensure that junior engineers become familiar with the ship's fuel treatment equipment and how to perform regular maintenance.

Changes in rules and regulations may lead to changes in procedures so training and facilitation of experience exchange are essential for the crew to be able to detect the cause of a fuel-related problem when it occurs, and adjust the fuel handling and treatment procedures to minimise potential losses.

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**Footnotes**

1 Permissible levels of sulphur oxide (SOx) emissions are regulated via IMO's MARPOL Annex VI and various domestic regulations. The sulphur content limit for LSFO allowed therefore depends on the location of the ship and the regulations in force at the time. At the time of writing, the maximum sulphur limit of fuel oils used outside emission control areas (ECAs) and other designated areas is 3.5%, while inside ECAs the limit is 1.0% (ref. IMO MARPOL Annex VI). Identified designated areas other than the MARPOL ECAs are: EU Community ports (0.1%), Turkish ports (0.1%) and California coastal areas (1.0% for marine gas oil (MGO) and 0.5% for marine diesel oil (MDO)).

2 ISO 8217 specifies the requirements for petroleum fuels for use in marine engines and boilers prior to appropriate treatment before use.
Loss Prevention Circular No. 03-12

Use of temporary equipment on board Mobile Offshore Drilling Units

Background
The Gard condition survey programme for Mobile Offshore Drilling Units (MODUs) has indicated a need for increased awareness when using temporary equipment (TE) such as cement, HVAC and ROV units provided by third parties. Gard's concern mainly relates to the potential additional ignition sources such TE represents. We have seen incorrect explosion protection of TE's electrical equipment for the selected location on board and poor maintenance of TE in general. System incompatibility can also prevent proper hook-up of the TE to the MODU's existing safety systems and, in this respect, of particular concern is the improper hook-up to the overall emergency shutdown (ESD) system.

The introduction of TE on board MODUs may interfere with a well-defined and interconnected hierarchy of safety barriers and may thus influence the overall safety level of the MODU in question. It is therefore of major importance to consider the location on board of the TE. The purpose of this circular is therefore to increase the awareness of the potential risks associated with the use of TE, and in particular to focus attention on the risks of introducing additional ignition sources when TE is placed on board.

Ignition source control
The key regulatory framework for the control of ignition sources on board MODUs is set by the national petroleum safety authorities (PSA) of the continental shelf on which the MODU is operating. Maritime certificates issued by flag administrations and classification societies normally form an essential part of the overall compliance documentation submitted to the PSA. Some maritime authorities have adopted the IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code) as their own rules whilst others have established specific requirements in addition to the MODU Code. Chapter 6 of the 1989 and 2009 MODU Codes cover measures to prevent ignition and these requirements have been developed based on the following safety strategy:

Although design and operational requirements may vary between the different regulators/authorities, the basic safety strategy as outlined above remains the same and rules and regulations providing a similar level of safety will normally be accepted as an alternative to the technical requirements stipulated by the regulator.

To ensure that additional ignition sources are identified and controlled using relevant safety barriers and operational/ emergency procedures, Gard would like to stress the following precautionary measures:

Risk assessment and general documentation:
- Evaluate the impact of new hazards arising from the TE upon the risk assessments performed for the permanent facilities on board the MODU. The hazard and risk assessments performed under the normal Permit to Work (PTW) system may not fully address specific hazards arising from the integration of TE into the existing operating system.
- Temporarily update existing engineering drawings and documents to reflect all operational changes. Establish safety barriers in accordance with applicable rules and regulations for the TE, e.g. new gas detectors, updated alarm and ESD logic diagrams, additional means of fire fighting, etc. The potential breach of existing safety barriers by installation of the TE should be identified and controlled, e.g. existing defined hazardous area zones, escape routes, etc.
- Carefully verify drawings and specifications, including maintenance reports and certificates, documenting the general condition of the TE to ensure that the TE is suitable for the intended operation. A formal “service container certificate” is not in itself a guarantee that the TE is in good condition as such certificates may not involve any continuous follow-up over time by the issuing authority.

On board arrangements:
- The existing hazardous area classification of the MODU, the corresponding explosion protection of the TE's electrical equipment and the safety criticality of the TE must decide its

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<th>Basic safety strategy for ignition source control:</th>
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<tr>
<td>1. All the areas where, due to the possible presence of a flammable atmosphere arising from the drilling operations, the use of machinery or electrical equipment without proper consideration may lead to a fire hazard or explosion, should be classified as and divided into “hazardous areas” zone 0, zone 1 and zone 2 depending on the likelihood of presence of a flammable atmosphere during normal operations.</td>
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<td>2. Equipment, electrical and machinery installations, operated in hazardous areas must be of a type approved/certified for use in that particular hazardous area zone.</td>
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<td>3. An ESD system should allow for the selective disconnection of equipment which may act as an ignition source where an accidental release of flammable gas extends outside the established hazardous area zones.</td>
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<tr>
<td>4. Equipment, electrical and machinery installations, normally operated in a non-hazardous area but which is essential to the safety of the MODU and is capable of operation during an emergency (after initiation of ESD) should be of a type suitable for operation in hazardous areas.</td>
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location on board. TE equipment due to be operational in an emergency situation, e.g. after initiation of ESD, should preferably be approved for use in zone 1 regardless of location.

- Electrical equipment and components used in hazardous areas should be certified by an independent testing laboratory in accordance with a recognized standard. Only electrical equipment with temperature Class T3 (maximum 200°C) should be used when hydrocarbon gases create hazardous areas.
- Diesel engines and other combustion type equipment that may be an ignition hazard due to flames or hot gases/particles should normally not be installed in hazardous areas. If this cannot be avoided, only equipment for which it has been documented that sufficient precautions have been taken against the risk of dangerous ignition should be used.
- Where temporary service containers are installed, special attention should be given to the location of access doors, ventilation and other openings. Doors facing hazardous areas should be self-closing and gas-tight and all ventilation intakes must be routed to a non-hazardous location.
- Verify and test the proper hook-up of the TE to the MODUs’ existing safety systems, in particular to the overall ESD system initiating automatic disconnection of ignition sources.

Crew awareness:

- Relevant personnel on board must be made aware of any changes to existing systems on board the MODU and the “new” safety barriers established for the TE.
- Identify and implement any temporary training requirements.

Recommendations

To ensure that use of TE will not introduce additional ignition sources on board, procedures should include detailed requirements for the installation, removal, testing and maintenance of TE and should outline the means of identification, assessment and control of any hazards associated with its use. Responsibilities should be allocated to the parties and interfaces between the various parties, e.g. operator and contractors, should be clearly defined. An important part of the process is to ensure a controlled return to normal operation following the removal of the TE.

Gard recommends that Members and clients highlight the above precautionary measures in their procedures to prevent the increased risk of ignition when using TE. In principle, Members and clients should always seek to incorporate similar provisions for TE as those required for permanent equipment of a similar type and function in the same location on board. Prolonged use of TE could be regarded as an abuse of the “temporary principle” and the consequences may be operation under an increased risk compared with a properly engineered arrangement.

Recommended sources for further reading and guidance related to use of TE are: NORSOK Z-015 “Temporary Equipment”, UK HSE SPC/TECH/OSD/25 “Temporary Equipment Offshore” and DNV Standard for Certification No.2.7-2 “Offshore Service Containers”.

Footnotes

1 For the purpose of this circular, temporary equipment (TE) is defined as “equipment intended for use on MODUs for a limited time and which requires hook-up and/or is a potential source of ignition”.
2 Several of the already established safety barriers may potentially be affected by placement of TE on board, e.g. existing defined hazardous area zones, ESD systems, established escape routes, explosion vent paths may be restricted, maintenance access may be restricted, operating envelopes (e.g. for cranes) may be limited, etc.
3 The code was developed as an international standard for mobile drilling units, to achieve a safety level for these units and the personnel on board, equivalent to that of the IMO Convention for Safety of Life at Sea (SOLAS 1974 with amendments).
**Loss Prevention Circular No. 02-12**

**Fire prevention in engine rooms**

**Introduction**

Every year fires on board ships lead to loss of lives and severe damage to the ships themselves. The majority of fires on board ships originate in the engine room and failure in a flammable oil system followed by impingement of oil onto a high temperature surface is the leading cause of engine room fires. In addition, many engine room fires have an electrical source, such as electrical short-circuits and thermal overheating in the switchboards.

Identification and protection of high temperature surfaces in the engine room is considered to be a very effective measure to prevent engine room fires and is also fairly easy to implement on board. The purpose of this circular is therefore to increase awareness of the potential dangers associated with exposed high temperature surfaces in engine rooms. The existing regulatory requirements have been highlighted to focus attention on companies’ responsibility to ensure that the engine room systems are maintained in a safe condition and in compliance with relevant regulatory requirements at all times during operations.

**Rules and regulations**

The IMO Safety of Life at Sea (SOLAS) Convention provides the key regulatory framework for fire safety on board ships and Ch.II-2/Reg.4 covers measures to reduce the probability of oil leaks igniting in engine rooms. SOLAS recognizes that if fuel oil, lubrication oil or other flammable oil systems leak, the chances of preventing the outbreak of a fire will be greatly increased if all potential ignition sources have been identified and removed, or properly insulated. Accordingly, the following key safety measures became mandatory SOLAS requirements for all ships from July 2003:

- jacketed (double) pipes in high pressure fuel oil delivery lines;
- insulation of all high temperature surfaces (> 220°C) at risk of flammable oil impingement after a failure of an oil line; and
- spray shields for flammable oil lines (fuel, lubrication and hydraulic oil) located immediately above or near potential ignition sources.¹

Compliance with rules and regulations is normally checked by classification societies/flag administrations and port authorities and fire safety in general is of course one of the main issues during their inspections on board. But the time available to complete a full survey on board is often short and when it comes to verification of the integrity/ functioning of machinery and systems, it may appear that the surveyors’ inspection is often limited to spot checks of known high risk areas and hazards in the engine room. Class and port state surveyors normally attend on board while the ship is in port and the engines are therefore not running at full load. High temperature surfaces in the engine room are not always detectable in these conditions, even where more sophisticated temperature measuring tools, e.g., thermo scanning cameras, are used as part of the inspection.²

**Gard’s experience**

Many companies go to considerable lengths to ensure safe conditions in their engine rooms and some also invest in use of temperature measuring tools to identify exposed high temperature surfaces. At the same time, Gard’s impression is that the effects of the SOLAS regulations implemented in July 2003 do not appear to have been as positive as expected and the initial strong focus on the required preventive measures may have diminished somewhat. In Gard’s experience, the risks are at their highest when maintenance work is taking place or immediately thereafter. The risks involved with the execution of a specific repair or maintenance operation are not always readily identifiable and are sometimes underestimated due to the perceived simplicity of the work to be carried out. As a result, additional safety precautions may not be implemented during and after the repair work. Typical examples are missing hot-work permits and the absence of a fire watch. Following a period of maintenance, the time available to prepare the vessel and get her back in operation can be limited, and the refitting of removed insulation mats or spray shields is often left for the crew to complete during the voyage.

**Recommendations**

Fire safety in engine rooms is the result of both good design and the company’s and crew’s continuous focus on fire prevention measures on board the ship. Companies must therefore bear in mind that, although compliance with fire safety requirements is controlled by authorities and classification societies, it is the company’s responsibility to establish procedures to ensure that the ship is maintained in compliance with the provisions of the relevant rules and regulations (ISM Code Ch.10) and that the crew is properly trained and provided with adequate resources/ tools to perform their tasks in accordance with the required standards (ISM Code Ch.6 and Ch.3 respectively).

Gard would like to draw Members’ and clients’ attention to the following specific measures related to fire prevention:

- High standards of cleanliness in the engine room are essential for fire prevention and any leakages in fuel, hydraulic, or other flammable oil systems must be dealt with promptly. The position and condition of spray shields for both high and low pressure flammable oil lines should be checked regularly, as should the drainage arrangements for jacketed fuel oil pipes.
- Materials used for insulating high temperature surfaces may degrade over time and regular checks should be carried out, both visually and using temperature

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measuring tools. Measurements using infrared thermo scanning cameras can be very useful to identify surfaces with temperatures in excess of 220°C in the engine parts, exhaust ducts and electrical equipment. Regular (e.g., annual) measurements are recommended to be taken as part of the standard maintenance and inspection routines, undertaken either by specialist firms or by trained crew.

- Particular attention must be paid to fire risks when repairs and maintenance are carried out. Prior to the execution of an operation, the risks involved should be identified and additional safety precautions taken. Special attention should also be given to the immediate and proper refitting of spray shields and insulation materials upon completion of maintenance.

- Recommendations in IMO MSC.1/Circ.1321 “Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms” should be consulted to define integrity standards acceptable under the SOLAS Convention. Standards covering maintenance of electrical systems should also be defined.

Serious fires have arisen because of failure to recognize potential fire hazards, and above all, the best fire prevention is a well trained crew. Training and experience transfer between crew should aim to create a common understanding of all hazards present in an engine room and their potential consequences.

Footnotes
1 See also articles “P&I Incident – Fire in engine room on board a fully loaded tanker” in Gard News 179, “Fire in engine room due to malfunction of moray switch” in Gard News 175 and “Hull and machinery incident – Fire in engine room” in Gard News 170.
2 Potential ignition sources: “Sources having enough energy to cause ignition. These include high temperature surfaces, sparks or flames from inefficient flanges or joints, electrical discharges caused from electrostatic atmospheres, or electrical contactor faults. Sources of these are for example exhaust gas piping of internal combustion engines, leakages from boiler furnace joints and electrical equipment within oil treatment rooms” (quoted from MSC.1/Circ.1321).
3 As far as Gard is aware none of the governing rules and regulations for ships have mandatory requirements for the use of infrared thermo scanning cameras to detect heated surfaces in engine rooms. Such measures may, however, be recommended, e.g., via classification societies’ optional class notations. See also article “Thermographical examinations of engine rooms” in Gard News 170.
Bunker Sampling

Introduction and background
Gard is frequently involved with machinery damage/claims related to fuel quality. The purpose of this circular is to emphasise the importance of the fuel ordering, delivery procedures, bunker delivery receipts and bunkering samples including the correct procedures for taking and handling of the samples.

Reducing the risk
To reduce or minimise the risk of claims arising or breakdown of machinery, there are some main issues to be aware of when handling bunkers.

- Fuel sampling and analysis is essential for verification of the quality of the fuel received onboard. Procedures and instructions should be established within the technical or operational departments to ensure correct sampling and stating where the samples should be sent for analysis. It is important to ensure that the engineers on board and technical staff ashore understand the results of the analysis and the limitations of their equipment. It is important that the quantity of the sample is large enough for the appropriate analysis to be undertaken.
- Always be selective when selecting fuel supplier. Order fuel to the desired ISO grade, and describe the required grade in the charterparty as well as in the request to the supplier.
- Take samples at the time of delivery and obtain confirmation from the suppliers that the samples are representative of the entire delivery. The samples taken must be properly labeled. If the supplier takes other samples at the time of delivery, try to establish how and when they were taken. Issue a protest if you are not invited to witness the sampling.

One sample should be retained on board the ship, another should be retained by the supplier, and a further sample may be used for analysis purposes and a fourth may be held by a responsible independent party for safe keeping and reference in case of a dispute.

- Bunker fuel samples should be sent to the laboratory for testing as soon as possible after completion of bunkering. Use a fast, reliable testing service to analyse the samples. Segregate any new fuel from that already held onboard. Avoid using the new fuel until the analysis results have been considered and it has been established that the fuel is suitable. Maintain accurate daily records of the contents of and consumption from each tank.

Off-Spec bunkers
If off-spec bunkers have been delivered and are found to be unsuitable for use, the bunkers should be off-loaded and replaced by new on-spec bunkers. If inferior bunkers have to be used or have already been used the following should be done:

- The vessel should immediately notify the shipowner if it is experiencing problems with off-spec fuel. If the shipowner purchased the fuel directly from the supplier, he should notify the bunker supplier and forward a copy of the test result. The time limit for any protest vis-à-vis the supplier is very short, at times only 2 weeks.
- Expert advice should be obtained from a reliable fuel testing service as to how to proceed and how to solve the particular problem. Contact the engine manufacturer as well as the fuel supplier for advice. Further actions to be taken will depend on which parameter is off-specification.

Recommendations
Bunkering procedures, including fuel-testing procedures and charter party requirements to fuel quality, should be reviewed to ensure that the correct procedures are followed when dealing with off-spec bunkers. The shipowners should also familiarise himself with any recommendations issued by class societies or any other experts. The crew involved should also be properly briefed on these guidelines and procedures to avoid costly and time consuming interruptions. Gard strongly recommends that bunker sampling and testing should be carried out in accordance with correct procedures. The lack of testing can lead to extensive damage to the vessels machinery which is costly for all involved.
Gard regularly sees casualties involving engine breakdowns due to excessive wear caused by abrasive particles in the bunkered HFO. There have been an increasing number of HFO deliveries with higher levels of catalytic fines. This is thought to be due to the introduction of the low sulphur fuel requirements in parts of the world, and is probably a result of the production/blending processes used by the refinery industry to satisfy the demand for such low sulphur fuel. The current international standard for HFO to be used in marine diesel engines and boilers is ISO 8217:2005. But even where the HFO received onboard satisfies these requirements, operational problems may occur if the HFO separators are not properly operated and maintained.

HFO contains catalytic fines such as aluminium and silicon oxides, which are remnants from the refining process. These are hard abrasive particles, and ISO 8217:2005 regulates the amount of catalytic fines permitted in HFO, expressed as Al+Si, to 80 mg/kg (ppm). However, due to the abrasive nature of these particles, most engine manufacturers limit the amount of catalytic fines in the fuel injected into the engines to 15 mg/kg. Excessive wear of the components in the combustion chamber (piston grooves, piston rings, cylinder liners) and of the fuel injection equipment (fuel pump plunger and barrel, fuel injection valves), will be the consequences of exceeding the level of catalytic fines of 15 mg/kg. In order for the HFO separators to efficiently reduce the level of catalytic fines and other impurities that can be present in the fuel oil, such as rust, sand, dust and water, the following precautions should be taken:

1. Keep the HFO inlet temperature at 98°C
   The efficiency of the separator is highly dependent on the inlet temperature of the fuel, and the preheaters are often too small, the set point is wrong, or the preheater is fouled or in other ways defect, resulting in an inlet temperature which is too low.

2. Use of correct flow ratio
   The longer the fuel oil is present in the separator, the better the cleaning of the fuel oil will be. Since the 1980’s, separators without gravity discs have been more or less standard, and it is recommended to always use all available HFO separators and to run them in parallel, with corresponding feed rate. If the separators are of the manual type with gravity discs, they must be operated in a series with a purifier followed by a clarifier, but with the lowest possible flow.

3. Maintenance
   Maintain the separators according to the manufacturer’s instructions and using the manufacturer’s approved spare parts only. Regular checks of the separators by the manufacturer’s service engineers will also enhance the quality.

4. Check fuel system efficiency
   In order to check the efficiency of the fuel system, it is recommended that samples are taken of the fuel oil before and after each separator at intervals of 4 or 6 months. The samples should be sent to an established fuel analysing institute for analysis, and the result will provide an indication of the efficiency of the separators. The analysis will be most accurate if performed once it is confirmed that a certain amount of cat fines are present in the bunkered fuel oil. Above 25-30 mg/kg is preferable.

5. Clean storage, settling and service tanks
   Large particles will settle in the storage, settling and service tanks, and over time the concentration of abrasive particles in the bottom of the tanks can be excessive. During rough weather these components can be whirled up and be supplied to the separators, sometimes in concentrations above the 80 mg/kg limit. Hence, these tanks should be drained and cleaned at regular intervals. It is therefore beneficial to run all available separators, even where the fuel used initially has a low level of catalytic fines.

6. Train responsible personnel
   Ensure that personnel responsible for the operation and maintenance of the separators are properly trained and are familiar with the equipment and how to perform the regular maintenance. This increases reliability, and reduces the consumption of non-wear parts.

It should be mentioned that companies such as DNV Petroleum Services and Lloyd’s Register (FOBAS) offer fuel management services that can assist shipowners in efficiently running onboard fuel treatment systems.

By following the above, the fuel treatment system should operate with optimum efficiency, which will increase the likelihood of the engines having an acceptable level of wear, which again will lead to the intervals between overhauls being as specified by the engine manufacturer.
Loss Prevention Circular No. 03-09

Slow steaming on 2-stroke engines

We have recently seen that shipowners and charters, due to current market conditions, seek to mitigate more expensive bunker consumption by reducing the vessels’ steaming speed. (Slow steaming)

The main engine is designed for continuous operation between 80-100% load, and a reduced load is normally only used for shorter periods of time, for example during manoeuvring.

Unless the slow steaming procedures are well managed there will always be a risk of machinery failure, and several factors must be taken into consideration once it has been decided to reduce the engine load for longer periods of time.

Reduced load primarily results in increased carbonisation and low temperature corrosion. Reduced load will also affect the combustion system, and lead to poor atomisation of the fuel nozzles.

Slow steaming will also lead to reduced scavenging air pressure and maximal cylinder pressure.

The efficiency of the turbocharger will also be affected resulting in a reduced air flow, which will lead to increased deposits and carbonisation problems. Serious engine damage as a result of deposits appears to occur when increasing the engine back to full load after longer periods of slow steaming.

Unless special precautions have been taken, the thermal load will also increase. This is due to:

1. Reduced air flow due to reduced efficiency of the turbocharger
2. Reduced combustion efficiency due to increased carbon deposits on injection nozzles
3. Piston rings’ efficiency have been reduced due to carbon deposit
4. Reduced heat transfer due to insulated carbon deposit.

Low load will also affect the exhaust gas temperature, which again reduces the efficiency of the exhaust boiler, which will increase the risk of low temperature corrosion in the exhaust system.

As the efficiency of the exhaust gas boiler is reduced, it may be necessary to use an oil fired boiler, which again will result in additional costs.

Recommendations

To reduce or minimise the risks involved in slow steaming it is important to maintain the cooling water temperature on the cylinder unit at optimal level.

Avoid condensation in scavenging air system due to low temperatures.

Increasing the scavenging air temperature will influence the combustion efficiency.

Keep the correct level of cylinder oil consumption based on load.

The above precautions are only for temporary slow steaming, and only for shorter periods of time. For longer periods of slow steaming it is important to contact the engine manufacturer to obtain more permanent modifications which may be required.

Most engine manufacturers have introduced upgrading kits for slow steaming, and it is recommended that all modifications are undertaken in accordance with the manufacturer’s instructions.
Exhaust boiler damages

Introduction
Gard has experienced an increase in the severity of incidents involving exhaust boilers, and in particular fire damages. The causes of the boiler damages vary, however, slow steaming, fuel quality and the frequency of manoeuvres can all be important factors, and can lead to soot accumulating. This can increase the risk of fire due to sparks from the exhaust gas igniting the soot.

The purpose of this circular is to address the risks involved and to emphasise the importance of proper soot blowing, cleaning, maintenance and treatment of boiler feed water.

Problems caused by soot on the exhaust side
The design of exhaust boilers is compact with very narrow channels and fins on the exhaust side. In addition the design of the main engine exhaust channel to the exhaust boiler on many ships is restricting the easy flow of gas through the boiler. Combined with e.g. slow steaming and reduced exhaust gas velocity the risk for build up of soot deposits will increase. Unburned deposits coming from the combustion process of the main engine due to different fuels and different loads will cause ignitable soot deposits to build up in the boilers. As the exhaust contains high levels of oxygen (about 14%), the ignition of the soot deposit may cause serious fire damage if preventive actions are not taken in due time. For long-stroke diesel engine, the larger lub oil quantum required will also add to the build up of ignitable soot deposit. High lubrication oil consumption in slow speed engines – lower gas temperatures and larger economizers in combination with low grade residual oils will increase the risk for soot fires and in worst case result in a complete meltdown of the boiler or economizer.

The soot blowing equipment fitted must be used according to manufacturer’s recommendations, but the equipment provided does not necessarily take into account the various design and layout of the exhaust channel. It is therefore important that the condition of the exhaust side is checked frequently in order to establish that the soot is effectively removed, and if not, more frequent blowing or manual cleaning will have to be performed. If the vessel operates on a reduced load, we recommend increasing the load during the soot blowing. It is also possible to fit additional equipment to monitor pressure and temperature through the boiler/economiser for optimization of cleaning intervals.

Proper treatment of feed water
As slow steaming appears to have become more common, the importance of regular inspection, water washing, blow down and proper feed water treatment should be emphasised. Impurities in the feed water can result in increased scaling, corrosion and foaming. Proper treatment of boiler feed water is therefore an important part of the boiler maintenance program and will reduce the risk of pitting and corrosion.

To reduce the possibility of problems arising, and to have control of the concentration of dissolved solids in the feed water, it is necessary to carry out “blow down” or periodically discharge the water or in some cases replace the water completely. Surface water blow down is often done continuously to reduce the level of dissolved solids, whilst bottom blow down is performed periodically to remove sludge from the bottom of the boiler. Regular testing and chemical dosing of the feed water is therefore important to reduce the problem of corrosion and pitting.

Normally the feed water is produced by the vessel’s own fresh water generator, however, it may become necessary to top up with shore water which will be of a different quality. If the feed water has been topped up with shore water, feed water tests, chemical dosing and blow down are extremely important.

Problems caused by scale on the water side
The biggest problem caused by scale is overheating and failure of the boiler tubes. The thermal conductivity of porous boiler scale is similar to insulating bricks. The scale acts as an insulating layer and prevents an efficient transfer of heat through the tubes to the circulating water. The reduction in thermal conductivity means lower boiler efficiency which in turn leads to overheating and may result in softening, bulging or even fracturing of the boiler tubes. Boiler scale can also cause plugging or partial obstruction of circulating tubes in a water tube boiler, which again causes starvation and overheating of the tubes. It can be necessary to plug some of the water tubes from time to time, however, this will reduce the water circulation, and is only intended to be a temporary solution. In case of a larger number of plugged water tubes, the manufacturer/class society should be consulted.

Recommendations
With the new generation of very efficient engines the soot cleaning of exhaust gas boiler has become even more important for efficient and safe operation.

- It is therefore strongly recommended that all soot blowing/fixed washing systems are used and tested regularly by skilled crew to ensure that they are fully operational.
- The importance of regular inspection, water washing, blow down and proper feed water treatment should be emphasised. Acceptance criteria for the condition after cleaning should be established throughout the fleet. By this, any alteration in operational conditions and its consequences for the boiler conditions will addressed.
- Alarm and monitoring system to be regularly tested to ensure proper function

The manufacturer to be contacted for further and more detailed instructions, and in particular - if vessels normal operational conditions alter. (i.e. such as slow steaming or change of fuel quality)

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Loss Prevention Circular No. 14-10

Loss of ship's records when changing ownership or management

Background
When a vessel changes ownership and/or manager, the rule has generally been that the outgoing technical managers remove all maintenance records from the ship, leaving the incoming crew and management with minimum information on the condition of both ship and machinery. This has even been seen where ownership remains the same, and there is a simple change of management - the outgoing management leaves no information behind, thus putting the incoming management at a serious disadvantage and increasing the risk and uncertainty for both owners and underwriters. In one recent case involving a simple change of management, the superintendent could not find any information in the maintenance system and the previous technical manager was not very co-operative.

This lack of continuity means that the crew and the new manager must start from the beginning when taking over the vessel. As they obviously need time to verify the condition of each component and system, there is a clear risk that some required maintenance will be overlooked, and this may result in costly claims arising out of damage to the vessels in the period immediately or shortly after a change of ownership or management. Typical claims can be a breakdown of machinery, rudder or component failures. The purpose of this circular is to highlight the risks and consequences of removing ship’s records and to provide some recommendations.

Increased risk and consequences
A new owner and/or manager will have a reasonable expectation of managing and operating the vessel immediately following a takeover. Where the documentation has been removed by previous owners/managers it can take some considerable time before the new crew and management are fully familiar with the vessel, her machinery and any maintenance schedules. The vessel and crew will be exposed to an increased risk of something breaking down during this period of familiarisation.

Should the repair costs result in a claim on an insurance policy, all policies exclude damage caused by wear and tear, inadequate maintenance etc. The surveyor attending on board on behalf of the insurer will request to see the maintenance records covering the damaged component. If no records are available on board there is no way the Assured can document the running hours of the component, and that the component has received the recommended maintenance as stipulated by the supplier of the component.

This lack of documentation will not automatically result in the claim being rejected by a leading insuring company, but by not being able to present relevant documentation in a claim situation, the Assured may not be able to prove the cause of the damage and recover the repair costs from the insurer. The requirement to present relevant documentation is basically the same for a second hand ship as for the existing ships of his fleet.

In order to document that adequate maintenance has been performed, Classification Society’s certification cannot be relied on as evidence that the vessel has been properly maintained throughout the periods between Class surveys. The requirement to establish programs and maintain records to verify the condition of the ship between the Class surveys is, however, an integral part of the objectives behind the ISM Code.

We are aware that change of ownership implies new DOC and ISM certification, but it is a paradox that old records of running hours and performed maintenance shall not follow each ship.

Recommendation
We strongly recommend that owners include in the Sales & Purchase agreement of a second hand ship that maintenance records should follow the ship in the same way as Class certificates and ship drawings delivered with the ship normally form part of a S&P standard agreement. Where the maintenance records are part of the outgoing manager’s own developed maintenance system, at least a hard copy of the records should be left on board. This will greatly assist the incoming crew and manager to familiarise themselves with the ship and will also provide an indication of where to concentrate any necessary maintenance and/or upgrading. It will also place the Assured in a position to document that any claim on an insurance policy is not as a result of wear and tear or inadequate maintenance.
Loss Prevention Circular No. 15-09

Low sulphur fuel changeover

Background
To reduce emission from ships, various international regulations and Emission Control Areas (ECA)¹ have been in force since 2005. Recently, new and stricter fuel sulphur content regulations promulgated by California² and the EU³ have been developed and implemented. The Californian Air Resource Board (CARB) has since 1 July 2009 enforced the use of diesel oils (MDO) or gas oils (MGO) in Californian waters.⁴ In addition, when in berth in EU ports, vessels must as of 1 January 2010 use marine fuels with a sulphur content not exceeding 0.1% by mass.

Since the implementation of the regulation on 1 July 2009, the USCG 11th District has documented a major increase in propulsion failures related to fuel changeover.⁵ The San Francisco Bar Pilots have reported anecdotally a marked increase in engine failures, engines not starting and problems with changes in speed, which affect manoeuvrability. The purpose of this circular is to set out the various fuel limits and their date of implementation, to provide information about the possible risks involved when switching to low sulphur fuels, and to give recommendations to owners and vessels.

Marine fuel limits in EU and date of implementation
The following table lists marine fuel limits in the EU, and their dates of implementation.

<table>
<thead>
<tr>
<th>Vessel location</th>
<th>Sulphur limits all types of marine fuels used onboard from</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 January 2010</td>
</tr>
<tr>
<td>Ships at berth in EU community ports and ports in non-EU countries that have adopted directive 2005/33/EC</td>
<td>0.1%</td>
</tr>
<tr>
<td>Inside ECA but not at Berth</td>
<td>1.50%</td>
</tr>
<tr>
<td>Outside ECA, but not at Berth</td>
<td>4.50%</td>
</tr>
</tbody>
</table>

The risks and possible consequences involved
Change from HFO to MGO or MDO on engines and boilers has occurred since HFO was initially used on board ships. However, one difference is the very low viscosity and low sulphur MGO or MDO now coming on the market as a result of the new requirements. When changing to low sulphur fuel, several engine problems can occur, one of which is thermal shock in the fuel system due to the rapid change in temperature and poorer lubrication qualities of low sulphur fuel. This can result in sticking/scuffing of the fuel valves, fuel suction valves and fuel pump plungers, which again lead to shut down of the main engine followed by manoeuvring problems. Waters where fuel switching is required are often environmentally sensitive and contain a number of hazards to navigation together with strong tides and currents. The increased risk of furnace explosion in the event of flame failure during operation of the boiler on low sulphur fuel is another safety issue.⁶

Recommendations to Shipowners and Managers
Owners and Managers are required, by the ISM Code 1.2.2.2, to assess the variety of risks that may be involved when changing to low sulphur fuel, by systematically identifying and analysing potential hazards to their vessels, personnel and to the environment. Based on these, the appropriate maintenance (ISM 10) and operational procedures (ISM 7) should be developed.

The manufacturers of the engines and boilers must be contacted and their recommendations on how to change over and run the equipment on low viscosity fuel must be part of the ISM procedures on board. If the manufacturer’s recommendation includes certain requirements for modification to the equipment or systems, these must be implemented with Class approval. As not all required modifications will be completed by 1 January 2010, there may be a need for owners to document that the necessary modifications are in progress.

Operational recommendations
Vessels that trade between areas with different sulphur limitations should test the MGO and MDO received on board as the Bunker Receipt may only give the max/min values of the viscosity. If viscosity below 2.5 - 3 cst is received, problems could be expected as the viscosity will easily fall below 2 cst when passing through the fuel system on board.⁷ The first problems will be the fuel pumps, injection valves and boiler burners suffering internal leaks with malfunction and reduced capacity.

If such low viscosity fuels are to be used, changeover on main engine, auxiliary engines and for boilers producing steam for propulsion from HFO to MDO/MGO should take place sufficient time before arrival at Californian ports to ensure that both the propulsion and manoeuvring are maintained.⁸ If difficulties are encountered, the engines must be changed back to their original HFO.⁹ Such procedures must be implemented by the Assured with reference to the ISM code and emergency procedures.

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Before starting the changeover, watch out for a reduction or increase in temperature, observe the viscosity and reduce the engine load. To protect the injection equipment against rapid temperature changes, the changeover process must be carried out slowly and in accordance with the manufacturer’s instructions. The same also applies when changing from MGO to HFO.

**Footnotes**


4 The following regulations are in force when operating within the 24 nautical mile regulatory zone off the California Coastline.

   From 1 July 2009, Marine gas oil (MGO) at or below 1.5% sulphur content, or Marine diesel oil (MDO) at or below 0.5% sulphur content.

   From 1 January 2012, Marine gas oil (MGO) or Marine diesel oil (MDO) at or below 0.1% sulphur content.


6 Other significant operational implications by using low sulphur fuels might be reduced lubrication, low viscosity, flashpoint, acidity, catalytic fines or ignition and combustion quality.

7 During the changing process from HFO to MGO, it is recommended that temperature change of the fuel inlet to the fuel pumps do not exceed 2°C/minute.

8 It is not considered necessary to test the auxiliary boilers before arrival at port.

9 If the Master of the vessel determines that compliance with the regulations would endanger the safety of the vessel, its crew, cargo, or passengers, the Master should immediately take the necessary steps to remedy the situation (CARB, “Marine Notice 2005-5, Safety Exemption Information and Claim Form”, Sept 2009).
Loss Prevention Circular No. 14-09

Lay-up of ships and the marine insurance cover

In order for Gard to maintain the insurance cover of a ship in short or long term lay-up, the Assured must present a lay-up plan which must include the following items:

1. Lay-up Site
A description of the lay-up site must be provided with particular focus on the weather conditions. The lay-up site must also be approved by the local authorities. Lay-up in hurricane affected and/or tropical areas must be the subject of particular considerations.

2. Mooring/anchoring arrangements
Description and maintenance routines of anchoring and mooring arrangements must be provided including distances to shore and to other ships. The arrangements should preferably be approved by the vessel’s Class Society or by a consultant appointed by them, but other competent bodies may also be used.

Information of sea bed, maximum wind forces and direction, shore and on board bollards, anchors with systems is needed for calculation purposes. The anchor windlasses and mooring winches which are in use or under constant tension must be the subject of frequent testing and maintenance to ensure that they function properly at all times.

3. Class Status
Gard generally requires that the Class is changed into the status of “laid-up” to facilitate a return of premium. Annual and other mandatory surveys must be carried out in accordance with Class rules. As for ships in normal trading it is a prerequisite for cover that the Class rules and regulations are followed at all times also during the lay-up, and any suspension of Class will lead to termination of the insurance cover.

4. Minimum manning
The Flag State’s requirement as to minimum number of crew for the different lay-up situations must be maintained. If watchmen and routine maintenance as described in the lay-up plan are contracted out to third parties, these arrangements must also be described in the lay-up plan.

5. Power availability
The lay-up plan should also include the envisaged need for propulsion power and describe the availability of tug assistance in the lay-up area.

6. Protection against explosions and fire
All cargo tanks, pump rooms, cofferdams and cargo lines must, as a general rule, be kept gas free during lay-up. Inerted tanks may be acceptable if approved by local authorities. Hot work is only permitted if a valid gas free certificate is kept on board.

All fire alarm systems must be fully operational during lay-up. The ship’s normal fire fighting systems must be available and ready for use. If fixed fire fighting systems are disconnected (CO2 tanks) for any reason, substitute systems must be operational and approved by Class.

7. Precautions against flooding
All sea overboard valves not in use must be closed. If sea water coolers/condensers etc. are left open, the sea water connections must be blanked off.

The water level in the ballast tanks, pump room and bilges must be checked regularly and bilge alarm systems and/or tropical areas must be the subject of particular considerations.

Temporary bilge alarm systems for cold lay-up conditions are acceptable. All water tight doors and manholes must be closed.

8. Maintenance of equipment
The lay-up plan must also include specific items in accordance with the manufacturers’ recommendations as to the preservation, maintenance and operation of machinery and other equipment to prevent damage occurring as a result of the items not being in normal use. The plan should describe the preservation and maintenance of among others:

- Main engine with turbocharger, gear and shafting arrangement
- Auxiliary engines with generators
- Boilers
- Rotating equipment such as pumps, compressors etc.
- Ship type specific equipment
- General requirements as to ambient temperature and humidity, use of heaters, dehumidifiers, preservation oil etc.

9. Resuming of trading/Breaking of lay-up
The extent of survey and testing when breaking lay-up will depend on the extent of maintenance and other preservative measures which had been undertaken during the lay-up and the reason for breaking lay-up (trading, dry dock for re-commissioning, scrap). Gard’s requirement is that Class’ requirements for re-commissioning are followed, and that the manufacturers’ recommendations for preservation and maintenance have been followed during the lay-up and re-commissioning.

Please note, these guidelines are general and should not replace any requirements given by class, authorities or flag state.
Loss Prevention Circular No. 11-08
Lifting gear – is your ship prepared to avoid accidents occurring?

Introduction
Lifting gear onboard vessels, such as cargo cranes, provision cranes and other service cranes, is an important part of the operational equipment for cargo handling and the supply of goods, spare parts and food. Faulty performance of the gear can easily lead to off-hire and loss of income for the vessel. The consequence of accidents which may result in injuries or fatalities is much more serious and tragic for those involved.

The current international legislation covering the operation and safety of vessel’s lifting gear does not provide sufficient details to ensure consistent enforcement by the various flag states. This contrasts with other areas of the shipping industry where conventions such as SOLAS or MARPOL compulsorily apply a consistent practice where adopted.

This current situation requires that the shipowners play an active part in establishing routines and systems for the inspection and maintenance of lifting gear onboard their vessels.

Experiences from casualties
One recent incident involved an entire crane cab, including the jib, separating from its pedestal and falling down into the cargo hold during operation. One person was seriously injured and disabled as a result of the accident. Investigations revealed excessive wear on and improper maintenance (greasing) of the slewing bearing. The manufacturer’s revised maintenance instructions were not readily available onboard and the maintenance was not carried out as recommended. An analysis of the quality of the grease in the slewing bearing or a proper wear-down measurement would have detected abnormal wear and could have prevented the accident.

Another recent accident with fatal consequences was caused by the stevedores manually overriding the safety monitoring system. During the lifting operation, the auto stop monitor of the boom/jib in lower position was disabled in an attempt to increase the reach of the boom for a specific lifting operation. The increased load on the equipment caused by this position of the boom caused a span rope to break and the derrick boom fell down onto jetty and fatally injured personnel standing ashore.

Regulations
The most commonly adopted legislation covering lifting gear is ILO convention no.152, Occupational Safety and Health in Dock Work of the International Labour Organisation. Certification according to the ILO 152 is adopted and required by many national authorities, but it does not contain a detailed description of how the convention shall be enforced.

The convention only requires a periodical thorough examination of the lifting gear with the service to be carried out by a competent person. A general definition of competent person is provided, but many flag state authorities leave it to the vessel’s technical managers to identify and appoint such personnel. Many companies use external inspection companies, but it is not unusual for chief engineers to be given this responsibility, even where no specific training is available. In Gard’s experience this solution is often insufficient. Considering the variety design, make, age and functionality of the lifting gear, it requires in-depth training to achieve the competence required to perform this duty.

Based on the current status of the international legislation it is not sufficient to rely solely on the individual flag states’ enforcement of the regulations to ensure safe operation of lifting gear. Gard encourages all shipowner to consider the recommendations below.

Recommendations
• Maintenance agreements.
  Consider establishing a maintenance agreement with the manufacturers to execute an annual thorough examination and 5-yearly re-certification. The involvement of the manufacturers will ensure that service instructions and operational experiences are transferred to the crew and reflected in the procedures onboard.

• Additional class notation
  Many classification societies are offering an additional notation covering cranes and lifting gear. Such a notation will, in addition to the above maintenance agreement, serve as a third party control and provide a survey regime in accordance with a recognised set of industry rules and requirements.

• Training and documentation
  The maintenance agreement with the manufacturers should include a training package and onboard training for execution and documentation of the regular maintenance to be carried out by the crew. A key issue is for the crew to gain knowledge and competence of the lifting equipment onboard. Knowing the limitations of the equipment and being familiar with the necessary safety checks of the lifting gear to be conducted prior to use will reduce the risk of failure. Since the operation of cargo handling cranes are very often left to stevedores it is vital that the crew is capable of ensuring that safety systems are functioning and that the operation instructions as prescribed by the manufacturers are available/posted prior to the stevedores operating the equipment.
Fire safety in the engine room

Most fires on board ships start in the engine room. There are a number of built-in safety features on board a vessel, designed to limit the risk of fire and the spread of it, and the officers and crew must have full knowledge of these and maintain their integrity. This circular highlights the main aspects associated with fire safety of engine rooms, based on observations made during condition surveys of vessels entered with Gard. This circular is based on an article previously published in Gard News.

Steel separations
One of the reasons for the engine room casing and various decks, bulkheads and staircases being made of steel is to limit the spread of a fire. If there is a fire in the engine room, it is important that the fire may not readily spread to accommodation, bridge, lifeboat stations and cargo areas. Likewise, a fire in the cargo areas should not be able to gain access to the engine room, which is “the heart of the ship”, where generators and fire pumps, the means to fight a fire, are located.

Therefore, getting to know the built-in fire boundaries and maintain the integrity of such separations is of vital importance. Be careful when making alterations on board, and be especially aware that when new cables and pipelines are installed, their penetration through steel decks and bulkheads, i.e. crossing fire zones must be made in a fire-proof way.

Air control
Air ventilation is essential for good working conditions in the engine room, but so is also the crew’s full knowledge of fans, fire flaps and other openings to the engine room that may need to be closed in a fire situation. Below are some important areas were we repeatedly have seen breaches of safety. These areas should be addressed on board.

– Air ventilator fire flaps which can not be closed and/or secured in closed position.
Solidity of fire flaps should be checked and they should be moved regularly and maintained with grease not to freeze. There should also be means to secure the flap handles in closed position and the open and closed position should be clearly marked. If fire flaps can not be secured, the draft of a fire is likely to throw them open.

– Entrances to the engine room that are damaged and allowing passage of an air draft.
Doors leading to the engine room from the accommodation are fitted with devices for automatic closing. Doorsills and coamings may be damaged by the moving of machinery parts through doors in the engine room, causing obstructions for the full closing of the door. Doors should be tested by releasing them from the open position, to see if they close fully by the automatic device, and there should then be no openings between the door and the coaming.

– Emergency escapes from engine rooms that are obstructed or damaged.
Emergency escapes may be arranged by shafts leading to deck and with access doors at various levels. The full closing of the doors should not be obstructed by the stretching of loose electric cables, hoses, etc., and also these doors should close tightly by their own automatic means. It must be remembered that such a shaft, if not kept closed, will provide a draft from the engine room.

– Engine room entrances kept open by the fitting of hooks, ropes or wedges.
This is often seen especially on doors leading through the steering gear flat to the poop deck. In the case of a fire, such doors may be inaccessible, and the hooks, etc., can not be released to close the door. Air to the engine room can then not be closed off. Likewise, Gard surveyors often see skylights at the top of the engine room and removable steel panels for the passing of spare parts being kept open by steel wire slings, etc.

Combustible oil
On board a ship there is fuel oil, lubricating oil, hydraulic oil - all very combustible and the most likely nourishments of an engine room fire. Gard surveyors have met crew members who do not consider lubricating oil and hydraulic oil to be fire hazards, as such oils are seen to be difficult to put on fire. That is, however, only a question of temperature. In an oil fire it is the gas above the liquid that burns, and if heated sufficiently by a fire, lubricating oil and hydraulic oil also become volatile and fire-hazardous.

Level glasses on oil tanks
One breach of safety which Gard surveyors see on board most vessels they inspect is that the lower valve of the level glasses of oil tanks is forcibly kept open. It is clearly stated in classification and statutory rules that such a valve is to close automatically.

Normally such a valve is spring loaded and the crew member will have to bend down and keep a pressure by hand until the oil has risen in the level glass. Thick oil may take some time to fill up the level glass, and for the ease of work, crew members often secure such valves permanently in open position, by steel wire, blocks of wood, etc., or by ingeniously designed “thumbscrew” fittings. During condition surveys Gard surveyors find this serious breach of safety on board many of the vessels equipped with oil tanks with level glasses. This could in case of a fire lead to a sudden and inexplicable increase in the power of a fire when the glass breaks and the tank drains.

Sources of ignition
The sources of heat most likely to start a fire in the engine room are hot exhaust pipe and engine surfaces, bearings of rotating machinery heating up and faulty electrical equipment. Heat sources can of course also be introduced by human error, as by for instance dangerous use of electric tools and welding equipment. Insulation of exhaust pipes is often found to be defective, especially in the vicinity of the diesel engines, where removal of insulation is needed during engine maintenance. Also, flange connections and steel supports of exhaust pipes may often be inadequately insulated, as well as indicators and other instruments fitted. Look for signs of hot areas, such as paint discoloration and reddish rust surfaces. Electrical installations will always represent a certain risk of sparks and fire, although the risk
is reduced by the use of quality safety devices and close adherence to valid regulations. All rotating machinery may also represent a source of sufficient heat to light a fire, first of all by bearings of pumps heating up.

**General cleanliness**
In some ships there is a large collection of used spare parts and items which are “nice to have”. Gard surveyors have seen large collections of plastic sheets, cardboard, wooden planks, used paint tins, etc., being stored in fire-exposed areas. It is important to discard combustible materials, remove outdated equipment that may hinder access in a fire situation.

Drain pipes from gutters to oil collecting tanks should be kept open, oily rags should be disposed of in a correct manner and engines and floor plates cleaned regularly. Oily deposits in bilges and in other areas below floor plates may at times need chemical cleaning to be removed.

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**Loss Prevention Circular No. 06-06**

**Marpol Annex VI – Challenges in operating on low sulphur fuel**

**Background**
International regulations to control harmful emissions from ships’ exhausts entered into force on 19 May 2005. MARPOL Annex VI contains provisions allowing special “SOx Emission Control Areas” (SECAs) to be established with more stringent controls on sulphur emissions. In these areas, the sulphur content of fuel oil used onboard ships must not exceed 1.5% m/m. Alternatively, ships must fit an exhaust gas cleaning system or use other methods to limit SOx emissions. The regulation requires any such alternative methods to be approved by the relevant flag state. Sanctions for Marpol violations are becoming increasingly severe around the world, and there is no reason to believe Annex VI will not be treated to the same scrutiny.

The regulation allowed for a 12-month period from the date of entry into force before the limits within a SECA could be enforced, and they will thus be enforced from 19 May 2006. The Baltic Sea Area is the first area designated as a SECA under the Protocol and will permit a maximum 1.5% sulphur content in any fuel used onboard. In 2007, the second SECA, covering the North Sea and English Channel, will be come into force, requiring similar sulphur levels.

The effects of low sulphur fuel
There are several implications of operating on low sulphur fuel or altering between high and low sulphur fuels. The issues listed below are some of the most common challenges that must be considered by the shipowners and operators to avoid problems related to operation and maintenance of the ship engines.

**Fuel related issues**
- Incompatibility of different fuels
- Combustion characteristics and impact on engine deposits and wear
- Varying fuel viscosity, and impact on fuel injection
- Low sulphur fuel having less anti-wear capability
- Supply and storage for low sulphur fuels

**Lube oil related issues**
- Matching cylinder oil BN fuel sulphur level across operating conditions
- Possible additional storage tanks
- Cylinder lubrication monitoring
- Cylinder oil feed rate

**Operations related issues**
- Monitoring sulfur content in fuel
- Engine load
- Cylinder Liner Temperature
- Water content in scavenge air

**Recommendations**
Shipowners and operators should thoroughly consider all undesired effects of operating on low sulphur fuel. It is recommended that the engine makers and the lube oil suppliers are contacted to obtain their detailed instructions and guidelines. Specifically worded charterparty clauses regarding bunkers supplied by Charterers are important to ensure that any problems are avoided.
Introduction

Many manufacturers around the world offer a wide range of non-original (pirated) spare parts for engines and machinery in general. Although these parts may be made in accordance with the original manufacturer’s specifications, they are usually not of the same quality as the original parts. Important characteristics such as raw material and strength may be unsuitable for the intended purpose and condition. Rotating parts are especially vulnerable to potential damage. The incident described below illustrates the need for prudence when dealing with ship’s spare parts. A more detailed article on problems experienced with spare parts will be published in Gard News later this year.

Course of events

A reefer vessel recently experienced a breakdown of one of the auxiliary engines. The requirement for maximum power is, depending on the cargo situation, often critical for this type of vessels. In this particular instance, the vessel was forced to deviate from its original course and enter port for a damage assessment. It also had to hire a portable generator to ensure maintenance of the appropriate cargo carriage temperature.

Later, during the damage assessment, it was found that the bolts of connecting rod no. 6 had parted, dislocating the rod from the crankshaft. The piston, liner, bearings, cylinder block and bedplate were severely damaged. The extent of damage was substantial and the repair costs were estimated to equal the cost of a replacement engine. A decision was made to repair the engine, and, in addition to the repair costs, expenses were incurred relating to the use of a portable generator set and the vessel’s two weeks off hire.

The cause of the damage were found to be the failure of one of the connecting rod bottom end bolts in unit no. 6, which appear to have broken in normal operational conditions. The crew had fitted the bolt in question during an overhaul only 15 days prior to the casualty. It turned out that the bolt had no markings, whilst according to the manufacturer; these bolts should have a logo stamped on the head.

Three bolts (the broken bolt, a non-original bolt as well as an original bolt) were sent to the classification society for metallurgical analysis. The results of this analysis showed quite clearly that the two non-original bolts were off-spec compared with the manufacturer’s requirements for tensile strength and elongation, and also had a considerably lower proof strength. Not surprisingly, the result of the material analysis also revealed that the material composition of the non-original bolts were different from that of the original bolt.

Lessons learned

This incident could easily have been avoided by using manufacturer approved spare parts when overhauling the engine. The spare parts purchased directly from the equipment maker, or their licensed sub-contractors may be more expensive than non-original spare parts available in the market. However, it can be stated with some certainty that the use of manufacturer approved spare parts, and in particular when used in connection with critical components, will, in the long run, be more profitable, both by duration and reliability of service intervals and a significant reduction in the risk of premature breakdowns with ensuing expensive consequential damages.

The origin of the production and delivery of spare parts may at times be uncertain. However, this places further responsibility on the receiver to ensure that the spare parts are of an appropriate quality and in accordance with the classification society’s and manufacturer’s requirements.

For further guidance with regard to the risks involved in using non-original spare parts for turbochargers, we also refer to the Gard Services Loss Prevention Circular 01-01, Turbocharger damages on the Gard Services website at www.gard.no.
Loss Prevention Circular No. 08-01
Effects of off-spec bunkers

Introduction
Taking onboard off-spec bunkers can cause significant disruption to a vessel’s ability to trade. In addition, it creates problems in recovering from the insurers costs incurred due to a lack of and/or limitation in cover. This circular is intended to provide an example of the problem as experienced by shipowners. The case described below relates to a passenger ship, but applies equally to all types of vessels. Loss Prevention Circular No. 08-01 is the next installment in a series of circulars produced by Gard Services dealing with damage associated with bunkers and bunkering1 and outlines problems which may arise when passenger ships have to deal with off-spec bunkers.

Passenger ship operations are very sensitive to operational disruptions. Costs of disruption can occur in the form of hull and machinery damages, damages and compensation to passengers and crew as well as damage to reputation that may influence future bookings and earnings. Compensation to customers beyond the initial costs due to commercial considerations can easily fall outside the scope of cover of hull and machinery, loss of hire and P&I cover.

Course of events
Upon arrival in Singapore, the vessel was firmly secured to the pier at 0550 hrs. At 0800 hrs, a bunker barge came alongside to deliver bunkers to the vessel. The barge commenced bunkering at 0810 hrs and completed the operation at 1255 hrs. The bunker delivery statement noted that 90 metric tonnes of supposedly IFO 180 cst was supplied. Fuel samples were taken for testing by a credible bunker quality testing company. However, the results from this bunker test would not be available for another 2 – 3 days.

The vessel departed Singapore for Thailand at approximately 1745 hrs on that same day. At 2215 hrs that evening, the vessel experienced a total blackout, including the loss of all navigational equipment. Power was temporarily restored at 2217 hrs. A second blackout occurred at 2218 hrs resulting in the vessel not being under control. Although power was finally restored at 0220 hrs, the vessel was only able to continue at half speed.

The Chief Engineer observed that the bunker which had been supplied in Singapore that day, had a high degree of carbon residue, clogging the complete fuel system in the main and auxiliary engines. The Master informed the owners of the problem and the decision was made to return to Singapore due to safety considerations.

At 1100 hrs the following day, fuel samples were taken in the settling and service tanks where the bunkers had been loaded and the vessel began discharging the off-spec bunkers at 1200 hrs. A representative from the Singapore Maritime Port Authority informed the vessel at 1230 hours that they were being cautioned due to the emission of black smoke – apparently the result of the burning of the off-spec bunkers. An engine repair contractor boarded the vessel at 1600 hrs and upon surveying the situation, indicated that repairs would take at least two days provided no extensive damage was found. After consultations with the owners, the Master decided to abort the cruise.

At 0630 hrs the following day, the debunkering operation was completed. Another bunker barge began loading a fresh supply of IFO 180 cst at 0810 hrs and the operation was concluded at 0945 hrs. All passengers were discharged from the vessel at 0945 hrs. A second agency was used for the sampling of the second bunkers taken and a different bunker testing company was used to analyse the second bunkers. The results of the tests of the first and second bunkers indicated high ash, water and total sediment potential (TSP) content. In addition, high sodium to water content was also reported, indicating the presence of seawater in the bunkers.

However, the bunker brokers advised the company that the samples had not been taken at the bunker barge as required by the Singapore Standard CP60.1996. Further samples were drawn at the barge’s manifold and sealed with a barge seal.

Damage to machinery
The damage to the main engine as a result of using the off-spec bunker was abrasive wear marks on all fuel nozzles, abrasive wear on all fuel pump barrel/plunger assemblies as well as heavy fouling of all turbochargers. The turbocharger impellers were noted to be heavily fouled, the labyrinth seals on the gas sides were choked with carbon deposits, and the bearing bushes were worn. In addition, the boiler burner unit was also heavily fouled. Upon review of the engine logbooks, there was no evidence of any problems with the engines prior to taking on the off-spec bunker. The running hours of the main and auxiliary engines were noted to be well within acceptable limits for overhauls.

In this case, there was no indication that the vessel had received the results from the first fuel test prior to sailing. In addition, the vessel had apparently a very limited amount of bunkers onboard prior to loading the first off-spec bunkers. Therefore, the vessel had to commence using the new bunkers prior to receiving the test results. In this circumstance, the vessel was not able to create a ‘buffer’ by using the existing bunkers while awaiting the test results. Had this been the case, the company may have been able to discharge the off-spec bunkers and taken on replacement bunkers.

What types of damages are actually covered?
In this type of case, shipowners can find themselves in a situation where insurance cover can only pay a portion of the costs incurred. For example, in this instance the cost of repairs to the damage to the machinery was below the deductible. For loss of hire, the vessel was off hire but within the off hire deductible. The P&I entry covered the Member’s “liability to pay damages or compensation to passengers onboard the Ship in consequence of a casualty” as per Rule 28(b) of Gard P&I Club’s Statutes and Rules. As stated in the Gard Handbook on P&I Insurance: “‘compensation’ relates only to the Member’s legal liability to the passengers and cannot include any claim by the Member in respect of payments made to passengers to protect the Member’s commercial reputation.” P&I cover thus, does not include additional compensation to passengers above the Member’s legal liability made to foster customer goodwill.

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The shipowners is therefore left to bear a significant cost for business disruption in these types of instances, where only limited insurance cover would be available under hull and machinery, loss of hire and P&I. Dependent upon the circumstances, demurrage may also need to be charged and thus creating problem for the shipowner.

Lessons learned
The lessons learned from this case apply to all types of ships. However, the passenger ship industry can be more sensitive than most industries.

Fuel testing
1. Bunkering procedures, including fuel-testing procedures, should be reviewed to ensure correct procedures when dealing with off-spec bunkers. The crew involved should also be properly briefed on these procedures to avoid costly and time-consuming interruptions. In the Det Norske Veritas Annual Report 2000, it is stated that only 40 per cent of the world fleet performs fuel testing. This lack of testing can lead to extensive damage to the vessel’s machinery which is costly both to the owner and insurer alike.

On the other hand, there are cases where there is a company fuel testing procedure but due to commercial or other reasons the results of the tests are neither received in time nor actions taken to adjust the fuel equipment and engines accordingly. The improper use of off-spec fuel can cause significant damage to the vessel and its ability to trade. In the case outlined above, the costs were considerable and were only partially recoverable from insurers.

Taking on bunkers
2. Every precaution should be taken to ensure that adequate bunker supplies are available to allow for the proper testing before use of any new bunkers taken on. It is imperative that passenger ships, as well as other vessels on tight charter schedules, are able to deal with situations where it is necessary to use bunkers without the test results being available. This may involve complex contingency planning in order to properly evaluate and ensure that a ‘buffer’ exists. For example, some shipowners maintain a quantity of marine diesel oil (MDO) onboard for situations where off-spec bunkers need to be discharged and only limited IFO is available.

Footnotes
1. Gard Loss Prevention circulars related to bunkers are: Loss Prevention circular 01-00 (Main Engine Damage Due to Ignition Delay), Loss Prevention circular 03-01 (Bunker Quality), and Loss Prevention circular 04-01 (Charterer’s Liabilities and Bunkers). These circulars can be found on the Gard website at www.gard.no.
2. Gard Handbook on P&I Insurance by Simon Poland and Tony Rooth. Published by Assuranceforeningen Gard. Arendal, Norway 1996. This handbook can also be found on the Gard Services website at www.gard.no.
**Introduction**

The securing of bunkers of an acceptable quality depends on a variety of factors such as availability, demand, area, choice of suppliers etc. The problems have, to a certain degree, fluctuated with the bunker prices. The market has seen fuels contaminated with waste chemicals detrimental to the health of the crew as well as damaging to the ships engines. For many years, it has been normal in certain areas of the world to dispose of used automotive lubricants in bunkers, thus possibly adding to engine operating problems.

High-density fuels, which far exceed the capabilities of the onboard fuel treatment plants, are being delivered to vessels. Water in the fuels is not uncommon, resulting in emulsified fuels and fuels that cannot be treated in shipboard fuel treatment plants. Some of the problems mentioned result in damages that are insured against, but in most cases the associated costs fall below the deductible. Occasionally, blending contaminated fuel with good quality fuel may solve the problem. In other instances, the damages in the form of wear and tear of moving parts are so great that the vessel has to divert to an emergency port for major repairs.

**Primary problems**

We see mainly three problems:

1. Catfines, aluminium and silicon resulting from the refinery cracking processes, are very abrasive to ship’s machinery, unless properly removed. The end result can be machinery damage unless the Catfines are removed to an acceptable level (contact your engine manufacturer) through effective fuel treatment onboard, i.e. optimum use of the centrifuges. The mode of centrifuge operation must be discussed with the manufacturer as the type and year of manufacture of the separators is of significance.

2. As the global demand for premium products such as gasoline, jet fuel, heating oils and gas oils has increased sharply, the use of refinery conversion processes have markedly influenced the quality of the end product, the residual component which is the major component used for blending Intermediate Fuel Oil (IFO) for ships. The result is fuels with higher density, carbon residue, sulphur etc. Practically every parameter has increased significantly throughout the refinery processing.

Ships fitted with older centrifuges are unable to effectively treat such fuels, particularly the "high density" products, i.e. fuel densities of 990 Kg/m³ and above. Centrifuge manufacturers offered upgrade kits for the “old” separators, but few operators invested in these kits.

3. Poor ignition quality is another problem that has arisen recently. The standard laboratory tests do not test the ignition quality, and it is not a part of the ISO 8217 Fuel Standards. The problem is normally associated with low viscosity/high density fuels. If a vessel receives this type of fuel, the ship should keep temperatures as high as possible, thus avoiding low load operation. Gard Services has seen a number of claims in the last few years where the vessel has had to be assisted to an emergency port. The use of inferior ignition quality fuels may well result in major repairs to the vessel’s engine(s).

**Recommendations**

Owners should be aware that the increased demand from shore side industries for premium products has resulted in a deterioration of IFO used in marine engines. Compounding the problem is the demand from shipowners for high performance lighter engines.

1. IFO used as bunkers should, as a minimum, meet the requirements of the specifications set out in ISO 8217, latest issue. Bunker testing agencies such as DnV Petroleum Services (DnVPS) and Lloyd’s Register’s FOBAS are set up to monitor that this is the case.

2. If the vessel has performance difficulties and poor ignition quality is suspected despite a satisfactory CCAI value, a further test for the ignition quality should be performed. Fueltech, FOBAS and DnVPS can perform these services (see Gard Services Loss Prevention Circular 04-01, Charterers Liabilities and Bunkers).

3. If the vessel is in the unfortunate situation of having received a high Catfines fuel, and has to use the fuel, owners should be prepared for a succession of replacements of plungers, nozzles and other moveable engine parts. A normal full set of spares may not be sufficient to see the problem through. The fuel testing service provider should also be contacted, together with your centrifuge manufacturer and fuel supplier for advice and decision-making.

4. Separators must be in prime conditions. Considerations should be given to replacing separators manufactured prior to 1984/1985.

5. If the vessel has been on extended lay-up, Catfines and other impurities may settle in the bunker tanks if a sufficient amount of bunkers remain onboard during the lay-up period. When subsequently re-commissioned, these Catfines and impurities are likely to be stirred up in heavy seas and cause damage to the engine(s). Therefore, consideration should be given to the cleaning of bunker tanks prior to bringing a vessel out of an extended lay-up to prevent the occurrence of this type of problem.

The settling of Catfines is a continuous process taking place onboard every seagoing vessel. As a rule, fuel tanks should be cleaned regularly. Settling and daily service tanks should be cleaned at least once a year. This messy, but important task would save ship operators a lot of problems.

For further information on bunker quality, testing and other relevant information can be found on websites such as www.bunkersworld.com, www.dnvps.com, and www.lrfobas.com and www.fueltech.no.

Gard would like to thank and acknowledge Mr. Kjell Haugland’s assistance in preparing this circular.
Turbocharger damages

Introduction
Turbochargers are among the most technologically advanced engine component onboard ship. Impeller blades of a medium sized turbocharger regularly rotate at as much as 400 revolutions per second. The outer edges of the rotor blades thus move at 1.5 times the speed of sound.

In the process, the turbocharger digests contaminated exhaust gases of up to 700 degrees centigrade. Thus, the turbocharger is a very sensitive piece of high-speed machinery continuously serving in harsh conditions and under extreme strain. Being on the receiving end of gas flows, turbocharger damages are often caused by the failure of various upstream components.

As shipowners and ship managers are aware, damage to main engine and auxiliary engine turbochargers have a significant impact on the vessel’s ability to trade. Damages can lead to costly repairs, significant reduction in speed while at sea and can be a considerable safety hazard.

These damages are costly to shipowners and shipmanagers as well as to Gard Services. For ships insured for Hull and Machinery through Gard Services in the period 1996 and 2001, there have been 192 incidents of turbocharger damages with total gross claims of USD 24.7 million. Taking into account deductibles, these turbocharger damages have cost shipowners and shipmanagers in excess of USD 25 million. Additional costs are accrued by shipowners and shipmanagers for turbocharger damages that fall below the deductible levels. As a result, this circular been have prepared as an assistance to the Members and Clients in the prevention of such costly damages to this critical part of the machinery system.

Some major contributors to turbocharger breakdowns

1. Late maintenance and overhauls. In many cases, the service life of major components is disregarded. Not only bearings, but also compressor wheels and turbine blades/discs can have service life limitations. Compressor wheels, for instance, can be limited to between 50,000 and 100,000 work hours depending upon the use and configuration. This is equivalent to 7.5 to 15 years of use between exchange intervals. Due to operational and financial constraints, overhauls are occasionally postponed until dry-docking rather than overhauling while the ship is in service.

   Obvious signals indicating that there are problems will at times be disregarded. Surging of the turbocharger can point to a clogged air cooler or fouled nozzle ring. Continued surging at full load might cause breakdown by itself. Further, rising exhaust gas temperatures may indicate that an inspection followed by service is required.

2. Non-manufacturer parts used in place of manufacturers parts. To reduce the costs of maintenance and parts, owners will use ‘pirate’ or ‘alternative source’ parts in place of manufacturer’s parts. Due to the rough service environment of a turbocharger, inferior quality parts with slight discrepancies in material, design and dimensions can easily lead to damages.

3. Maintenance not performed by manufacturer. Maintenance costs for turbochargers can be significant. Maintenance undertaken by the crew, shipyard or other personnel not qualified by the manufacturer to perform such servicing can lead to improper maintenance and servicing. Below are listed a few examples of small mistakes which may eventually lead to total breakdowns:
   - Failure to observe the right fitting sequence may pre-damage components.
   - Failure to exchange key wear parts may lead to loss of functionality, for instance to loss of bearing lubrication.
   - Failure to observe the correct clearances of the assembly and to adjust the right true run of rotors may lead to rubbing of the rotor with consequential unbalance.
   - Improper cleaning of cover rings can lead to blade rubbing and consequent blade failure when installing overhauled rotors.
   - Lack of or improper balancing of a rotor may damage bearings. (Due to the high speed, tolerances are extremely low).

4. Missing service letters. When there is a change of ownership of a vessel, the service letters and logbooks for the turbocharger, as well as other critical pieces of machinery and equipment can be missing. This break in information does not allow the new owners or shipmanagers the opportunity to assess the maintenance and services needs of the turbochargers.

5. Inappropriate use. Depending upon the ship’s trade and operation, engines and turbochargers are sometimes specified for ‘slow steaming’. When increased load demands are made on such equipment, some components may need to be replaced to match the new operating conditions. If disregarded, operational problems and/or reduced lifecycle of the rotating parts of the turbocharger due to elevated speed may result.

6. Actual turbocharger is not appropriately matched to engine. During vessel construction, turbochargers are rated for specified operating conditions. Engine conversions and changes to increase the
power output places a greater load demand on the turbocharger and thus reducing the reliability and service time of turbocharger turbine wheel, compressor wheel and bearings.

7. **Upstream maintenance resulting in damage to the turbocharger.** In many cases, damages to turbochargers occurs when maintenance has been conducted on other machinery components or systems upstream of the turbocharger. Since the turbocharger is downstream of most other engine machinery, any foreign objects, loose parts, forgotten equipment or pieces of machinery equipment that may have not been properly reassembled may eventually move downstream to damage the turbocharger. Such items include loose bolts, injection nozzle fragments, compensator bellow bits, welding electrode stumps, wrenches and screwdrivers, rags or any other foreign objects. Due to the extreme service speed of a turbocharger, even minute particles may damage vital parts and lead to severe damage.

8. **Improper operation and maintenance by the crew.** Improper maintenance and operation by the crew can lead to damage to the turbocharger. The following is a list of some of the types of causes and events that can lead to more serious damages.

- **Dirt on compressor and turbine blades** – Improperly implemented or neglected washing routines can let dirt accumulate on both compressor and turbine blades. This will lead to imbalances in the rotor, and consequently it can cause bearing damages and even total break down.

- **Improper lubricating oil** – The use of lubricating oils not recommended by the manufacturer or contaminated oil, can lead to reduced performance and eventual damage to the bearings.

- **Improper cleaning and maintenance of filtration rings** – The intake air quality can be affected when air filters are not properly cleaned and/or changed. A clogged filter may lead to surging. In some cases, it has been observed that the crew, to keep from having to maintain and clean the filters, have removed the filtration rings.

- **Turbocharger over-speed** – Due to incorrect maintenance or operational activities, turbochargers are in some cases over-speed. When continuously over-speed by only a few percent, this quickly damages turbocharger components and reduces their service life. An over-speed of 30-40% is likely to blow up the turbocharger instantly.

**Recommendations**

- Only qualified manufacturer approved maintenance personnel should perform maintenance to turbochargers. In most cases, the most qualified personnel to perform maintenance and overhauls are the manufacturers themselves where repairs can be performed while the ship is in service or at dry-dock. Some companies and shipyards are willing to perform turbocharger maintenance and overhaul at a ‘cheaper’ cost than the manufacturer. These reduced costs can be attractive to shipowners and ship managers. However, this cost can be based on a ‘false economy’ if damages occur due to inadequate maintenance and it can, in the end, be very costly to the owner and underwriter in settling a claim. Whereas, when qualified personnel perform the manufacturer’s work, workmanship is more than likely under warranty.

- **Use the correct manufacturers replacement parts.** The turbocharger is a highly loaded, high technology engine component. Therefore, it is imperative to maintain and overhaul them with the correct parts. As with the maintenance work, the parts will also more than likely be under warranty.

- **Ensure that proper records of turbocharger service documents and letters are obtained and kept.** This is to ensure that proper maintenance and service can be scheduled. In cases where the service documents and letters are not available upon sale of the ship, the equipment manufacturer can often help with proper documentation and sometimes even with the turbocharger service history.

- **Operate the turbochargers within the operational design parameters.** Damages arising due to improper use can be very expensive and lead to operations at reduced speeds, a total breakdown of the turbocharger or loss of hire due to the need for maintenance and repair. Therefore, important parameters such as turbocharger speed and exhaust gas temperatures should be routinely monitored and if possible used as input to trigger alarms.

- **Ensure proper care and maintenance of the turbocharger.** Turbocharger care and maintenance are required at regular intervals and should be in accordance with the manufacturers recommendations. If in doubt, contact the equipment manufacturer for information on component service life. Proper care and maintenance include:
  1. Water cleaning of compressors and turbines to remove dirt and other residual material from the rotor to ensure proper balance.
  2. Regular cleaning and changing of air intake filters to prevent foreign objects entering and dirt and residue build up on the rotor blades. Furthermore, contamination of air intake filters results in a higher inlet restriction and may cause turbocharger overspeed or surging.
  3. In case of turbocharger separate lubricating system: Regular changing of lubricating oil (consult manual for approved oil) and cleaning of centrifuges as well as filters.
  4. Regular inspection of turbocharger parameters while in operation.

**Acknowledgements**

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Loss Prevention Circular No. 03-00

Main Engine Damage Due to Contaminated Lubricating Oil

Ship Type: Bulk carrier (85,000 dwt, built 1981)

Course of Events
The above-mentioned vessel operated for more than 1 year with the main engine lubrication (lube) oil contaminated by fresh water. During the same period the lube oil purifiers were not operated on a regular basis. Occasionally the vessel used the diesel oil purifier for cleaning the lube oil. The lube oil sump was cleaned on at least two occasions and several thousand litres of lube oil were fully or partly replaced. On one occasion the engine room was flooded with sandy water outside a river reef barrier where water entered the engine sump through the thrust bearing. Lube oil sampling during that year showed a wide variation of results. Sometimes it was within acceptable limits. At other times, the lube oil was contaminated with up to 30% water making the texture similar to “whole milk” and “creamy and mud like”.

At all times the vessel was in close contact with the shore operation. Requests for spares for purifiers and replacements for lube oil were frequently made. The shore superintendents did not appreciate the lube oil problem for the vessel. Therefore, requests from the vessel were not taken seriously. This led to delays in delivery and/or in insufficient quantities of critical spare parts. Few actions or initiatives were taken to correct the situation.

Except for the flooding incident, no conclusion was made as to the source of the continuous contamination of fresh water in the lube oil. However, possible sources were condensation, lube oil coolers and/or the purifiers. In addition, the vessel was mainly employed in a fresh water river trade. Finally the ship operator’s technical advisors requested the attendance of a service engineer from the engine maker and extensive damage to the engine was revealed.

Extent of the Damage
Excessive wear was discovered to all engine main, crankpin, crosshead and camshaft bearings, plus damage and wear to other lubricated parts of the engine. The vessel stayed offshore for 125 days for the repairs that resulted in a Loss of Hire (LOH) claim of USD $5,000,000. The Particular Average claim to the hull & machinery (H&M) underwriters is not known to us, but is estimated to be approximately USD $2,000,000.

Probable Cause
The lube oil purifiers had been out of order during operation. When in operation, they were acting more as transfer pumps instead of purifiers due to incorrect operation that included: (1) a lack of parts in the disc stack, (2) incorrect gravity discs, and (3) a low operation temperature.

The lube oil sump had only been partly replaced. With 15,000 litres of contaminated oil, it is not sufficient to replace 10,000 litres to eliminate the contamination. The remaining 5,000 contaminated the new oil.

Water had entered the crankcase through the thrust bearing on at least one occasion when the vessel suffered a partial engine room flooding. It was reported that the lube oil in the sump was replaced on this occasion, but it is unclear to whether the piping and engine internals were sufficiently cleaned.

A lack of proper control and follow-up from vessel operators who used personnel without the proper qualifications and knowledge to take the necessary actions in ensuring the proper maintenance and operation of the vessel despite being continuously kept informed of the lube oil system problems. Even after the top management had been made aware of the problem with the main engine, they forced the vessel to continue service for several weeks.

Technical & management lessons to be learned
The lessons to be learned from this incident are among the following:

- Oil sampling must be taken at frequent intervals and recorded as best recommended practice.
- It is very important of correct and continuous operation of the lube oil purifiers. The gravity disc must be selected to obtain the optimum oil-water interface at a maximum temperature close to 90 deg C depending on specifications.
- The lube oil feed system to the purifiers should be evaluated in order to ensure the optimum flow rate between the purifier’s capacity and feed pump. Older lube oil feed system designs use a direct drive pump that has too high capacity with respect to the recommended flow through the purifiers.
- If heavy contamination of water is present in the system: (1) the lube oil in the sump tank must be transferred to a settling tank, (2) the sump tank should be cleaned, and (3) fresh oil filled to the minimum level recommended by the engine maker. The contaminated lube oil can be drained and circulated through the purifiers and the future use of the oil can be assessed after analysis.
- If it has been determined that solid particles are present, you should also consider cleaning of the piping system and flushing the entire engine.

This incident also shows the importance of responsible and qualified shore management. In this case, the person at the management office in direct contact with the vessel did not have the proper qualifications required to effectively assist the vessel or take the necessary actions in case of an emergency. There was little understanding of the continuous request for spare parts or of the seriousness of running the main engine with contaminated lube oil.

Impact on vessel’s LOH and H&M policies

Insurance conditions
The vessel’s H&M insurance was subject to Institute Time Clauses Hulls (ITCH) Port Risks including Limited Navigation (20.7.87). The ITC Perils Clause includes, inter alia, the following wording:

“This insurance covers loss of or damage to the subject matter insured caused by negligence of master, officers, crew and pilots…provided such loss or damage has not resulted from want of due diligence by the assured, owners or managers.”

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Furthermore, the vessel was insured for LOH, and the policy was based on the SP 40B Loss of Charter Hire Form (August 1961), amended to cover loss or damage caused by a peril insured against under the ITCH Port Risks including Limited Navigation (20.7.87). Consequently, the above perils clause would also govern the LOH policy.

Cause allegation
The assured maintained that the damage was proximately caused by an act or acts of negligence by vessel's engineers in failing to ensure that the main engine lube oil was properly purified. Therefore, this would be a “prima facie” claim under the above stated perils clause.

Coverage issues
Whilst it might appear difficult to disregard the assured's allegation, it seems clear that the lack of proper supervision/ supply of spares etc. by shore-based personnel significantly influenced the damage.

With reference to the perils clause quoted above, it should be noted that the cover of loss or damage caused by negligence of the master, officers, crew and pilots is subject to a proviso that the loss or damage has not resulted from want of due diligence by the assured, owners or managers.

Therefore, the crucial questions to consider in this type of case are:
(a) Whether the lack of proper supervision/actions by shore personnel amounts to “want of due diligence”, and if so,
(b) Whether the loss/damage was a result of the want of due diligence, and
(c) Whether those who could be blamed for want of due diligence could be identified with “the assured, owners or managers”.

If the answers to all questions are affirmative, there is no claim. The ITCH Port Risks are subject to English law and practice. However, the numbers of English cases that have considered the wording of the due diligence proviso have been rather limited.

We propose however the following comments to the questions above:
(a) There appears to be little doubt that the lack of proper supervision/actions by shore personnel amounts to “want of due diligence”.

There is no doubt that the want of due diligence by shore personnel has been an important factor in the development of the damage. On the other hand, one can easily argue that the vessel's engineers have committed several acts of negligence have also contributed to the damage.
Ship Type: Panamax bulk carrier (built 1981)

Course of Events
We have recently experienced two severe consequential damages to main engine crankshafts after failure to big end connecting rod bearings. The sequences of events have, in both cases, been the same. Alarms were given for the oil mist detector fitted in the crankcase indicating over heating of internal parts. The engine was slowed down and continued running on reduced load for a period between 20 to 45 minutes before it was finally stopped. The crankcase was then opened for inspection of crankshaft and bearings.

Clear evidence was found of a damaged big end connecting rod bearing that had rotated inside the connecting rod. In order to reach a safe port the piston with connecting rod was dismantled and cylinder blanked off. Preparation was made to grind the crankpin in-situ to remove the scores and to fit an undersize connecting rod bearing.

Extent of Damage
The crankpin in both cases was found with considerable scores and small cracks, but these could have been removed by in-situ grinding of the crankpin. Serious damage was discovered when testing the Brinell hardness of the crankpin. The long period with running the engine with a damaged big end connecting rod bearing had transferred such amount of heat to the crankpin that the steel had hardened to an unacceptable level. To fully restore the crankpin, the diameter had to be reduced by more than 8 mm. Consequently, the engine would have to be de-rated.

This was not acceptable for the shipowner. The result in both cases was a complete dismantling of the engine and fitting of new crankshaft.

The approximate costs for each of the repairs were about USD 1,800,000, and total off-hire days excluding slow steaming or towing to repair yard, about 2 months depending on delivery time for new crankshaft.

In comparison, had the main engine been stopped after the alarms indicated the overheating, the damages could have been limited. The total costs for a normal in-situ grinding of the crankpin including new undersize connecting rod bearing and other spares would have been in the range of USD $50,000.

Cause of Damage
It has not been possible to establish the cause for the breakdown of the big end connecting rod bearings, but it is most likely to be related to the cleanliness and/or supply of lubricating oil. Small scores could be seen on other main journals and crankpins.

Lessons to be Learned
– When overheating is detected and/or the oil mist detector alarm is sounding, stop the engine immediately if possible.
– The engine should not be restarted before the reason for the overheating is identified and corrected.

Keep the lubricating oil as clean as possible using continuously the lubricating oils purifier at the maximum recommended temperature (normally above 90 deg. C.). Maintain the lubricating oil filters in clean and proper condition by frequent daily routines or as necessary.
Loss Prevention Circular No. 01-00
Main Engine Damage Due to Ignition Delay

Ship Type: Panamax bulk carrier (built 1980)

Course of Events
In a Gulf of Mexico port, the vessel received heavy fuel oil IFO 180 according to ISO category RME 25 with a density of 989.6 kg/m$^3$ and a viscosity of 172 Cst. The bunker receipt information and the following DNVPS analysis coincide with respect to these parameters.

Based on the density and viscosity information, the ignition qualities of this fuel (CCA1) were calculated to 860 which is acceptable for slow speed engines. The vessel is equipped with a 16-cylinder medium speed main engine of European design, and this fuel is on the limit of where operational problems could be expected for medium speed engines. As a result, the chief engineer on board and the ship management office were informed by DNVPS that precautions should be taken to ensure satisfactory combustion.

The chief engineer on board and the ship manager ashore did not pay any attention to the fuel analysis. They did not considered the specific recommendations issued by the engine maker or DNVPS's precautions for operating the main engine with fuel with inferior ignition characteristics. To compound the problem, the vessel was sent to areas for trading including days with river passage with variable loads on the main engine. This made it difficult to maintain maximum combustion temperature and thus made it virtually impossible to follow the operational recommendations.

The delayed combustion resulted in increased combustion pressure, combustion close to the cylinder walls and the consequential failure of the lubrication of the pistons and liners.

Extent of the Damage
The result was a complete breakdown of all pistons, cylinder liners and cylinder heads with related parts. Due to lack of availability of spare parts onboard ship, only preliminary repairs were made. Thus, the voyage to the discharge port was made at reduced speed. Meanwhile, the company had to make arrangements at the discharge port to acquire spare parts and make preparation for final repairs. The vessel was taken off-hire upon arrival at the discharge port.

As a result the total cost to repair is approximately $530,000 USD and the total time off-hire is approximately 45 days.

Probable Cause
The ship manager and/or commercial operator of the vessel made the error in believing that a lower viscosity fuel (180 Cst) was of better quality than a high viscosity fuel (380 Cst). This is commonly seen when a fuel supplier lowers the viscosity by adding lighter components that may seriously alter the ignition characteristics.

The ship manager had arranged for sampling and analysis of fuel. However, the ship manager had not ensured that their chief engineers were provided with proper procedures and instructions to take the necessary precautions against damages that could be incurred by inferior quality fuel.

The result was that the vessel left the bunkering port with no preventive actions and precautions on how to deal with a situation with a fuel on board with inferior combustion characteristics.

Lessons to be Learned
The importance of fuel sampling and analysis is essential for verification of the quality of the fuel received on board. There is however little value in companies spending money on sampling and testing if shipboard engineers are not properly trained to understand the fuel quality analysis and provided with procedures and instructions on how to adjust the fuel equipment and engines accordingly.

Procedures and instructions should be established in the technical or operational departments on how to:

- establish requirements for fuel quality depending on the fuel treatment equipment and engines on board
- follow-up the vessels’ bunkering schedules, ensure correct sampling and where to send samples for analysis
- ensure the engineers on board and technical staff ashore will understand the analysis and the limitations for their equipment, and
- in the event of having taken on fuel of inadequate quality, establish communication with the engine makers and fuel analysing company in order to provide proper instructions to the vessel.
Loss Prevention Circular No. 7-09

Master’s brief before entering high risk piracy areas

Piracy is currently one of the major concerns to shipping. In order to prepare the ship properly, it is important that the entire crew has a full understanding of the situation and the tasks to be carried out. A Master’s brief to the crew prior to entering the area is therefore recommended. The below list contains items which should be considered when preparing a Master’s brief.

Area of operation
• Chart of the high risk area.
• Designated route and time spent within the high risk area.
• Weather forecast.

Situation and risk assessment
• Current piracy situation in the area.
  o The pirates’ known mode of operation and their expected use of force.
  o The number of pirates which can be expected.
  o The pirate’s historical success rate.
• Maritime security situation.
  o Other civilian vessels in the area.
  o Dedicated military or civilian armed escort and/or assistance available.
  o Authorities and organisations which will be informed.
  o Naval rescue resources in the area.
• Shipowner’s policy – brief overview.
• The Master’s overall risk assessment.1
  o Crew safety.
  o Freeboard.
  o Speed.
  o Prevailing Weather.
  o Time of transit.
  o Recent piracy activity.
  o Identification of soft spots and strengthening measures.
• Physical measures available onboard to discover and delay pirates – e.g. barbed wire, water hoses, cameras, radar watch operating on different scales (e.g. 3nm and 12nm), dedicated lookouts, additional guards (armed/unarmed – Shipowner’s policy), internal communications, night vision goggles.

Mission
• Execute preparations and implement strengthening measures in vulnerable areas in order to prepare the ship for transit through a high risk piracy area.
• Conduct training and exercise planned hijacking procedures.

Execution of the Ship Security Plan
• General
  o Prepare close-down of ship.
  o Only personnel on duty have access to the bridge or outside area.
  o Watch routines and escalation triggers.
• Plan procedures for the following scenarios:
  o Notification of a suspicious vessel.
    – Description of vessel/boat.
    – Distance and direction of travel.
    – Number of people onboard.
    – Additional information (weapons observed).
  o Threatening/attacking vessels approaching.
    – Immediately notify the bridge.
    – Activate piracy alarm with additional instructions.
  – Activate SSAS and AIS (if turned off).
  – Make emergency call to UKMTO, or other regional reporting services.
  – Signal the attackers that they have been detected.
  – Implement final physical barriers, if not already in place.
  – Evacuate crew to dedicated area.
  – Activation of remote controlled security measures, such as fire hoses.
  – Evasive steering and maximum speed.
  o Hostile boarding in progress.
    – If necessary and possible, control ship from engine room.
    – Master and management shut down bridge and evacuate to safe room.
    – Report on VHF channel 16 (8).

Communications
• All personnel on duty to carry a radio.
• VHF channel 16 (8) on the bridge and in safe room.
• Identify the relevant contact information that should be available on the bridge. This could include: MTO Dubai Hotline, own company, MSC-HOA, CJTF-HOF, Rescue sources, other ships and naval ships nearby.2
• Test of all communication equipment.

Other
• Prepare safe room with supplies, food, water, medical, communications equipment and VHF.
• As far as possible, protect all outside equipment sensitive to fire and small arms.
• Remove all outside equipment that can be used to gain entry or cause damage to the ship.

This Circular has been prepared with the assistance of Bestia Risk Consulting, Oslo.

1 details, see: OCIMF, Practical Measures to Avoid, Deter, or Delay Piracy Attacks
2 Contact details for GoA, Horn of Africa, see: OCIMF, Practical Measures to Avoid, Deter, or Delay Piracy Attacks
US Customs regulations – Importer Security Filings and Additional Carrier Requirements (10+2 Rule)

The United States Bureau of Customs and Border Protection (CBP) has recently begun enforcement of regulations that require the electronic transmission of additional data elements to be provided as advance information with respect to cargo destined for importation into the United States. This information must be provided prior to loading of such cargo on vessels at foreign seaports. These regulations were promulgated under The United States Security and Accountability for Every (SAFE) Port Act of 20061 and the Maritime Transportation Security Act 2002,2 by publication of a final rule on 25 November 2008, Importer Security Filing and Additional Carrier Requirements, commonly known as the “10+2 Rule” in the Federal Register (73 FR 71730). The final rule came into force on 26 January 2009 and included an additional carrier requirements, commonly known as the “ISF 10+2 Rule” in the Federal Register (73 FR 71730). The final rule came into force on 26 January 2009 and included a delayed compliance date of 12 months. As of 26 January 2010, CBP is enforcing the 10+2 Rule.

**Importer Requirements (The “10” of the 10 + 2 Rule)**

The 10+2 Rule requires importers, including owners, purchasers, consignees, or agents such as licensed customs brokers, to submit full Importer Security Filings (ISF) to the CBP for cargo, other than foreign cargo remaining onboard a vessel and certain goods transported in bond, no later than 24 hours before the cargo is loaded onboard a vessel destined for the United States. ISFs must be made electronically via the Automated Broker Interface or the Automated Manifest System (AMS). Importers need only submit five elements for foreign cargo that remains onboard and goods intended to be transported in bond as an immediate exportation or transportation and exportation shipment.3

**The Carrier requirements**

In addition to submitting the cargo manifest information electronically to the CBP by way of its AMSs,4 the carrier is now required to also electronically submit two additional data elements; a Vessel Stow Plan and Container Status Messages to the CBP for all containerised ocean vessel shipments inbound to the United States.

A Vessel Stow Plan must include information on the physical location of the cargo, in particular, dangerous goods and other high-risk containerised cargo, loaded onboard the vessel destined for the United States. The CBP must receive the stow plan no later than 48 hours after the carrier departs from its last foreign port. If the voyage is less than 48 hours, the CBP must receive the stow plan prior to the vessel’s arrival at its first U.S. port. The vessel stow plan must include standard information regarding the vessel and each container onboard the vessel. According to the CBP, the vessel operating carrier, not the NVOCC, is responsible for filing the vessel stow plan. For bulk and break-bulk carriers shipping part container cargo, the CBP requires the carrier to submit a vessel stow plan for all containerised cargo aboard the vessel.

Container Status Messages (CSM) report container movements and changes in status, e.g. whether full or empty. If a carrier currently creates or collects CSMs in an equipment tracking system, that carrier must submit CSMs to the CBP regarding certain events relating to all containers destined to arrive in a U.S. port by vessel. Carriers must submit CSMs electronically via the secure file transfer protocol no later than 24 hours after the message is entered into the carrier’s equipment tracking system. As with the Vessel Stow Plan, the CBP requires the vessel carrier, not the NVOCC, to submit CSMs.

**Enforcement**

According to the CBP, enforcement in 2010 will be gradual and progressive depending on the circumstances.6 In the first quarter, CBP intends to concentrate its enforcement measures on importers who have not made an ISF despite having imported products, or who have made inaccurate or untimely ISFs. Although the CBP does not intend to assess liquidated damages or issue “Do Not Load” orders (DNLS) during the first quarter, instances of non-compliance will be reviewed on a case-by-case basis potentially subjecting non-compliant operators to penalties.7

In the second quarter, the CBP intends to use holds on cargo and other security approaches as a means to compel compliance. However, the CBP has advised that it does not plan to assess liquidated damages or issue DNLS during this period. In the third and fourth quarters, the CBP intends to begin assessing liquidated damages on ISF with data or filing problems, including timeliness. By the fourth quarter, CBP will be in full enforcement mode.

**Recommendations**

Even though enforcement will reportedly be gradual, carriers and importers should ensure that they are complying with 10+2 requirements. Importers and carriers should take this opportunity to review their procedures for compliance to avoid delays at the border or the imposition of fines.

**Footnotes**

1 Security and Accountability for Every (SAFE) Port Act of 2006 (sec 203).
2 Trade Act of 2002 as amended by the Maritime Transportation Security Act 2002 (section 343a).
3 See also Federal Register, Vol. 73, No. 228. 25 November 2008, pg 71731-71733. For certain limited purposes, the ocean carrier may be deemed an importer, for example, with respect to foreign cargo remaining on board (FROB), and is responsible for submitting the five data elements to CBP before the cargo is loaded on the vessel, although it is not a requirement that such notice is submitted 24 hours before loading.
4 Exempt from the carrier’s additional “2” reporting requirements are: (1) Bulk and break bulk carriers that are exclusively carrying bulk and break-bulk cargo and (2) carriers of goods (including containerised cargo) arriving via vessel into Canada or Mexico and afterwards trucked or railed into the U.S.
7 The CBP will impose fines of at least USD 5,000 for each
US Coast Guard – Formal policy on voluntary disclosure of MARPOL violations

The United States Coast Guard has issued a formal policy on voluntary disclosure that applies to MARPOL violations that may result in criminal prosecution of owners and operators of foreign flag vessels in the United States. The policy is similar to existing policies of other U.S. government agencies and the US Justice Department in describing the factors that will be considered in evaluating a violation for possible criminal investigation or prosecution.

These policies require companies to have in place a compliance management system to prevent, detect and correct violations of environmental regulations. If implemented, the Shipping Industry Guidance on Environmental Compliance published by International Chamber of Shipping (ICS) and International Shipping Federation (ISF) would appear to meet all the requirements for a compliance management system as set out in the USCG policy. The shipping industry guidance can be downloaded at: www.marisec.org/environmental-compliance

The USCG voluntary disclosure policy states that if a company promptly and voluntarily discloses a violation discovered within the company's environmental compliance plan including ship audits to the Coast Guard, and the disclosure otherwise meets the requirement of the Coast Guard policy, the Coast Guard will not recommend prosecution of the company. However, it is important to note that such decisions will be case-specific, and ultimate discretion on whether or not to undertake a criminal investigation still rests with the US Coast Guard. The Coast Guard investigates violations and can refer matters to the Justice Department for further investigation, typically through the use of a Grand Jury. The Coast Guard policy now makes it clear that the Coast Guard may recommend leniency in certain cases before the matter goes to the Justice Department.

Other important requirements stated in the policy are:

- The violation must be discovered and identified before the Coast Guard or any other government agency likely would have identified the problem either through its own investigative work or from the information received through a third party;
- The violation must be reported in writing within 21 days of discovery;
- The violation (or a related violation) has not occurred previously within the past three years involving the same vessel and has not occurred within the past five years as part of a pattern involving multiple vessels owned or operated by the same entity.

Under US law, foreign flag shipowners and operators can be and often are prosecuted for entry into US waters with a false oil record book that conceals discharges of oily wastes which have taken place outside of US waters. Discharges in violation of MARPOL in international waters are violations that are subject to the law of the flag state but the United States does not have jurisdiction to prosecute foreign flag operators for the discharge itself because the vessels were outside of US waters at the time of the discharge. According to the Industry Guidance on Environmental Compliance, "non-compliance with MARPOL regulations should be reported to the vessel's flag administration. In the event of the discovery of evidence of intentional discharges of waste, the flag administration must be notified immediately and a request for an investigation should be initiated."

If the vessel trades to the United States, the vessel owner or operator may also consider reporting the discovery and the correction of any false entries in the oil record book to the Coast Guard in addition to the flag state, in order to comply with the voluntary disclosure policy. In deciding whether to report to the Coast Guard, prudence suggests foreign flag owners and operators should seek immediate legal advice from a lawyer familiar with the Coast Guard and Justice Department policy guidelines and MARPOL criminal prosecutions in general.

The official document can be found at: www.uscg.mil/foia/docs/CH-4%20Appendix%20V.pdf
Oily water separation and discharge: Discharge of oil prohibited

Introduction
As part of our overall loss prevention activities, Gard Services regularly monitors port State detentions from the Paris Memorandum of Understanding (MoU), Tokyo MoU and United States Coast Guard (USCG). In 2000, there was a total of 131 detentions of ships entered in the Gard P&I portfolio. Oily water separation and discharge related items were the single most frequent deficiency cited. Similar results were also observed in the detention of vessels entered in the Gard Marine portfolio for 2000 (147 detentions and the second most cited deficiency). We are not satisfied with these figures. As a result, we believe it is necessary to revisit this issue for Gard Services Members and Clients.

This circular includes updated adaptation of the article “Discharge of oil prohibited”, which appeared in Gard News issue No. 152 (December 1998/February 1999) warned against the implications of pumping oil and oily bilge water overboard. This is the second in a series of circulars produced on this matter. Gard Services Loss Prevention Circular 06-01 entitled, “Oily water separation and discharge: Risk of oil pollution versus vessel’s safety” also addresses safety and environmental matters related to this subject. We hope that this circular will assist our Members and Clients in staying vigilant in light of the potential costs of non-compliance with regulations relating to oily water separation and discharge.

Bilge water problems
On vessels in operation before the implementation of MARPOL 73/78, it was customary to pump the oily engine room bilge water straight overboard, even if an oily water separator was installed. Pipe systems were arranged so various pumps could be used as stand-by for each other, interconnected by valves and blind flanged connections. When the engine room pipe systems of existing ships were inspected for compliance with MARPOL 73/78 and issuance of the vessel’s first International Oil Pollution Prevention Certificate, such ‘useful’ connections had to be removed or blinded off. To maintain the possibility of an emergency discharge connection, careful Chief Engineers fitted chains and padlocks to valve handles. With time, illegal shipside valve connections disappeared or were blanked off permanently.

A useful pre-entry condition survey
During an inspection of a 16 year old cargo vessel of 4,000 GT which had been purchased by one of our Members, we discovered that the water discharge line from the vessel’s oily water separator was joined at the ship side valve by an unmarked pipe which came from the lower part of the engine room. Following the two inch pipeline from the overboard valve, it connected one floor lower down to a four inch lube oil pipe, ending up in a blind flange on the delivery side of the main engine stand-by lube oil pump. The four-inch pipe had probably once been part of a pipeline to deck, for the purpose of discharging the main engine lube oil sump tank to a shore recipient.

From the blind connection at the stand-by oil pump, there was a further branch line to the vessel’s bilge pump and bilge water tank.

The oily water separator. “Fine 5000” placard is in place.

This vessel could thus pump oily bilge water overboard by bypassing the oily water separator. By removing a blind flange at the main engine lube oil stand-by pump, the vessel could also, if needed, pump the entire main engine lube oil sump tank overboard! The welding work of the unauthorised pipe connection was crudely carried out so it easily caught a surveyors’ attention. It was definitely not a new installation, and oil deposits smeared the shipside valve. Strange to think that a number of IOPP surveys have been carried out over the years without detecting such an obvious default.

Our Member, who had just purchased the vessel, was thankful for our detecting the by-pass of the separator and the Association was pleased to see it removed immediately. This vessel had been sailing in the West Indies and occasionally visiting US ports. Our Member was to use the vessel in the same area.

A warning outdated
On most vessels inspected, the Association finds that warnings of fines up to USD 5,000 are posted in engine rooms, in crew quarters and on the bridge. Under the US Federal Clean Water Act an owner, operator or person in charge of an onshore or offshore facility could be fined up to USD 5,000 for oil discharged from such facility affecting US waters. Prudent owners or Masters have obviously used the threat of a USD 5,000 fine as a tool to prevent the crew from discharging oil overboard, and the “Fine 5000” warnings have spread to ships never visiting US waters.

After the entry into force of the United States Oil Pollution Act of 1990, the “Fine 5000” stickers became obsolete, and may mislead the crew in respect of the implications...
of discharging oil overboard in US waters and elsewhere. Today shipowners not only may carry unlimited responsibility for the clean-up operation and the damage caused by an oil spill in US waters, but are also faced with strict criminal penalties for violations of US law. By spilling oil affecting US water, the offender risks criminal prosecution for spilling the pollutant and for failing to notify the government of the spill. Both individual violators and organisations may be penalised; individuals may even be imprisoned. For negligent violations, the maximum fine is USD 50,000 per day and one year imprisonment. For “knowing violations”\(^3\) the imprisonment may be up to three years.

Under the Alternative Fines Act the maximum fine for an individual is USD 100,000 (negligent) and USD 250,000 (knowingly). For an organisation the fines are doubled. If an individual or an organisation derives pecuniary loss to a third party, the fine will be up to twice the gross gain or loss, which, depending on the circumstances could run to millions.

The text of the new warning

US regulations require every ship above 26 feet in length to have a placard of at least 5 x 8 inches made of durable material fixed in a conspicuous place in each machinery space, or at the bilge and ballast pump station, with the following message, in a language understood by the crew:

"Discharge of Oil Prohibited

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States, or the waters of the contiguous zone, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States, if such discharge causes a film or discoloration of the surface of the water or causes a sludge or emulsion beneath the surface of the water. Violators are subject to substantial civil penalties and/or criminal sanctions including fines and imprisonment."

Old warning-placards may be left in place, but new ones should be added and all crewmembers should be informed that the time of a maximum USD 5,000 fine is now history. There should be no excuse for not using the new placard, as it may be obtained easily through ship handlers.

Some good advice

1. A copy of MARPOL 73/78 should be kept on board. The crewmembers should be made fully aware of the regulations.
2. Ensure the vessel has a valid IOPP certificate at all times.
3. The Oil Record Book must be correctly filled in. Port State inspectors will inspect the book and may check the vessel’s sludge tanks. If the vessel has no sludge on board and has no record of delivery, the Master and Chief Engineer are likely to be fined.
4. The oily water separator installed on board must be of an approved type and function well.
5. The oil content meter, the monitoring device and the alarm/automatic-stopping device must function correctly.
6. When purchasing a second hand vessel, visually check all lines from sluage and oily bilge water tanks to verify that no oily bilge water line or sludge line may discharge directly overboard. If one such connection is found, remove it immediately. If in doubt, consult the vessel’s Classification Society.
7. The placard with warning against the discharge of oil overboard must reflect the true penalty situation faced by the crew and operator.
8. Reduce the oil leakages to the bilges by collecting oil in drip trays and gutters leading to a waste oil tank. Be sure the drain pipes from the gutters are not clogged by deposits and rags.
9. Oil sludge from engine rooms is not to be pumped overboard. If not disposed of in an incinerator, the oil must be contained on board until discharged to shore-based reception facilities.

P&I Cover

Members should be aware that Rule 47 of the Associations Rules does not include cover for the Member’s liability for fines resulting from non-compliance with the provisions contained in MARPOL 73/78.

Footnotes

1. It seems to be less known that the same Act allowed fines up to USD 250,000 for discharges being a result of negligence or wilful misconduct.
2. The fine is composed of a mandatory civil penalty for up to USD 25,000 per day of violation or USD 1,000 per barrel discharged, and a further USD 25,000 a day or three times the costs incurred by the Oil Spill Liability Trust Fund, for failing to clean up. Two years imprisonment for a negligent violation may occur if it is the second or subsequent offence.
3. “Knowing” requires only general intent, not specific intent to violate the law.
Loss Prevention Circular No. 06-01

Oily water separation and discharge: Risk of oil pollution versus vessel’s safety

Introduction
As part of our overall loss prevention activities, Gard Services regularly monitors port State detentions from the Paris Memorandum of Understanding (MoU), Tokyo MoU and United States Coast Guard (USCG). In 2000, there was a total of 131 detentions of ships entered in the Gard P&I portfolio. Oily water separation and discharge related items were the single most frequent deficiency cited. Similar results were also observed in the detention of vessels entered in the Gard Marine portfolio for 2000 (147 detentions and the second most cited deficiency). We are not satisfied with these figures. As a result, we believe it is necessary to revisit this issue for Gard Services Members and Clients.

The article “Discharge of oil prohibited”, which appeared in Gard News issue No. 152 (December 1998/February 1999) (also reproduced as Gard Loss Prevention Circular 07-01) warned against the implications of pumping oil and oily bilge water overboard, and was followed by another article on the same topic in Gard News issue No. 155 (September 1999/November 1999), titled “Risk of oil pollution versus vessels safety”. The present circular contains a summary of that second article, which we hope will assist Members and Clients in staying vigilant in light of the potential costs associated with an incident, fines, port State detentions and the safety implications related to oily water separation and discharge.

Environmental and safety matters
During condition surveys of vessels, the Association normally notes that Masters and Chief Engineers enforce a strict policy regarding pumping of bilge water, in order to avoid any oil spill. Port State control officers inspect engine room pipelines and oily water separating equipment to ensure compliance with the MARPOL regulations. Fines and detentions are not popular. To guard against accidentally pumping overboard engine room bilge water which has not been cleaned, shipside valves are sometimes chained and padlocked or lines are even blind flanged, all in an effort to reduce the risk of an oil spill. At times, such remedies are requested by port State control officers, and are willingly installed by the ship’s crew.

Oily water separator
All efforts to avoid polluting the seas and coastal areas are appreciated, of course, but it should be noted that there is also an overriding issue involved: the safety of the vessel in an emergency situation. In case of water ingress and flooding of the engine room or the cargo holds, the vessel needs a fully working and readily operational bilge pumping system. Therefore, the overboard connections from the bilge pump should not be blocked by locked hand wheels, blank flanges or by removed spool pipes. It should be noted that SOLAS, Chapter II-1, Regulation 21, as well as relevant Class rules, require a vessel to be equipped with a bilge pumping system that should be operational under all practical conditions. In case of a sudden flooding of the engine room, the bilge pumping system must be able to be started without undue delay.

So is there a problem in complying with both MARPOL and SOLAS? Not really, if one keeps in mind that the MARPOL 73/78 regulations are meant for non-emergency operational situations. In Annex I of MARPOL 73/78, Regulation 9 deals with the control of oil discharge and Regulation 10 covers methods for prevention of oil pollution from ships within a special area, but Regulation 11 provides exceptions from both, in the case of an emergency. The exceptions under Regulation 11 are the following: “Regulation 9 and 10 shall not apply to:

Oily water separator
(a) the discharge into the sea of oil or oily mixture necessary for the purpose of securing the safety of a ship or saving life at sea; or
(b) the discharge into the sea of oil or oily mixture resulting from damage to a ship or its equipment:

(i) provided that all reasonable precautions have been taken after the occurrence of the damage or discovery of the discharge for the purpose of preventing or minimising the discharge; and
(ii) except if the owner or the master acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result, or
(c) the discharge into the sea of substances containing oil, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimise the damage from pollution. Any such discharge shall be subject to the approval of any
Government in whose jurisdiction it is contemplated the discharge will occur.”

Overboard line for cleaned bilge water from the oily water separator. The hand wheel has been chain locked by the vessel’s Chief Engineer at the request of port State control authorities. A seal has also been fitted to the chain.

In view of Regulation 11, MARPOL and SOLAS are not in conflict with each other and it is important that all authorities inspecting a vessel for compliance with MARPOL understand this. Blocking the overboard pipe from the main bilge pumps should never be done, as this would seriously affect the safety of the vessel and would be in conflict with SOLAS and Class requirements. In the interest of the coastal States, at times port State control officers seem to pay more attention to the MARPOL regulations than to the corresponding SOLAS regulations. A conflict of interest may occur when the bilge pump of a vessel is also used for ballast water and in some cases even for emptying a sump tank. Oil remains in the pipeline may not be large in quantity, but will put harbour authorities on full alert if inadvertently pumped overboard with ballast water. In some such cases port State authorities have required blanks inserted in the pipeline or the locking of valve handles. This may secure against oil pollution, but as pointed out, may reduce the safety of the ship in an emergency situation.

On the other hand, there should be no excuse for pumping oil overboard through pumps serving a dual purpose. It should always be ensured that all pipelines, whether used for clean bilge or ballast water, are free from oil contamination prior to using the bilge/ballast pumps for direct overboard discharge. Such verification should be included in the operational procedures.

It should also always be clear to a vessel’s crew that sludge tanks, waste oil tanks and oil drain tanks are not allowed to have any direct connection overboard (MARPOL 73/78 Annex I, Regulation 17(3)) and that the content of such tanks must be discharged to reception facilities shore through the standard discharge connection required (MARPOL 73/78 Annex I, Regulation 19), if not disposed of in an incinerator on board. If required by harbour authorities, pipelines from such tanks may be closed off to prevent oil pollution, but not the overboard pipeline from the main bilge pump.

In case Members face conflicting requirements from various authorities concerning the issues addressed above, they should always consult the vessel’s Class Society, which has approved the vessel’s bilge pumping system and normally has also issued the International Oil Pollution Prevention Certificate. In any case, all changes to a vessel’s bilge system should always be informed in advance to the vessel’s Class Society, for proper approval.
Look after your back during manual work

Background
Every year, seafarers are injured through incorrectly lifting, carrying and pulling loads. Back injuries are one of the most common types of injuries suffered by ships’ crew and can have serious implications for both the seafarer and the shipowner. An injured seafarer may find that his ability to do his job is affected and that his lifestyle in general may have to change. Shipowners on the other hand may have to bear substantial costs when an injured seafarer is unable to perform his duties on board. Since most back injuries are preventable, primarily by the use of proper lifting techniques, the purpose of this circular is to remind shipowners and crew of the importance of adhering to the proper instructions for lifting and manual handling of loads - regardless of the type of work and the time schedule involved in each particular task.

Gard’s experience
Crew claims in Gard are those claims originating from illness, injury or death amongst ships’ crew. A review of all such crew claims registered with Gard over the last 10 years shows that crew injuries make up quite a substantial part of all Gard’s P&I claims costs. Over this period, close to 10% of Gard’s total P&I claims costs were generated by crew injuries alone. Furthermore, back injury is by far the most expensive injury type, representing some 25% of all of Gard’s crew injury claims costs. A review of the injury cases registered as occurring in a specific location on board indicates that almost half of all back injuries occur during work on deck or in the engine room. It is not possible to conclude that the age of the crew members involved in back injury cases is a contributing factor.

In one of the cases handled by Gard, a seafarer complained of pain in his lower back, radiating to his lower extremities, after a work operation involving lifting of the gangway. As his symptoms persisted, a doctor on shore was consulted and the seafarer was medicated and repatriated to his home country for further evaluation and treatment. The seafarer’s disability grade was assessed to be high and, as the injury appeared to have incurred during his work on board, he was given a 100% disability compensation. The table below presents costs that potentially can be involved in any back injury case. There can also be additional costs not listed, e.g. related to possible voyage deviations and/or legal fees in case of disputes.

Worth noticing is that the cost of each element may vary dramatically between different geographical locations, e.g. medical expenses in the U.S. can easily amount to USD 200,000 in a single case and even higher if hospital intensive care is required as daily hospital rates in the U.S. can be of the order of USD 25,000. Early notification by Members is particularly important in cases involving medical costs in the U.S. as this will allow Gard to evaluate the case and make arrangements for proper medical case management services and vetting of medical bills.

Back injuries - contributing factors
Some of the most common contributing factors to acute back injury relate to bad body mechanics, in other words, how we lift, push, pull, or carry objects; poor physical condition; poor design of job or work station; heavy lifting and/or poor underfoot surfaces such as slippery floors. It can be particularly challenging to carry out manual work tasks in a safe manner on board ships. Ships can be quite hazardous working environments and harsh weather conditions and movements of the ship are factors that must be taken into account. Decks can also be extremely slippery when continuously washed by the sea. Another challenge related to ship operations is time. With time being a critical factor, crew may sometimes feel pressured to take short-cuts and use unsafe working practices to achieve the planned sailing schedule.

The operation of a ship naturally involves a lot of physical activity and lifting of heavy loads by crew members and the consequences may be a gradual development of a back disorder over time. Signs of a potentially serious injury are often ignored because the pain is perceived as “normal” and bearable. Therefore, while an acute back injury may appear to have been caused by a single well-defined incident, weakening of the musculoskeletal support mechanism through years of incorrect working activities is instead the real cause of the injury.

Employer and worker duties
Health and safety on board ships is regulated by the laws of each flag state and an important document in this respect is the ILO’s Maritime Labour Convention (MLC) which will enter into force in August 2013. Regulation 4.3 of the MLC deals with health and safety protection and accident prevention but does not specify details. Instead the MLC stipulates what should be addressed by the flag states’ regulations. Various international and national standards define the acceptable levels of exposure to workplace hazards as well as how to develop and put into practice a ship’s occupational health policy.

It is important to emphasize that shipowners have a duty to put such regulations into practice but that each crew member has an obligation to comply with the specific standards and policies applicable on board their ship. Crew members must take reasonable care of their own health and safety and that of others on board that may be affected by their activities and must immediately report incidents and near-misses to the appropriate officer.
Recommendations - prevention of back injuries
Fortunately, most flag states and shipowners take pride in providing their seafarers with good working conditions. However, with the entry into force of the MLC in 2013, Gard’s Members and clients have a clear regulatory responsibility to ensure that the crew’s work environment on board ships promotes occupational health and safety. Most occupational accidents and back injuries occur whilst performing daily routine duties and preventive measures should therefore focus on workplace instructions for all important functions on board and not only for high risk tasks such as mooring or repair work in engine rooms. It is recommended to:

Regularly assess the risks associated with each work task and improve procedures and equipment if necessary. Lifting and work equipment provided must be suitable for its intended use.

Plan jobs to eliminate or minimise the need for work to be performed in awkward positions.

Customise training for each work group. Include basic instructions in anatomy and focus on the risk factors associated with poor body positioning.

Draw attention to the correct methods of bending, lifting and carrying at every opportunity such as during safety meetings and “toolbox talks”. Awareness posters and instructions along with graphic illustrations of manual handling techniques should be posted at important locations on board. 2

Stress the importance of teamwork. Work with a partner to share a load and obtain mechanical assistance for heavy and/or oversized loads when necessary.

Encourage early reporting of symptoms such as neck or back pains. If individuals with reduced robustness can be detected, acute back injuries can be prevented before they can happen. Early reporting can often make the difference between a relatively short treatment and recovery period and long term permanent disability.

Promote exercise! A well-toned body can take unexpected stresses or strains better than one suffering from lack of exercise.

Gard’s statistical data indicate that back injuries alone account for a significant amount of human suffering, loss of productivity, and economic burden on compensation systems in the maritime industry and clearly demonstrate that personnel health and safety is of utmost importance on board a ship. By providing a safe and secure working environment on board, including opportunities for training, shipowners can facilitate the possibility for each individual working on board to take care of their own and fellow crew’s personnel safety.

Footnotes
1 Examples of standards are the ILO code of practice “Accident prevention on board ships at sea and in port” and the UK MCA’s “Code of Safe working Practices for Merchant Seamen (COSWP)”.
2 See sample illustrations included in an Annex to UK MCA’s COSWP Ch.19 “Manual Handling”.

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Malaria and dengue - precautions to be taken

Background
Many of the world’s mosquito species can transmit a number of diseases of which malaria and dengue are the most common today and the ones most likely to affect seafarers. From time to time, Gard is notified of cases where seafarers fall ill from such diseases, sometimes with serious consequences as many of the mosquito-transmitted diseases can be fatal. Falling ill far away from home can be a very difficult situation for the seafarer and his/her family and a challenge for the remaining crew and the ship operator. A crew member unable to perform his/her duties due to illness may need to be sent ashore; the vessel may have to deviate from its original voyage plan in order to disembark the patient and it will be necessary to find replacement crew at short notice.

The purpose of this circular is to increase awareness amongst seafarers and to describe the risks and precautions to be taken when calling at ports in malaria and dengue-affected areas. It is also important that shipowners and operators are always aware of the situation in the ports called at by their vessels, that they assess the changing risks and facilitate implementation of the necessary preventive measures on board.

Key facts about malaria and dengue
Malaria is not a new concern for seafarers but according to the “World Malaria Report 2011”, the estimated incidence of malaria globally has, fortunately, declined by 17% since 2000 and malaria mortality rates have dropped by 26%. In contrast, the global incidence of dengue has grown dramatically in recent decades and according to the World Health Organization (WHO), about half of the world’s population is now at risk.

Useful sources of information
The risk of being infected with malaria or dengue may vary within a single country and with the seasons. It is therefore important to check the current official advice every time a vessel is destined for areas where there is a potential risk of mosquito-transmitted diseases. Links to some of the recommended sources of official advice are found below.

The World Health Organisation (WHO, www.who.int), is the directing and co-ordinating authority for health within the United Nations system and their website covers both malaria and dengue as part of their health topics (malaria: www.who.int/topics/malaria; dengue: www.who.int/topics/dengue).

The United States Centers for Disease Control and Prevention (CDC, www.cdc.gov), is one of the major operating components of the US Department of Health and Human Services and provides general health information to the public. Dedicated pages on malaria and dengue also include links to interactive “health maps” that can be used as a guide for the assessment of malaria and dengue risk.

Malaria
Source: WHO Fact sheet N°94, April 2012

| Cause | Caused by a parasite. There are four sub-types of parasites and the most dangerous sub-type (Plasmodium Falciparum) is found mainly in tropical Africa. |
| Transmission | Transmitted to humans by the bite of the ‘malaria mosquito’ (Anopheles) which is active mainly between dusk and dawn. |
| Incidence | Most malaria cases and deaths occur in sub-Saharan Africa; however, Asia, Latin America and to a lesser extent the Middle East and parts of Europe are also affected. |
| Symptoms | Like regular influenza: fever, headache, chills and vomiting. If not treated within 24 hours, the most serious form of malaria (Falciparum) can progress to severe illness often leading to death. |
| Incubation period | Symptoms typically appear 7 days or more, usually 10–15 days, after the infective mosquito bite. |
| Prevention | Avoid mosquito bites. In high risk areas, antimalarial drugs should be taken. No vaccine is available. |

Dengue / Severe Dengue
Source: WHO Fact sheet N°117, January 2012

| Cause | Caused by a viral infection. |
| Transmission | Transmitted to humans by the bite of the Aedes mosquito which, in contrast to the malaria mosquito, is active also during the daytime. |
| Incidence | Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. Dengue is endemic in more than 100 countries in Africa, the Americas, the Eastern Mediterranean, South-east Asia and the Western Pacific, the latter two regions being the most seriously affected. |
| Symptoms | Like serious influenza or malaria: high fever, headache, muscle pain and possibly rash. ‘Severe dengue’ is a potentially deadly complication due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment. |
| Incubation period | Symptoms typically appear 4–10 days after the infective mosquito bite. Signs of severe dengue typically appear some 3–7 days after the first symptoms. |
| Prevention | Avoid mosquito bites. No vaccine is available. |
risk throughout the world (malaria: www.cdc.gov/malaria/; dengue: www.cdc.gov/dengue/).

In addition, safety alerts concerning seasonal outbreaks of the diseases may be published on national governments’ “safe travel” websites, e.g., by national Ministries of Foreign Affairs or Health Ministries. Relevant information could also be obtained from medical doctors and local vaccination offices.

**Recommended precautions**

Although the best protection against mosquito-transmitted diseases is to avoid being bitten during a stay in malaria and dengue affected areas, measures implemented prior to and after a stay in such areas can also contribute to reducing the risk of crew members becoming seriously ill. The following guidelines should be considered:

Prior to a stay in malaria and dengue affected areas:
- Evaluate risk in the ports to be visited and remember that the risk of being infected with malaria or dengue varies between different areas within a country. Assess the length of stay in known risk areas, time spent at sea, in port, on rivers, etc., and planned shore leaves by the crew.
- Continuously monitor the WHO website and similar sources for official advice as the types of diseases expected within certain areas may change with the seasons. Contact a medical practitioner if in doubt.
- Inform the crew about the risks and the precautions to be taken as well as actions to be taken if illness occurs at sea. Stress that a slight headache, fever and flu-like symptoms are always reasons for contacting the medical officer.
- Evaluate, in close co-operation with a medical doctor and based on the vessel’s expected exposure time in a risk area, if the crew should take an antimalarial drug.

During a stay in malaria and dengue affected areas:
- Implement measures to avoid mosquito bites:
  - wear protective clothing when outdoors, e.g. long-sleeved shirts, long trousers tucked into socks and a hat if thin-haired, and bear in mind that dengue-carrying mosquitoes are active during daytime;
  - use effective insect repellents on skin and on clothing and reapply at regular intervals as prescribed;
  - stay in air-conditioned screened areas when indoors; and
  - arrange for undamaged, impregnated bed-nets to be used in sleeping areas not properly screened or air-conditioned.
- If crew members are taking antimalarial drugs, implement a method of control to ensure they take the medication at the prescribed times, e.g., via a log book.

After a stay in malaria and dengue affected areas:
- Seek medical advice over the radio if malaria or dengue is suspected on board.

Normally the vessel is in port only for a short time and will most probably be back at sea when symptoms are noticed due to an incubation period of several days.
- Place the patient under close observation and undertake the required on-board treatment, preferably in close co-operation with a medical doctor. Evacuation may be the only solution if the patient’s condition does not improve despite the proper on-board treatment.

In order to create a sense of safety on board their vessels when navigating in regions with a high risk of malaria, dengue or other mosquito-transmitted diseases, Members and clients are advised to, as far as practicable, tailor make their own strategies for dealing with the risk. The above guidelines, as well as advice on preventive measures published by other official sources, like the WHO, should be taken into account.
Loss Prevention Circular No. 14-11
The impact of diet on performance and health

Background
Over the years Gard has seen that the medical status ‘not fit for duty’ and repatriations due to illness have increased in frequency. Working at sea involves long shifts of physically challenging work and frequent high levels of stress. To cope with their work situation and manage their day to day routine, seafarers must maintain both their mental and physical health.

A nutritious diet is considered to be one of many factors influencing an individual’s mental and physical health; regular exercise, adequate rest and sleep, good hygiene, protection from workplace chemicals and noise, and a positive work climate in general are also important. However, many chronic diseases develop as a direct consequence of poor eating habits, particularly where obesity is involved. Although conditioned by background and geography, obesity is generally recognised as an increasing problem among seafarers. In 2010, the International Maritime Medical Association (IMMA) warned that “seafarer health must be made a priority to tackle the rising tide of obesity among seafarers”, while the International Committee on Seafarers’ Welfare (ICSW) feature “Overweight Prevention” as a separate topic in their Health Information Programme. The IMO’s International Life-Saving Appliances (LSA) Code has also updated the requirements for life-saving appliances to reflect an increase in average body mass.

The purpose of this circular is to highlight the importance of a healthy selection of food onboard vessels, primarily as a means of reducing the potential for ill health and chronic diseases developing amongst the crew, but also to keep the crew alert and thereby promote safety onboard.

Potential consequences of poor eating habits
Poor eating habits can lead to lack of sleep, digestive problems, depression and difficulty in staying awake and alert whilst on duty. These can also lead to obesity, diabetes 2 and heart problems in the longer term. If a seafarer becomes ill he may be unable to perform his duties, may have to be absent from the vessel, and there may be delays or diversions, costly medical claims, repatriation fees, possible litigation and settlement costs. To fall ill far away from home can also be a very difficult situation for the seafarer himself and his family.

The connection between fatigue and nutritional deficiency is well known and eating habits may therefore indirectly have an impact on the vessels’ safety and work performance in general. Human error is often seen as the cause of accidents and may typically be related to poor judgment, misunderstandings, communication failures, and failure to follow prescribed standards – all of which may be linked to the crew’s ability to concentrate and perform work tasks over any length of time.

We have also seen other consequences of poor physical condition and obesity. It is crucial that the crew onboard a vessel is able to act quickly in an emergency situation and it may become a safety issue if crew members struggle with emergency response and rescue operations such as searching smoke-filled areas, entering confined spaces or donning survival suits in an evacuation. Rescue of overweight people from the sea or using a stretcher onboard will require additional effort for those involved and can in an already critical situation further endanger the crew members.

Recommendations for meals onboard
Food habits vary a lot across the globe and the type of food served on board a vessel depends on the geographical location of the vessel, access to fresh ingredients and the nationalities, cultures and religious beliefs of the crew. It is therefore difficult to give a universal practical guide to healthy eating onboard all vessels but, in general, a healthy and nutritious diet must consist of a selection of food that, in combination, provides the body with the nutrients it needs: proteins, carbohydrates and fats as well as a selection of vitamins and minerals. A balanced diet for seafarers must also take into account the fact that some of the work performed onboard can be extremely physically demanding.

A varied diet is important and as general advice, hot and cold meals onboard should primarily be based on the following basic ingredients:

<table>
<thead>
<tr>
<th>Basic ingredients for healthy food options</th>
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</thead>
<tbody>
<tr>
<td>Breakfast cereals low in fat and sugar, but high in fibre</td>
</tr>
<tr>
<td>Wholemeal breads</td>
</tr>
<tr>
<td>Vegetable oil based products, e.g. for sandwich spreads</td>
</tr>
<tr>
<td>Brown rice and wholemeal pasta</td>
</tr>
<tr>
<td>Fish, shellfish, poultry and other low fat meat and cold cuts</td>
</tr>
<tr>
<td>Nuts and seeds</td>
</tr>
<tr>
<td>Low fat dairy products (milk, cheese, yoghurt, etc.)</td>
</tr>
<tr>
<td>Fruit, vegetables and berries</td>
</tr>
<tr>
<td>Low fat salad dressings and sauces</td>
</tr>
<tr>
<td>Fruit juices without added sugar</td>
</tr>
<tr>
<td>Cold and clean drinking water should be readily available</td>
</tr>
<tr>
<td>Breakfast cereals low in fat and sugar, but high in fibre</td>
</tr>
</tbody>
</table>

Foods full of sugars and fats but without important nutrients, e.g. sugary soft drinks, cakes, biscuits and similar items, should only constitute a small part of the food selection on board. Too high an intake of such foods will replace the intake of other healthy foods and/or be in addition to such foods which would lead to too high an energy intake.

An important part of a healthy diet is to encourage good meal time routines, i.e. the intake of food and energy should be evenly spread throughout the day. The advantages are many: improved concentration, fewer hunger pangs between meals, more energy and ability to work, stable blood sugar levels and, not least, a better mood.

Summary and advice
It is vital for the health and wellbeing of the crew and the safety of the vessel that individual crew members look after their bodies to reduce the potential for illness and chronic disease but also to stay alert and thereby promote onboard safety. The crew on board will depend on having a good variety of foods available to be able select a healthy diet and the following advice should be considered by Gard’s Members and Clients:
• Shipowners should carefully plan and budget for supplies of fresh ingredients to ensure variation in the food offered onboard. A healthy menu is not necessarily more expensive than an unhealthy one.

• With respect to meals onboard:
  - good meal time routines are important to ensure an even intake of energy throughout the day;
  - healthy food options should be available at all meals and healthy drinks and snacks should be available between meals; and
  - safe drinking water should be readily available at all times, especially for crew performing work in hot environments such as the engine room.

• Seafarers engaged as ship’s cooks must be trained, qualified and competent for the position and should also be involved in the meal planning process.

• Every crew member has a part to play in establishing a healthy food “culture” onboard and, as such, the crew must be given the necessary information and training in healthy nutrition.

In other words, the shipowner should take responsibility for providing information, creating healthy eating habits and ensuring that there is always good, healthy and safe food available to the people on board. Where the shipowner encourages and facilitates a healthy lifestyle, the people on board may better look after their own mental and physical health.

We would like to thank Mona Kleiven at Volvat Medical Centre in Norway for her assistance in the preparation of this circular.
Loss Prevention Circular No. 13-11

Dangers to crew during in-transit fumigation of cargo

Background
A fumigant is a chemical which under certain conditions will enter a gaseous state and in sufficient concentrations will be lethal to pest organisms. Fumigants are commonly used for killing insects in bulk cargoes like grain and other cereal products but are also used for cargoes like cocoa in bags, timber and for plants and foodstuff inside containers.

In the old days fumigation would take place with the vessel in port and with the crew staying ashore, but today in-transit fumigation is the most common practice. In-transit fumigation is very convenient for the shippers but poses a certain risk to the crew members onboard, as the gases can also be deadly to humans, even in very low concentrations.

Over the years Gard has seen many cases where crew members have been exposed to dangerous concentrations of fumigant gases, some ending in fatalities and others endangering the entire crew. The purpose of this circular is therefore to alert Members and Clients to the risks involved, and their responsibility for the safety of their crew, when carrying out in-transit fumigation of cargo holds.

Fumigation in general
Hydrogen phosphide (PH₃), commonly called “phosphine”, is now the most common fumigant in use for disinfestation of dry plant products loaded in bulk. Phosphine is relatively easy to handle as it is manufactured in a solid formulation of either magnesium or aluminium phosphide, often in the shape of tablets. These tablets are spread, using various methods, within the cargo or on top of it and will react when in contact with moisture. The hydrogen phosphide gases released are heavier than air and are efficient in killing insects within, for instance, a bulk cargo of grain. The most favourable conditions for the complete release of phosphine from the tablets are in tropical and subtropical climates, where four to five days are sufficient. In colder climates or in very dry atmospheres, more time is needed, in some cases more than a month.

Fumigation must be carried out by a professional fumigator whose job starts by inspecting the vessel, together with trained representatives of the Master, to decide whether the vessel is suitable for fumigation. It must be possible to make cargo holds sufficiently gastight to prevent leakage of the fumigant to the vessel’s accommodation area, engine rooms and other working spaces. Very small corroded holes may act as sources of leaks of fumigant gases and can cause gas to seep into spaces occupied by the crew. In older vessels it is therefore imperative that all boundaries between cargo holds and living quarters and enclosed work spaces are thoroughly examined. Ventilators, conduct pipes for electrical cables, rubber seals and other deck and bulkhead penetrations should be given particular attention. Engine room ventilation systems may have sufficient exchange of air to prevent any build-up of dangerous concentrations of gases, but people within the accommodation areas can be more exposed, especially if extraction fans from bathrooms and toilets are in use creating a slight under-pressure.

Fumigation in transit should be carried out in accordance with strict procedures and only at the discretion of the Master. The IMO has issued recommendations on how to carry out fumigations, “Recommendations on the safe use of pesticides in ships”, and we refer to MSC.1 Circ.1358 for general recommendations and to MSC.1 Circ.1264 and MSC.1 Circ.1361 for safety recommendations related to fumigation of cargo holds and cargo transport units, respectively. The fumigator, the vessel’s management and the Master and staff onboard must be fully familiar with the IMO recommendations when establishing a procedure for how the fumigation is to be carried out and the procedure should be followed to the letter.

The vessel must be equipped with adequate respiratory protective equipment and gas detection equipment; however, it is important to be aware of the equipment’s shortcomings. Respiratory protection equipment normally consists of gas masks with a supply of filters, but gas masks may leak and filters need to be of the right type and be replaced on a regular basis. Individuals who understand the dangers of phosphine gas are likely to prefer breathing apparatus with air bottles if they have to enter a space containing gas, as the overpressure in the air supply will prevent gas leaking through the mask. It is important to emphasize, however, that entry into a space under fumigation should never take place except in the event of an extreme emergency.

With respect to detection equipment made available onboard, it is important that the crew has sufficient knowledge of how to use the equipment. Gas concentration safety checks should be carried out at regular intervals throughout the voyage and as a minimum every 8 hour as required by the IMO at all appropriate locations (accommodation area, engine rooms and other working spaces). Readings should be recorded in the ship's logbook. A permanently installed gas detector with an alarm in the accommodation area would lower the risks the crew members are exposed to, but such installations are not common onboard ships. Warning signs should be prominently displayed in relevant areas onboard.

Potential consequences for the crew
The IMO documents mentioned above list the symptoms of inhalation of phosphine gases as “nausea, vomiting, headache, weakness, fainting, chest pain, cough, chest tightness and difficulty breathing”. If someone onboard a vessel carrying cargo under fumigation becomes ill, it is important to consider that the person may suffer from poisoning by the toxic fumigant gas. There are cases of crew members thought to have been suffering from seasickness or food poisoning and told to go to bed, never to wake up again. If there is a gas leak into the accommodation area, the worst place to stay could be the cabins. There is no antidote to phosphine poisoning. Treatment consists of support of respiratory and cardiovascular functions. In an emergency onboard a ship it is important to get the victims into fresh air.

Summary and recommendations
Fumigation of cargo for killing insects is normally carried out with the use of gases that are toxic and deadly to humans. As in-transit fumigation is the most common practice today, Members and Clients should be aware of the risks involved and carefully plan the operation to prevent crew being exposed to the toxic gases.
• Fumigation must only be carried out by a professional fumigator. Specific procedures for the fumigation operation must be established and must be approved by the Master. IMO’s “Recommendations on the safe use of pesticides in ships” must be adhered to, including a formal written handover of the responsibility for maintaining safe conditions onboard from the fumigator to the Master.

• The ship should be inspected prior to the fumigation to determine whether it is suitable for fumigation. All boundaries between the vessel’s cargo holds and accommodation areas, engine rooms and other working spaces must be inspected to ensure that there are no openings that can act as sources of leaks of fumigant gases and cause gas to seep into spaces occupied by the crew.

• Adequate respiratory protective equipment and gas detection equipment must be available onboard and the crew should be well trained in how to use the specific equipment. Warning signs should be displayed in relevant areas and gas concentration safety checks performed at regular intervals during the voyage.

• In case of illness among crew members during fumigation operations one must never exclude the possibility that the individuals may be suffering from poisoning by the toxic fumigant gas.

More information on the risks involved in fumigation onboard ships can be found in Gard News no. 204 and no.173. For the problem of toxic gases in containers, we recommend the handbook on toxic gases and vapours in cargo “Don’t get caught by surprise” by Donald Suidman (editor), Feico Houweling and Jacques Bonewit, which can be found on web page www.tgav.info.
Loss Prevention Circular No. 12-11

Review and new approval of lifeboat hooks

Background
On-load release hooks in lifeboats became mandatory in ships built after 1 July 1986 and have led to many accidents during lifeboat exercises. Deaths and serious injuries have resulted from these accidents and Gard has played a role in asking for improved hook designs and a solution to the problem.

In 2001 a process started at the IMO to improve the safety of lifeboats with on-load release hooks, and at the meeting of the IMO Maritime Safety Committee in May 2011 (MSC 89) new requirements were introduced.

The purpose of this Circular is to remind our Members and clients of the new requirements, and of the need to act within the deadlines given.

New requirements for release and retrieval systems
The new requirements are found in IMO Circular MSC.1/Circ.1392, “Guidelines for evaluation and replacement of lifeboat release and retrieval systems” (available online at http://www5.imo.org/SharePoint/blastDataHelper.asp?data_id=30629&filename=1392.pdf). In the new IMO texts the wording “on-load release” is not used, the term now being “Release and Retrieval System”, comprising the hook assembly and the operating mechanism. All existing Release and Retrieval Systems have to be reviewed and tested against the new requirements not later than 1 July 2013. Systems which do not comply with the new requirements will have to be replaced or modified not later than the first scheduled dry docking after 1 July 2014, but not later than 1 July 2019. Amendments to the 1974 SOLAS Convention by a new Regulation III/1.5 will enter into force on 1 January 2013, as will amendments to the LSA Code, by a revised Chapter IV.

Evaluation process for existing lifeboats
MSC.1/Circ.1392 contains a flow chart for the evaluation process for existing lifeboat Release and Retrieval Systems, which starts with a self-assessment and a possible design modification by the manufacturer. The manufacturer has then to submit the self-assessment together with the necessary documentation to the Administration, being the flag administration(s) or a “recognised organisation”, normally one of the international class societies. If the Administration’s design review is positive, a performance test witnessed by the Administration must be carried out by the manufacturer. Finally, if the manufacturer obtains an approval for his hook system, there is an on-board verification of the system to be carried out for every lifeboat. This “overhaul examination” is to be carried out not later than the first scheduled dry docking after 1 July 2014, by a representative of the manufacturer. See Annex 1 to the “Measures to prevent accidents with lifeboats”, MSC.1/Circ. 1206/Rev.1.

Hook systems which do not pass the evaluation and test will be reported to the IMO by the Administration and such hook systems will have to be replaced in all lifeboats.

For a shipowner, the process will start by establishing exactly the type of hook systems in use in the lifeboats on his ships and then contacting the manufacturers of the lifeboats to check the approval situation. The hook systems may not have been produced by the manufacturer of the lifeboats and there may be different types of hooks in boats by the same manufacturer, depending on year of production, etc. “Type” is defined in MSC.1/Circ 1392 as “an identical lifeboat release and retrieval system of given safe working load, make and model (thus any change to the materials of construction, design arrangement or dimensions constitutes a change of type)”. Bearing in mind the above definition of “type”, some manufacturers of older hooks may over the years have produced more “types” than they may be aware.

Recommendations
It is today uncertain how quickly manufacturers will be able to obtain the new approvals of their various hook systems and the number of hooks that will have to be replaced. In order to avoid congestion, we recommend Members and clients to commence the process without delay.

If hooks have to be replaced, there will be a variety of new hooks to choose from.

It would be a considerable advantage to the seamen if an owner used the same type of hook system onboard all his ships. It would greatly reduce the risks of accidents if all seamen were better trained and fully understood the working of the hook system they are to operate.

When replacing the hook system in an existing lifeboat, the original “type approval” of the lifeboat/hook assembly is breached. MSC.1/Circ. 1392 points to this in “Procedure for replacement of non-compliant lifeboat release and retrieval systems”. The regulators appear to prefer that new hooks are selected in cooperation with the original manufacturer of the lifeboat, but may also accept hook systems by another maker. The retrofitting has to be approved by the Administration. It is assumed that these approvals in most instances will be undertaken by the class societies.
Refugees and migrants rescued at sea

The 1982 United Nations Convention on the Law of the Sea and the 1974 International Convention for the Safety of Life at Sea (SOLAS) place a duty on every shipmaster to render assistance to any person in distress at sea, irrespective of their nationality, status or the circumstances in which they are found. This is a longstanding maritime tradition and the obligation has been enshrined in international and humanitarian law through these international conventions. This loss prevention circular aims to provide a summary of some of the procedures to follow should the vessel find itself in a rescue situation.

Planning and executing the rescue
The Master should refer to procedures in the Emergency Contingency Plan and the vessel's SSP when encountering refugees at sea. Once refugees have been spotted at sea, the following actions should be taken:

- Contact the nearest and/or responsible Rescue Co-ordination Centre (RCC), and, if needed, nearby ships who may be able to assist you. Clarify whether the RCC has any guidelines for the rescue operation.
- Establish a plan for the rescue prior to its commencement. This plan should also include any safety and/or security issues.
- Assess the safety of the crew and passengers should persons brought on board become aggressive or violent. As each refugee/migrant is brought on board, he or she should be searched and any weapons or dangerous objects confiscated.
- The crew should obtain as much personal data from each individual as possible.
- Establish whether one of the refugees is able to communicate in a commonly understood language. Appoint one of the refugees to manage the group and be their spokesperson.
- To avoid the potential spread of disease or sickness onboard the vessel, consider using gloves and other personal protection equipment.

Treatment of people rescued at sea - health and safety concerns
The shipmaster should do everything possible, within the capabilities and limitations of the ship, to treat the survivors humanely and to meet their immediate needs.

- Consider whether the vessel has sufficient food and provisions on board for the crew and refugees, as well as medical equipment should it be needed. If not, steps should be taken immediately to rectify the situation.
- Provide sufficient accommodation on board. Set aside a protected area for the refugees to stay, including blankets and beds.
- Provide for the basic human needs of the refugees (food, water, shelter or medical needs). Establish whether any member of the refugees needs immediate medical assistance. Seek medical advice from ashore if necessary.
- If possible, inform the survivors of your intentions and their arrival at a place of safety where the rescue operation are considered to terminate on shore.

Notification
The Master should inform the Company, the RCC and the P&I insurer of the presence of refugees onboard. If it is not possible to contact the RCC responsible for the area where the refugees were recovered, attempts should be made to contact another RCC or any other Government authority that may be able to assist:

- Contact the Company to advise them of the situation as well as your intentions.
- Contact the P&I Club for further advice.
- Inform the RCC responsible for the region of the conditions onboard, assistance needed and actions taken or planned for the disembarkation:
  - Name of the ship, flag and port of registry.
  - Name and address of the owner's agent at the next port.
  - Position of the vessel, next intended port of call, continuing safety and current status with additional persons onboard.
  - Number of refugees onboard, name, age (if possible), gender.
  - Apparent health, medical condition and special medical needs.
  - Actions completed or intended to be taken by the Master.
  - Master's preferred arrangement for disembarking the persons rescued.
  - Any help needed by the assisting ship, during or after the recovery operation.
  - Any other factors (e.g. prevailing weather, time sensitive cargo, etc.).

Disembarkation
The coastal states are obliged to assist the Master in the disembarkation process. Once a decision has been made to land the refugees, the following actions should be taken:

- Inform the Company's agent and the correspondent in the port of disembarkation.
- Comply with any requirements of the Government responsible for the SAR region where the survivors were recovered, and seek additional guidance from those authorities where difficulties arise in complying with such requirements.
- Disembarkation of refugees and asylum seekers recovered at sea in territories where their lives and freedom would be threatened should be avoided.
- For the type of evidence to be collected, see GARD Guidance to Masters, para 3.13.4.

If the people rescued at sea claim asylum, alert the closest RCC and contact the UNCHR.
Lifeboat accidents continue to occur during lifeboat drills on board ship.

In an effort to minimise the risk to the seafarers taking part in such drills, the IMO’s Maritime Safety Committee has decided to clarify the application of SOLAS regulation III/19.3.3.3 which governs the launch of lifeboats during abandon ship drills.

The regulation requires each lifeboat to be launched and manoeuvred in the water by its assigned operating crew at least once every three months during an abandon ship drill. However, Circular MSC.1/Circ. 1326 states that although the regulation requires the lifeboat to be launched and manoeuvred as previously indicated, it does not require that the assigned operating crew be on board the lifeboat when it is launched.

The Committee has therefore agreed that the assigned operating crew is not required to be on board the lifeboat during launching, unless the Master, having taken into account all safety aspects and in accordance with the authority conferred to him by paragraph 5.5 of the ISM Code considers the lifeboat should be launched with the assigned operating crew on board.

During the period 1 September to 30 November 2009 the Port State Control (PSC) regions of Paris MOU and Tokyo MOU will launch a Concentrated Inspection Campaign (CIC) on lifeboats. The PSC of the regions of Indian Ocean MOU and Black Sea MOU will also participate.

The clarification provided in MSC circular 1326 should also be observed by Port State Control officers involved in the CIC on lifeboats.

Gard’s general advice to Members is that crew members should not be on board the lifeboats in the course of lowering and hoisting during exercises, until the IMO has provided detailed new requirements for safe on-load release hooks, and until existing hooks have been certified to comply with such new requirements.

Gard also refers to Loss Prevention Circular no. 02-08: Lifeboat accidents during drills, issued in February 2008 which provides general advice on how to deal with this problem on board.
Loss Prevention Circular No. 01-09

United States – Responsibility for stevedores

Introduction
Gard continues to see stevedore incidents occurring during loading and discharge operations in the United States. This circular highlights the duties owed by the ship to the stevedores under US law.

Legal Responsibilities
The Longshore and Harbor Workers Compensation Act (LHWCA) places primary responsibility for the longshoreman's safety on the stevedoring company as employer. However, the US Supreme Court in the case of Scindia Steam Ship Navigation Co. v. De Los Santos, 451 U.S. 156, 1981 AMC 601 (1981) has held that the shipowner may become legally liable if he does not exercise due care towards the stevedores while on board his vessel.

The duty of care can be split into the following five duties which the vessel owes the stevedores:

1. Turnover Duty of Condition: The vessel must exercise “ordinary care under the circumstances to have the ship and its equipment in such condition that an expert and experienced stevedore will be able, by the exercise of reasonable care, to carry on its cargo operations with reasonable safety to persons and property.”

2. Turnover Duty to Warn: The vessel must warn the stevedore of any hazards on the ship or with respect to its equipment that are known to the vessel or should have been known to it in the exercise of reasonable care, that would likely be encountered by the stevedore in the course of his cargo operations, and that are not known by the stevedore and would not be obvious to or anticipated by him if reasonably competent in the performance of his work.

3. Active Involvement Duty: The vessel may be liable if it actively involves itself in the cargo operations and negligently injures a longshoreman.

4. Active Control Duty: The vessel may be liable “if it fails to exercise due care to avoid exposing longshoremen to harm from hazards they may encounter in areas, or from equipment, under the active control of the vessel during the stevedore operation.” e.g. the gangway.

5. Duty to Intervene: If a stevedore’s judgment is “obviously improvident”, and if the ship “knew of the defect” in equipment, and the stevedore continues to use the defective equipment, and the ship should have realised that the use of the defective equipment presented an “unreasonable risk of harm to the longshoreman,” the vessel has a duty to intervene and have the equipment repaired.

Recommendations
Ensure that your Quality Management Systems and Safety Manuals list the five duties of care. They should also be distributed to the senior deck officers.

Inspect and test any equipment to be used by the stevedore prior to turnover.

Have a walk through with the stevedore foreman and Chief Mate before operations begin and at the end of operations. Promptly address any problems or unsafe situations under the vessel's control that are uncovered.

Use a sign-off sheet to show that the stevedores are satisfied with the condition of the vessel prior to handover.

The deck officer on duty should perform frequent rounds on the vessel during the cargo operations. Notes should be taken and included in the deck logbook.

The deck officer should carry a digital camera and take pictures of anything amiss.

Have an alert and well trained gangway watch making note of any unusual activity. Keep a gangway log which accurately records the name and employer of all persons on and off the vessel.

Notify the stevedoring company, in writing if possible, of any dangerous work practices observed during the cargo operation.

In every instance of a stevedore alleging injury the incident should be promptly reported to Gard so that a proper investigation can be undertaken to protect the interests of the vessel and mitigate any potential losses, if possible before the ship sails and a change of crew has taken place.
For the last 20 years, accidents during mandatory lifeboat drills have been an ongoing issue in the discussions of the safety of seafarers. This circular provides general advice on how to deal with this problem on board.

**Background**

The lifeboat accidents are associated with the on-load release functions of the lifeboat hooks which are mandatory under IMO regulations for all ships built after 1 June 1986. On ships built before this date there are generally off-load hooks that cannot be released unless the lifeboat is fully supported by the water.

The number of accidents and the number of people killed or injured runs into the hundreds. However, there are no official records for the total numbers and the lack of such records may be one of the reasons why the regulators have not managed to change the situation. The end result is reduced confidence in davit launched lifeboats.

Gard has warned about the on-load release accidents for many years and hosted a conference in October 2007 to discuss these accidents with representatives of flag states, lifeboat manufacturers, P&I Clubs, class societies and various other international organisations attending. For the purposes of this conference, we reviewed Gard's losses over the years 1992-2007. A total of 37 accidents, resulting in 13 people killed and 87 injured had been registered during this period. In addition, there will also have been lifeboats accidents without injuries to personnel and thus not resulting in notification to the P&I club.

During 2007, Gard registered two accidents resulting in 1 death and 6 people being injured. Compared to other types of accidents on board ships and in relation to the 6,200 vessels entered with Gard, one may consider these figures low. The dilemma is, however, that the accidents with lifeboats do not occur in normal work situations on board, but during mandatory drills with the vessel's lifesaving equipment. Due to the many accidents with lifeboats, IMO regulations no longer require people to be on board the lifeboats during lowering and hoisting. The crew members can be placed into the lifeboats by other means after launch, such as lifeboat ladders or taxi-boats in port.

Accidents with on-load release hooks are found to occur due to lack of maintenance, lack of knowledge or poor design. When complying with the IMO requirements for hooks to have both offload and on-load capability, it has proved difficult to design sufficient barriers against the effects of poor maintenance and human error.
General advice
Due to the increased attention to the problem of on-load release hooks, we have received many questions from Members about what to do. While Gard cannot recommend one manufacturer over another, we will in the following attempt to provide some general advice.

1. It is very important to know the type of hook release system which is installed on your lifeboats. While it would be natural in a shore based industry to have such an important item standardised, the Gard Conference last autumn revealed that there were 72 different systems in use, and the number is still growing.

2. Ensure you have clear and correct manuals and instructions about how to handle the hook release system on board and that such material is made available to the crew. Ensure that anyone who operates the lifeboat release gear has been trained on that particular system.

3. Do not allow anyone not trained in the operation of your vessel’s particular hook system to operate it. If your crew is not trained in the operation of the system, send them for specific training or ask a specialist in that particular system to conduct training on board. Up till now, most seamen have only received mandatory shore-based training in the launching of lifeboats during their education and very rarely any training on the exact type of release gear found on board.

4. Give priority to the maintenance of lifeboats. Use strong hanging off pendants to secure the boat to the davit arm before any work is done on the hook release system. For instance, the Australian Maritime Safety Authority (AMSA) now requires such restraints to be present before their surveyors can enter a lifeboat. For the maintenance of hook release systems, engage service people from or approved by the manufacturer.

5. Do not have any people on board the lifeboat during lowering and hoisting, unless you know your hook release system is well maintained and that the crew on board both understands the mechanisms of the system and the risks represented by human error. The IMO regulations require the hook system to be capable of releasing the boat with the total load of boat, equipment and a full crew. However, if the boat is released before reaching sea level, people on board may be seriously injured or even killed.

6. Free-fall lifeboats should be considered for newbuildings. If davit launched lifeboats are selected, review the hook release systems available in the market and insist on the safest system available.

Summary
A lot has been learned from 20 years of accidents, and there are today on-load release hooks in the market which are far safer than the first generation of hooks. We suggest that the old hook systems are replaced with new improved designs.

Since lifeboats with modern on-load release hook systems are still capable of being accidentally released before they are lowered on the water, Gard strongly recommends that all owners and shipmanagers address this issue within their respective companies and ensure that adequate training is provided to the crew on the specific hook systems within their fleet.

The IMO Sub-committee on Design and Equipment is discussing the problem of lifeboat accidents and will be meeting in Bonn on 18 February 2008. It is hoped that this important meeting will result in new regulations to reduce the number of accidents and injuries occurring.
Loss Prevention Circular No. 03-04

Accidents involving crew and stevedores during cargo operations

Fatal or serious accidents can easily occur when crew and stevedores stand on top of moving objects during cargo operations. Regrettably, this is widespread behaviour, particularly during lifting operations involving containers, though it is not unknown for personnel to stand on top of gangways or baskets during loading and discharging. This is clearly a hazardous practice since the crane wire can snap, hooks can come loose, and other factors can cause the suspended object to fall or move.

Gard P&I has been notified of several cases involving such practices, resulting in fatalities or serious injuries and high liability exposure - particularly in the US.

Recent cases

LIFTING CONTAINERS
A fatal accident occurred at a port in Thailand during discharge of empty containers. The vessel’s crane was being used together with a manually operated spreader. Two stevedores were positioned on top of the container to lock/unlock the container spreader when lifting, and then again when the container had been discharged. While the stevedores were standing on the container 6 to 7 meters above the wharf, the runner broke, and the container fell on to the wharf seriously injuring the stevedores, one of them has subsequently died.

LIFTING A GANGWAY
A vessel was under repair in a US dockyard. A shipyard worker was standing on a gangway that was being lifted on to the vessel, when the crane wire broke. The gangway and yard worker fell down to the ground. The yard worker was seriously injured and died several months later without regaining consciousness. The claim was settled in the US for a very significant amount of money.

LIFTING A BASKET
At a port in Germany, two stevedores were positioned in a basket to be lifted on board the vessel. The hooks attached to the basket loosened and the basket fell down on to the wharf. One of the stevedores was killed and the other was seriously injured.

Recommendations

Members are recommended to introduce instructions on board their vessels regulating this behaviour. Crewmembers and stevedores should be clearly advised of company policy and procedures regarding this practice. If stevedores fail to comply, a written protest should be issued and sent to the stevedoring company in order to protect the shipowner in case of accident.
Introduction
A recent judgment of the High Court of the Hong Kong Special Administrative Region highlighted the responsibility of Masters for the safety of surveyors boarding their vessel. The dangers of entering enclosed spaces have previously been highlighted in Gard News 154 and in the Gard Guidance to Masters, paragraph 2.8.5.7 (see the Guidance to Masters on the Gard Services website at www.gard.no). Nevertheless, surveyors can be at risk whilst performing surveys aboard ship and every effort should be made to prevent their injury or death. This circular highlights this and particular steps that should be taken by a Master to protect surveyors. A more detailed report of this case and associated decision appears in Gard News 167.

The course of events
A bulk carrier entered with an International Group P&I Club (not Assuranceforeningen Gard) called at the port of Chiwan, China in 1997 to discharge a cargo of bulk soyabeans. The shipowners appointed a survey company (‘the Survey Company’) to check the condition, quality and quantity of the cargo and the seals of the holds, for the purpose of protecting them against possible claims by the cargo owners for damage or short delivery. The Survey Company was based in Hong Kong and one of their marine surveyors (‘the Surveyor’) attended on board during afternoon following the vessel’s arrival. The Master offered him the assistance of the vessel’s Chief Officer to carry out his inspection but the Surveyor advised that this was not necessary and that he only needed the help of an Assistant Bosun. The Master therefore delegated the duty AB to accompany the Surveyor.

The hatch covers of the No 1 hold were opened and the Surveyor was observing taking photographs of the cargo inside the hold from the deck. The hatch covers of the Nos 2 and 3 holds were opened and the Surveyor was observed taking photographs of the cargo inside these holds from the deck. Following this inspection the hatch covers of these holds were left open. The duty AB then advised the Master by portable radio that he and the Surveyor would be taking samples from the forward holds. There were no witnesses to what transpired thereafter.

At 4:00 pm that afternoon there was a change of watch with the Chief Officer and a different AB taking over. Some 20 minutes later the Chief Officer advised the Master that the relieving AB had not been able to locate the duty AB when taking over the watch. The Master ordered the crew to search for the Surveyor and the duty AB. Shortly thereafter the Surveyor and the duty AB were observed lying at the foot of the ladder leading to the access hatch of the No 1 hold. Both of them had died as a result of oxygen depletion.

The judgment on this case
Following the accident, the administrators of the estate of the Surveyor instituted proceedings in the High Court of the Hong Kong Special Administrative Region against the Survey Company, as the employers of the Surveyor, for breach of the contract of employment and negligence and against the shipowners and bareboat charterers of the vessel (‘the Shipowners’) for breach of statutory duty under the Occupiers’ Liability Ordinance and negligence. The Shipowners before trial settled the claim of the administrators and the judgment was concerned only with the apportionment of liability between the Survey Company as employers, the Surveyor (contributory negligence) and the Shipowners.

Although there was no direct evidence of this, the assumption was that the Surveyor had requested the duty AB to go down into No 1 hold first in order to obtain samples and that, after the duty AB had collapsed due to oxygen depletion, the Surveyor had followed the duty AB into the hold and suffered a similar fate. It is unlikely that the Surveyor was the first one to enter the hold as, if he had done so and had collapsed, the duty AB, who was in possession of a portable radio, would most probably have reported the incident to the bridge.

The evidence was that the Surveyor had 14 years experience at sea followed by 6 years working as a marine surveyor for the Survey Company. He held a number of Certificates of Competency, including a Certificate of Competency as Chief Officer and a transitional Certificate of Competency as Master. The latter document was issued by Panama and most of the other documents were issued by Liberia. No evidence was produced of the examinations sat and passed by the Surveyor to obtain these Certificates of Competency. The evidence of the Survey Company was that the Surveyor had carried out numerous surveys on their behalf based on which they were satisfied as to his competence.

The court found that it was not sufficient merely for the Survey Company to rely on the Certificates of Competency produced by the Surveyor as evidence of training. They should have done more to ensure that he was kept up to date with information about dangers on board ship, was fully aware of such dangers and knew how to deal with them.

As for the Surveyor himself, the court found that he must have been aware of the dangers of entering enclosed spaces, particularly when dealing with cargoes such as soyabeans that cause oxygen depletion, and he was
therefore to some extent the author of his own misfortune. Notwithstanding these findings against both the Survey Company and the Surveyor, the court apportioned their degree of blame for the accident at only 30 per cent and 20 per cent respectively.

A harsher criterion was applied to the conduct of the Master who was found to be 50 per cent to blame. The court started from the premise that the Master is in overall charge of the vessel and responsible for the safety of all persons on board, including lawful visitors. The relevant safety codes provided for a planned entry into any enclosed space with a competent officer or other person appointed specifically for that operation. There was no such operation planned in this case. The fact that the Master had offered the services of the Chief Officer whose presence might have avoided the accident, and that the Surveyor rejected this offer, did not detract from the overriding responsibility of the Master.

The most important finding of the court was on the question of whether the Master was entitled to assume that the Surveyor was qualified and competent to carry out the tasks expected of him and to follow safety procedures, in particular those relating to entry into enclosed spaces. The court held that the Master was not in possession of sufficient information to make a decision about the ability of the Surveyor to deal with any dangerous situation that might arise. The Master could make no assumptions in this respect.

This judgment confirms the general trend of courts everywhere to impose more responsibility on the Master. Shipowners and Masters should be guided accordingly.

**Recommendations**

It's clearly impractical for the Master to check the qualifications and training of every surveyor who comes on board his vessel and satisfy himself that the surveyor is competent to carry out the tasks expected and follow safety procedures. The Master should make no assumptions about the qualifications and training of a surveyor no matter how experienced a surveyor may appear or claim to be. In some cases he may not even hold the qualification claimed. Therefore:

(1) whenever possible, the Master should insist on surveyors being accompanied at all times by a deck or engine room officer, depending on the type of survey.

(2) before commencement of the survey, the scope of the survey and a plan to deal with any potentially dangerous situations, such as entering enclosed spaces, should be agreed with the surveyor and the appropriate safety equipment provided.

Whilst shipowners have no control over the choice of surveyors appointed by charterers, cargo interests and other third parties to attend on board their vessel, the same is not true of surveyors appointed by the P&I Club, the hull & machinery insurers or their correspondents. Therefore, it is recommended that:

(3) before selecting a survey company to perform work on behalf of Members or insureds, correspondents should ascertain from that survey company not only the qualifications and experience of their staff but also what ongoing in-service safety training is provided. The safety culture of a survey company should be one of the criteria applied by correspondents in deciding which survey company to appoint. It is not sufficient merely that surveyors have in the past undergone training as such matters need constant reminders. It should be requested of the correspondent to ascertain this information from survey companies.
Loss Prevention Circular No. 01-13

Flooding of cargo holds on container vessels

Introduction
Approximately one third of all Gard’s P&I claims associated with container vessels are cargo-related. Types of such claims vary but generally involve shortage, deterioration (e.g. of foodstuff), physical damage, wet damage or loss overboard. Gard has recently seen an increase in the number of wet damage cases resulting from flooding incidents in the cargo holds; incidents which have the potential to give rise to substantial claims. The purpose of this circular is to review the main causes of such flooding incidents and to increase awareness on measures to prevent similar incidents in future.

Incidents
In one case, a vessel developed an unexpected list half an hour into ballasting, which was then stopped. The cargo holds were checked immediately but nothing wrong was found. Ballasting was resumed and completed some hours later. It was only then that flooding was detected in one of the holds. Some 20 containers were immersed in several metres of ballast water. Following cleaning operations it was discovered that ballast had leaked through a manhole cover. This incident gave rise to significant cargo claims.

In another ballasting case a cracked valve in the ballast tank system caused leakage into the cargo hold. The leakage was only detected during sounding of the cargo holds many hours after the ballast operation was started. Flooding of the hold affected numerous containers, again giving rise to significant cargo claims.

Causes of flooding
As the above incidents suggest, flooding of cargo holds most commonly occurs during ballast operations. In the case concerning the manhole cover, cleaning work within the ballast tank had been completed immediately prior to loading and the manhole cover was not closed/tightened properly. Other cases have involved cracks in bulkheads to adjacent ballast tanks, corrosion on ballast tank vent pipes or defective non-return valves. It can also be said that a contributing cause to flooding and certainly to the extent/impact of flooding is the delayed detection of the flooding which may be due to inadequate monitoring routines or a malfunction in the cargo hold bilge alarm system.

Prevention
- Checks should be made to ensure that ballast water is flowing into the designated tank and to ensure that ballasting is stopped in a timely fashion in order not to over pressurise or overflow ballast tanks.
- Checks should also be made to ensure that ballast water is not leaking into any other tank or into a cargo hold through a leaking manhole cover.
- Ballast tanks fitted with automatic sounding gauges should be regularly fully tested for accuracy of monitoring systems. Spot checks/manual soundings should be taken to ensure accuracy of the gauges.
- Cargo hold bilge alarms and gauges should be regularly inspected, maintained and tested. Even if the vessel is fitted with cargo hold bilge alarms and automated sounding gauges, these cannot always be relied on to function properly and spot checks should therefore be made with manual soundings. It is also prudent to undertake regular visual inspection of the cargo spaces. The effectiveness of the non-return valves for bilge ejector systems should also be regularly tested and verified.
- All manhole covers (ballast, fuel etc.) in cargo holds should be regularly inspected and properly closed/tightened after every tank inspection.
Loss Prevention Circular No. 03-13
Prevention of soya bean cargo claims

Background
Most soya bean cargoes are safely carried in bulk, with minimal deterioration in quality. However, from time to time such cargoes are damaged during the course of a voyage, resulting in degrading or other loss in quality. Soya beans are considered a valuable commodity and it is not unusual to see substantial cargo claims being made against the carrier – even where inherent vice is recognised as the most probable cause of the damage. The purpose of this circular is therefore to raise awareness of the main risk factors involved in the carriage of soya beans and to stress the importance of securing evidence of the carriage conditions to defend expensive claims.

Inherent cargo conditions affecting safe carriage
The main factors affecting the quality of soya beans in bulk during storage and carriage are moisture content (MC), temperature and duration of storage. Unless these parameters are controlled, the consequences may be excessive growth of fungi/mould and heat damage.

During storage, moisture within the soya beans reaches equilibrium with the surrounding air, i.e., the air in the interstitial spaces between the beans. For safe storage of soya beans, the interstitial air equilibrium relative humidity (ERH) must generally be below 70%. Below this level most microbes are dormant and growth of fungi will be restricted. The ideal would therefore be to maintain the environment in which soya beans are stored at an ERH below 70% at all times. However, as the ventilation systems for cargo holds on bulk carriers cannot ensure an environmentally-controlled atmosphere, the cargo’s MC at the time of loading normally serves as an important parameter for determining the potential for cargo deterioration during a voyage. A 13% MC is commonly assumed to constitute the upward limit for safe carriage of soya beans. Below this limit, the risk of deterioration of the cargo while on board is considered to be low. But the equilibrium MC for soya beans is not a constant value. Soya beans in storage are still ‘live’ and can absorb moisture from the surroundings, and, since warm air holds more water vapour than cold air, the temperature of the cargo loaded is equally important in order to assess a cargo’s biological stability at its declared MC. At temperatures above 25°C, the MC must be lower than 13% for safe carriage, while at temperatures below 25°C it can be higher. Table 1 in the Annex to this circular illustrates how the equilibrium MC of soya beans varies at different temperatures and relative humidity levels.

Although moisture and temperature are probably the most important factors affecting the quality of soya beans during carriage, factors like age, pre-shipment storage conditions, bean soundness and the presence of foreign material can also influence fungal growth while on board. Fungi are more likely to occur if the soya beans are broken or split. The presence of foreign material may prevent proper air circulation during storage and can create local pockets where fungi or insects can grow. Because soya beans’ MC and temperature have a close relationship with their safe storage period, a soya bean cargo that has been handled and stored under unfavourable conditions prior to loading (e.g., very close to the upper limit for safe storage) may have a drastically reduced safe storage time and an increased risk of deterioration while on board. As illustrated by Table 2 in the Annex to this circular, a soya bean cargo with 13% MC, stored for 35 days at 21°C prior to loading, could have reduced its safe storage time by half already before commencement of the voyage. Hence, the risk of cargo deterioration during a normal voyage cannot be completely eliminated even if the declared soya bean MC at the time of loading is as low as 12%.

Ventilation
A soya bean cargo can absorb and release moisture during a voyage, but damage caused by moisture absorption is more probable. Such damage is often encountered when a vessel with soya beans loaded in a warm and humid climate enters colder waters. Vapour will leave the cargo and unless the hold is properly ventilated, condensation may form on the steelwork of the cargo hold (ship sweat) and expose the cargo surface to moisture. Proper ventilation in this case means replacing warm moist air released from the cargo with drier outside air. The decision whether to ventilate or not will be made based on regular and appropriate measurements of the air conditions outside and inside the holds. Natural ventilation as found on board many bulk carriers is, however, not effective in controlling spoilage deep within the hold. It therefore follows that the condition of a soya bean cargo, with the exception of its surface layers, will be almost entirely dependent on the condition of the cargo at the time of loading.

Gard’s experience
The majority of Gard’s claims involving soya bean deterioration fall within the category ‘moisture damage’, characterised by general caking and discoloration of beans in a hold, often with an unpleasant musty odour. Common allegations by claimants in such cases are that the vessel’s ventilation practices resulted in the development of ship sweat or that fuel oil in tanks adjacent to the cargo holds was overheated. It is, however, not uncommon for single parcels of soya beans loaded to have MCs or amounts of foreign material and broken/split beans much higher than the average values declared for the cargo as whole. This can create ‘uneven conditions’ in the stow and lead to moisture migration from one region of the hold to another during the voyage. The result is increases in local MCs within the hold that can serve as ‘hot-spots’ for growth of biological organisms. The consequential damage in such cases is typically identified as scattered areas/layers of caked beans at elevated temperatures, not only at the surface as would normally be the case for damage caused by ship sweat, but at different depths within the hold. In cases where overheated fuel in double bottom tanks is the cause of deterioration, damage is normally identified as discoloration of beans immediately next to the relevant tank. Above this, there can be a layer of caked beans as a consequence of moisture being driven upwards by the heat from the fuel, but, from experience, it is not usual to see such damage extending more than a metre or two upwards into the hold away from the fuel tank. And, significant overheating of the fuel is normally required in order to cause damage.

Even if independent surveys and investigations conclude that a) the inherent condition of the soya beans at the time of loading was the most probable cause of the deterioration, and b) the ship’s ventilation practice would have had no
effect on deterioration within the stow, the carrier often finds it difficult to defend claims. The Hague Visby Rules include an inherent vice defence but it is the carrier who bears the burden of proving the cause of the damage to the cargo. And without evidence (e.g., in the form of records showing adherence to proper ventilation practices during the entire voyage) this has shown to be a challenge. If details of ventilation practices are missing or if available records could be interpreted as evidence of bad or insufficient ventilation practices (e.g., if ventilation has been performed only in daylight hours), it can be difficult to argue that reasonable care was taken by the carrier and that the effective cause of the loss was the nature of the cargo.

Recommendations
Gard’s Members and clients involved in the carriage of soya beans in bulk should carefully evaluate their strategy for prevention of cargo claims and consider the following advice:

At the load port:
• Make sure cargo holds are clean and dry and verify the watertightness of all cargo hold openings, e.g., sounding pipes, hatch covers and associated access points.
• As far as practically possible, secure all available information about the cargo’s condition and history, e.g., date of harvesting, storage conditions and quality certificates.
• Perform odour and visual checks of each individual parcel loaded to detect abnormal conditions, e.g., germination, presence of insects, lumping/caking, changes in colour and request that shippers replace any obviously moulded or low quality cargo with sound.
• Be particularly careful during checks if the declared cargo MC is close to or exceeds 13%, especially if loading in warm climates.
• Consider measuring the cargo temperature in order to assess the biological stability of the cargo at its declared MC, e.g., by measuring and recording the temperature across the surface of the stow and at a depth of 1m after completion of loading.
• If in doubt as to whether the cargo is fit for shipment, consider obtaining assistance from an experienced surveyor or cargo expert.
• Ensure that the charterparty does not prescribe ventilation requirements which may be difficult or even impossible to comply with. Where the vessel is fitted with natural ventilation only, it could be useful to obtain written acknowledgment from the shipper.

During the voyage:
• Make sure that the engine room personnel understand the character of the cargo carried and operate the fuel oil heating system within normal operational limits.
• Ventilate the cargo day and night, unless the outside air has an unsuitable dew point or adverse weather/sea conditions are imminent.
• Duly record the ventilation control measures implemented for each hold. Air and sea temperature readings should be recorded together with the time of commencing, ceasing or resuming ventilation, and reasons for doing so. Also record visual inspections of hold, e.g., any sweat observed.

• Take and record bilge soundings as these too can be evidence of moisture within a hold.

At the discharge port:
• Notify Gard immediately if there is any suggestion by the receivers that all or a substantial part of the cargo in a hold is damaged by fungi and/or heat. The immediate appointment of a cargo expert to observe the pattern of damage in the hold and to take samples for analysis could be crucial in order to defend the carrier in case of a claim.
Annex: Relationship between soya beans’ MC, temperature and safe storage period
The tables below demonstrate the importance of understanding how variations in moisture content (MC) and temperature can affect the potential for deterioration of a soya bean cargo. There may be individual differences between types of soya beans. The numbers must therefore not be considered as conclusive for all soya bean cargoes loaded under all conditions but merely as an illustration of the soya beans vulnerability to various parameters over time. “Safe storage” therein means storage without loss in quality. Table 1 Equilibrium MC of soya beans at different temperature and relative humidity levels

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Relative Humidity (%)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>Equilibrium MC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td></td>
<td>4.2</td>
<td>5.3</td>
<td>6.5</td>
<td>7.8</td>
<td>9.4</td>
<td>11.5</td>
<td>12.8</td>
<td>14.4</td>
<td>19.1</td>
<td>28.9</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td></td>
<td>4.1</td>
<td>5.3</td>
<td>6.4</td>
<td>7.7</td>
<td>9.3</td>
<td>11.3</td>
<td>12.6</td>
<td>14.2</td>
<td>18.9</td>
<td>28.7</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>4.0</td>
<td>5.2</td>
<td>6.3</td>
<td>7.6</td>
<td>9.1</td>
<td>11.1</td>
<td>12.4</td>
<td>14.0</td>
<td>18.6</td>
<td>28.2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>4.0</td>
<td>5.1</td>
<td>6.2</td>
<td>7.4</td>
<td>8.9</td>
<td>10.9</td>
<td>12.2</td>
<td>13.7</td>
<td>18.3</td>
<td>27.8</td>
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<tr>
<td>21</td>
<td></td>
<td>3.9</td>
<td>5.0</td>
<td>6.1</td>
<td>7.3</td>
<td>8.8</td>
<td>10.7</td>
<td>11.9</td>
<td>13.5</td>
<td>17.9</td>
<td>27.3</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>3.8</td>
<td>4.9</td>
<td>6.0</td>
<td>7.2</td>
<td>8.6</td>
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<td>11.8</td>
<td>13.3</td>
<td>17.7</td>
<td>27.0</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>3.7</td>
<td>4.8</td>
<td>5.8</td>
<td>7.0</td>
<td>8.4</td>
<td>10.3</td>
<td>11.5</td>
<td>13.0</td>
<td>17.3</td>
<td>26.5</td>
<td></td>
</tr>
</tbody>
</table>

* Mould growth is suppressed during storage when the environment is maintained at a relative humidity level of 65% or lower.

Source: University of Kentucky, Biosystems and Agricultural Engineering

Table 2 “Approximate” safe storage times for soya beans depending on temperature

<table>
<thead>
<tr>
<th>MC (%)</th>
<th>Temperature (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
</tr>
<tr>
<td>11</td>
<td></td>
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<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>*</td>
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<td>14</td>
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<td>15</td>
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<td>16</td>
<td>*</td>
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<tr>
<td>17</td>
<td>*</td>
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<tr>
<td>19</td>
<td>190</td>
</tr>
<tr>
<td>21</td>
<td>130</td>
</tr>
<tr>
<td>23</td>
<td>90</td>
</tr>
<tr>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>27</td>
<td>60</td>
</tr>
</tbody>
</table>

* Safe storage time exceeds 300 days
1) Airflow through the soya beans permits maintaining the temperature, but does not extend the allowable storage time beyond that listed in the table.
2) Allowable storage time is cumulative. If 16% moisture soya beans were stored for 35 days at 50F, one half of the storage life has been used. If the soya beans are cooled to 40F, the allowable storage time at 40F is only 70 days.

Source: North Dakota State University
Liquid bulk cargo sampling – collecting evidence

Introduction and background
Disputes relating to “off-spec” or contaminated liquid cargoes are a recurring problem and Gard is often involved in cases where the shipowner has no independent evidence as to the cause of an alleged cargo contamination. The source of the problem could be in the shore tank at the load port, in the shore pipeline during loading or on board the vessel itself. The cargo could even have been manufactured out of specification prior to delivery to the terminal for shipment. But if the cargo is found to be “off-spec” when the vessel arrives at the discharge port and there is no evidence of contamination from the load port, the vessel could be faced with a potentially large claim, even if the vessel is not at fault.

Samples showing that the condition of the cargo has not changed between loading and discharge provide the best defence against any cargo claims. The purpose of this circular is to draw shipowners’ attention to the importance of implementing procedures for taking, and retaining on board, own (duplicate) samples from all cargoes loaded on the vessel. It is also important to involve competent crew in the sampling process. An experienced officer may be able to identify a poor quality sample by visual inspection alone, and early intervention may prevent an expensive problem arising later.

Gard’s experience
Although substantial resources are used on board the vessel in the preparation and cleaning of tanks and lines prior to loading, samples are all too often not taken by the vessel at the start of loading, or if they are, they are not taken properly or are discarded before they can be analysed. In one recent case handled by Gard, a chemical carrier arrived at the terminal with its cargo tanks and lines cleaned and prepared for loading. The vessel was inspected upon arrival and found to be suitable for the contracted cargo. The loading hose was connected and loading commenced but no manifold samples were taken at the start of loading. A short time into the loading operation, the crew realized that they had not followed company procedures and immediately took a first-foot tank sample of the cargo. Upon analysis of the sample the cargo was found to be off-spec and the loading was stopped. The vessel was held responsible for contaminating the cargo. The cargo already received by the vessel was pumped back to the terminal and the vessel instructed to leave the terminal in order to clean her cargo tanks and lines. Valuable time was lost and a cargo claim was lodged against the vessel.

In this particular case, the vessel returned to the terminal following cleaning operations and loading was resumed. A manifold sample was taken and analysed and everything found to be in order. When the first-foot sample with the contaminated cargo had been analysed further, it became clear that the cause of the contamination was most probably deposits or remains from previous content of the shore tanks and lines. Fortunately, in this case the contamination source could be identified. In many cases it may not be possible to determine whether the contamination originated from the ship or shore, hence the importance of a manifold sample.

Cargo samples necessary to protect the vessel’s interests
The transfer of custody of the cargo from the terminal to the vessel, and vice versa, normally takes place when the cargo passes the vessel’s permanent hose connections. A manifold sample taken at the start of loading and discharge can, in principle, determine with whom the responsibility for contamination of a cargo rests. But even where vessel procedures are in place and a manifold sample is taken at the start of loading, Gard often sees that there is limited understanding amongst crew of the importance of cargo sampling. It is not unusual for the crew to dispose of a sample taken of the very first product loaded, the “first drop” sample, if it does not appear to be of the expected quality. What can often make matters worse is to then draw a new sample once the cargo quality appears as expected, and this then becomes the manifold sample “on record” as having been taken by the ship at first loading. This may mean that the only evidence available indicates that sound cargo was loaded and the evidence showing that the cargo had been contaminated ashore is lost.

In addition to manifold samples, first-foot samples should be taken to ascertain that the vessel’s systems and pipes are clean, in particular if sensitive and/or expensive cargoes are loaded.

This will also reduce the risks associated with contamination of the entire cargo parcel.

Taking a final tank sample after completion of loading and prior to commencement of discharge will further enable the vessel to determine the actual cause of any potential contamination on board. It can also be potentially useful for the officer in charge to request specimens of samples taken by the terminal’s surveyor at the terminal pier manifold. Samples from the shore tank and shore line might also be requested. If the quality of the cargo samples from the ship and shore appear to be different, loading should be stopped in order to investigate further.

All samples should be taken in compliance with the applicable and recognised industry practices and, if possible, in the presence of a representative of the shipper or terminal. Clean sampling equipment and bottles should always be used. Closed sampling systems should be used with caution as residues of previous cargoes may be retained, also scale or rust could contaminate samples. All samples taken should be sealed and properly labelled (including vessel name, berth, cargo description, sample source, name of sampler, date and time and seal number). A note of where and when a sample was taken as well as its seal number should be recorded in the cargo log book to ensure traceability. If space allows, samples should be retained for at least one year after completion of discharge, stored in a designated place on board or delivered to appropriate storage facilities ashore. Sufficient sample amounts should be secured as it may be necessary to test the sample more than once.

Recommendations
In order to ensure the best possible defence of a cargo claim against the vessel, it is strongly recommended that shipowners foster awareness of problems related to improper sampling and have in place written procedures describing the sampling process in detail. The procedures should include and emphasise the following points:

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• Cargo samples should be taken with the participation of the vessel’s crew during loading and discharge. Sufficient crew competence must be applied with respect to checking and verifying the quality of the samples taken and the Chief Officer should preferably be involved in all cargo sampling. An improper sampling method can result in a poor quality sample being taken and a sample which is not necessarily representative of the cargo itself.

• The following independent cargo samples should be taken by the vessel’s crew:

At loading:
- Manifold sample, taken at the vessel’s manifold at the start of loading, preferably with the manifold valve in a closed position. Spot checks should be carried out at the manifold during loading whenever practicable, e.g., after shore stops and/or change of shore tanks.
- First-foot samples, in particular if sensitive and/or expensive cargo is loaded.
- Final tank samples, after completion of loading.

At discharge:
- Tank samples prior to commencement of discharge.
- Manifold samples, taken at the vessel’s manifold at the start of discharge.

• By far the most important sample is the “first drop” manifold sample: a sample taken of the very first product loaded. Vessel procedures should be specifically formulated to avoid any misunderstandings when it comes to ensuring that this “first drop” manifold sample is never disposed of during slopping, regardless of its apparent quality. This sample should preferably be specially marked, e.g., “FIRST DROP SAMPLE”, but otherwise treated as a regular manifold sample.

• If loading is taking place by use of the vessel’s hose and not the terminal’s hose, samples should ideally be taken at the hose connection as a manifold sample in this case may have less value as evidence to defend the vessel.

• Clean and suitable sampling equipment should be used and the samples taken should be properly labelled, sealed and stored in designated areas. Sufficient sample amounts must be secured and the samples should be retained for at least one year after completion of discharge. Recordings should be made in the cargo log-book to ensure traceability of samples taken.

It is also recommended that shipowners instruct their officers that whenever they are in doubt as to the apparent quality of a liquid bulk cargo, they should ensure that expert advice is sought and samples analysed at the loading port.

For additional information on cargo sampling, please refer to the articles “Cargo Sampling” in Gard News No.153, “The importance of taking (and keeping) samples” in Gard News No.169 and to Sec.2.12.3.5 “Liquid Bulk Cargoes - Cargo Samples” of the Gard Guidance to Masters.

Footnotes
1 See also article “Soybean claim in China” in GN 172 (2004)
2 For information on proper hold ventilation practices, see article “Don’t work up a sweat” in GN 173 (2004)
Clearing of shore pipelines following cargo operations at terminals

Introduction and background

Over the years, Gard has seen some extensive structural damage incidents as a result of overpressure in the liquid cargo tanks during loading operations. Such damages result in time consuming and costly repairs and unfortunately, for reasons unknown, the frequency of such incidents has increased, despite ship procedures addressing the risks involved.

In Gard’s experience such incidents often occur during the loading operation phase when shore pipelines are being cleared, either by line blowing or by pigging. In one such incident, failure to maintain close communication with the terminal and a lack of ship personnel’s attention to and awareness of the hazards related to an unattended open manifold valve during shore pipeline clearing operations seem to be the main causes. After the completion of loading of one tank and initial clearing of the line, the terminal requested the re-opening of the manifold valve for further blowing of the cargo line. The line was then left open and the ship reportedly did not receive any further information from the terminal. Some five hours after the request for the re-opening of the manifold valve, a “bang” was heard on deck and cargo was seen emitting from the tank vent. The results were significant damage to the transverse bulkheads between the tanks and cargo mixing between tanks.

The purpose of this circular is therefore to highlight the main issues involved in order to minimize the risk of pollution and damage to the cargo tanks during cargo operations involving clearing of shore pipelines.

Reducing risks related to shore pipeline clearing operations

The immediate causes of any damage are gas being supplied at a too high pressure compared to the capacity of the ship’s tank vent system arrangement, or that the amount of cargo being pushed into the ship’s cargo tank is too large compared to the tank ullage available, or the cargo coming at too fast a rate. The root causes are, however, often complex and may involve lack of detailed planning of the overall operation, lack of communication between the parties involved during the operation, and personnel having a lack of training and awareness of procedures applicable to the actual operation.

The procedure for clearing shore pipelines between the shore tank and the ship manifold will depend on the facilities available at each terminal and the type of cargo loaded. Ship and terminal procedures will address all relevant aspects of the cargo and line clearing operations but it has become evident that enforcement of good communication between the involved parties prior to and during the entire operation is a key factor in order to prevent incidents. The following should therefore be observed:

Planning and responsibilities

All cargo operations must be carefully planned and documented well in advance of their execution. The details of the plans must be discussed with all personnel, both on the ship and at the terminal and the manner in which responsibility is to be shared between the ship and terminal must be agreed.

The Master or Responsible Officer should ensure that ship’s personnel assigned duties during the cargo operation are made aware of the hazards associated with pipeline clearing operations.

A pre-cargo operation meeting between personnel responsible for the operation from ship and terminal should confirm all critical interface parameters, including those important in the pipeline clearing operations.

Specific hazards that the ship’s personnel should be aware of and related interface parameters to be discussed with the terminal during the pre-cargo operation meeting are listed below:

<table>
<thead>
<tr>
<th>Hazards to be aware of</th>
<th>Parameters to be discussed in pre-cargo operation meeting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- pressure surges in line</td>
<td>- stages at which the line clearing will be carried out</td>
</tr>
<tr>
<td>- tank overpressurization</td>
<td>- notice period required by the ship prior to line clearing operations</td>
</tr>
<tr>
<td>- dramatic increase in the filling rate</td>
<td>- propelling medium to be used</td>
</tr>
<tr>
<td>- cargo tank overflow due to excess cargo</td>
<td>- length and size of the shore line</td>
</tr>
<tr>
<td>- cargo tank overflow due to entry of compressed gas</td>
<td>- time required for a pig to travel along the line</td>
</tr>
<tr>
<td></td>
<td>- pressures and venting capacity of the ship’s reception tank</td>
</tr>
<tr>
<td></td>
<td>- volume of residual cargo in the line and the amount of ullage space available in the ship’s reception tank</td>
</tr>
<tr>
<td></td>
<td>- capacity of the vapour return line to shore</td>
</tr>
<tr>
<td></td>
<td>- amendments to the cargo operation plan as a result of pipeline clearing operations, including volumes available for topping off</td>
</tr>
<tr>
<td></td>
<td>- communication routines during the entire operation</td>
</tr>
</tbody>
</table>
Precautions and procedures
At the commencement of loading, and at each change of watch or shift, the Responsible Officer and the Terminal Representative should each confirm that the communications system for the control of loading is understood by them and by the personnel assigned duties during the cargo operation.

Precautions and procedures requiring special awareness by the ship’s personnel are presented below. During the operations, there should be continuous and direct communication between the terminal and the ship until the operation has been completed and all valves have been closed.

Gard strongly recommends that only properly trained and experienced personnel is assigned duties related to operation of ship manifold valves during pipeline clearing operations.

Precautions and procedures requiring special awareness by the ship’s personnel:

- avoid using tanks that are loaded close to 98% as reception tanks for line clearing
- add a safety margin when estimating required ullages for reception tanks, this to take account of the potential for inaccurately declared “pigging quantities”
- consider to include provisions for a standby cargo tank to be lined up and ready to be opened
- keep manifold valves closed during idle periods
- ensure that the vapour return line to shore is open during the operation (when available)
- throttle the main manifold valve as required
- monitor the manifold pressure closely
- monitor the available amount of cargo tank ullage space and pressure in tank
- during freezing weather conditions, inspect tank vents (P/V valves) at regular intervals
- close manifold valves immediately (in agreement with the terminal) once a pig has reached its receiver/trap, this to avoid compressed propelling gas entering a loaded cargo tank
- report immediately any abnormalities or deviations from existing procedures

Footnotes
1 Pigging is a form of line clearing in which an object, most often in the form of a rubber sphere or cylinder and known as a “pig”, is pushed through the line by a liquid or by compressed gas. A pig may be used to clear the line completely, in which case it will usually be propelled by compressed gas, or to follow a previous grade to ensure that...
Loss Prevention Circular No. 01-11

Damage to cargoes of wind turbine blades

Introduction
As a result of the increasing number of shipments containing wind turbine blades Gard has recently been involved in a number of cases of alleged damage to turbine blades stowed both on and under deck. Among the main causes of such damages are poor welding of stoppers, handling of the blades and poor stowage. The purpose of this loss prevention circular is to provide information on the risks involved and increase the awareness needed when handling turbine blades.

Causes of damage
1. Welding
In a recent Gard case the blades were stowed below deck in the holds in stacks two or three blades high. At the discharge port, the stow in the hold collapsed causing severe damage to both the cargo and the bulkhead, which led to the vessel having to call at an intermediate port for relashing/securing of the cargo. Only one welded stopper out of nineteen was found to be still in position. The surveyor was of the opinion that the collapse of the stow was due to poor welding of the stoppers. Gard’s experience is that poor welding operations carried out by both ship’s crew and third parties appointed by the charterers/shippers is one of the main causes of loss of or damage to wind turbines.

2. Handling damage during loading/discharge.
The grouping of the blades and the size of blades varies between manufacturers. The blades are packed in different ways depending on their design, some completely packed within a steel frame (Figure 1), while others are shipped with frames at the root end of the blade and a frame somewhere at the opposite end of the gravity point.

However, the cargo delivered for shipment is often unpackaged and stowed either on deck or below deck in the holds. The turbine blades are made of polyester and are therefore particularly vulnerable to transit damage, although repair is economically feasible to a certain extent.

Gard has experienced that strong winds during loading and discharge operations is a contributing factor for handling damages. Another factor is wrong determination of the structure lifting points and the centre of gravity; special attention should be given to the lifting points and the centre of gravity on the lift needs to be verified to avoid the blades becoming bent or touching other obstacles during these operations.

3. Poor stowage and/or insufficient/improper securing
One incident involved the collapse of a stow of turbine blades, packaged in 40’ ISO frames and stowed 3 high and 5 wide both on deck as well as in the cargo holds. In most cases the blade units will be stowed on deck in longitudinal direction. The cargo is relatively lightweight but voluminous and therefore susceptible to wind forces. The force of the wind, which increases proportionally with the height of the stow, should be taken into consideration when calculating lashing capacity.

Preventing damage
Clearly the stowage position on board ships depends largely on the size of the holds and the length of the blades to be carried. The height of the stow depends on the strength of the designed frames or cases or other manner of packaging of the blades. The preparation of the vessel to properly load/stow and secure the cargo is therefore of the utmost importance. The booking note should contain information in respect of the weight, the manner of packaging, unit weight, dimensions of the blades and maximum allowable stowage height.

Calculations should be made prior to the commencement of loading, based on the vessel’s relevant characteristics (such as length, speed, GM, stowage location on board), the cargo (dimensions and weight) and the lashing material to be used (container lashing material, chains, wires, belts, etc.). The units have to be handled with extreme care as strong winds during loading/discharging create difficulties when lifting the blades.

We do not here intend to discuss the various issues surrounding the calculation of stability aspects when loading a ship, however, during heavy weather with high seas excessive initial stability will result in rapid and violent motion which will impose large sliding and racking forces on the cargo causing high stressing on the lashings. The master should take into consideration the stability information obtained from the ship’s stability manual.

Recommendations
Members should pay particular attention to the allocation of contractual responsibility for the loading, stowage, securing and discharge operations. If the member has responsibility for any of these operations they may wish to consider appointing a competent surveyor to assist with ensuring that the operation is done properly. If the cargo is to be carried on deck, it is essential that this is clearly stated in the contract, as it will have a significant impact on the terms and conditions on which the cargo is carried. Particular attention should be paid to the welding stoppers ensuring that welding operations have been properly performed.
The vessel's Cargo Securing Manual should be approved by the relevant Flag State authority or directly by the relevant Class Society, if such authority for approval has been transferred to the Class Society by the Flag State Authority. As windmill blades are not mentioned in the list of cargoes under the section 5.3 for non-standarised stowage and securing in The Code of Safe Practice for Cargo Stowage and Securing, 2003 edition, an annex describing the general nature for the stowage and securing should be worked out and approved by the relevant Flag State authority or Class Society. Vigilance is therefore vital to ensure that stowage/lashings and securing of the cargo is in compliance with the applicable annex.

With respect to software products relating to lashing programs the relevant Class Society may be contacted for advice. Regardless of the manner of unitising, the stowage, lashing and securing of the units of blades should be in accordance with The Code of Safe Practice for Cargo Stowage and Securing, edition 2003.

1 With respect to hot works to be performed on board the vessel we wish to refer to our previous LP circular No. 06-10: The danger of hot works on cargo securings.
Liquefaction of cargoes of iron ore

Background
Members may be aware of the problems that have arisen in recent times with respect to the liquefaction of cargoes of iron ore fines originating in India and loaded at Indian ports. However, similar problems have been experienced in the past with similar cargoes elsewhere in the world and, as such, these cargoes must always be treated as liable to liquefy regardless of their origin.

Liquefaction of mineral ores, resulting in cargo shift and loss of stability, has been a cause of some major marine casualties for many decades. However, a spate of incidents leading to several losses in recent times involving iron ore fines loaded in Indian ports has lead to considerable focus on the lack of compliance with the requirements for safe carriage of this cargo. There have also been incidents involving cargoes of nickel ore from Indonesia, the Philippines and New Caledonia.

The Southwest Monsoon generally prevails from June to September and mainly affects India’s west coast. The Northeast Monsoon generally prevails from December to March and mainly affects India’s east coast. The advent of the Southwest Monsoon gives us good reason to revisit this subject through this circular.

Main causes of casualties
The main cause of the casualties and near misses appears to be the poor compliance of some shippers with the testing and certification requirements that are required under SOLAS and the IMSBC Code 2009 and designed to ensure that cargoes are loaded only if the moisture content is sufficiently low to avoid liquefaction occurring during the voyage. Indian iron ore fines tend to be left in the open prior to shipment, and as a consequence, are entirely subject to weather conditions during this period. The problems related to wet cargo and its moisture content particularly worsen during the wet monsoon seasons.

In cargoes loaded with a moisture content in excess of the Flow Moisture Point (FMP), liquefaction may occur unpredictably at any time during the voyage. Some cargoes have liquefied and caused catastrophic cargo shift almost immediately on departure from the load port, some only after several weeks of apparently uneven sailing. While the risk of liquefaction is greater during heavy weather, in high seas, and while under full power, there are no safe sailing conditions for a cargo with unsafe moisture content. Liquefaction can occur unpredictably even in relatively calm conditions on a vessel at anchorage or proceeding at low speed.

Given this unpredictability, it is of utmost importance that the length of voyage and prevalent and forecasted weather conditions do not serve to encourage the carriage on ships of cargoes prone to liquefaction with a Transportable Moisture Limit in excess of that which is accepted as safe for carriage. It is for these reasons that SOLAS and the IMSBC Code incorporate provisions intended to ensure that only cargoes with sufficiently low inherent moisture content to avoid liquefaction are loaded. Strict adherence to these provisions is the only safe way of carrying these types of cargoes.

Preventive measures
Based on previous experiences with respect to cargoes of iron ore fines loaded from India, Members are advised to exercise extreme caution when loading such cargo on their vessels. It is important that cargoes of iron ore fines unsuitable for shipment are identified and rejected before coming onboard the vessel and proper measures are taken to ensure that the cargo loaded on board complies with SOLAS and meets the requirements of the IMSBC Code. Additional sampling will be required if the cargo is subject to sources of moisture during loading.

Although the IMSBC Code places the burden of certification on the shipper, in many cases the information contained in the certificates may be incorrect. This may be due to failure to correctly analyse the samples, or use of facilities not geared to properly test the samples, or the test samples not being properly representative of the cargo to be loaded. It is thus extremely important that the ship owner and master ascertain that the cargo is suitable for sea transport.

Although exposure to moisture is heightened during the monsoon seasons, ship owners should ensure that the same level of caution is exercised with respect to the loading of iron ore fines irrespective of the time of the year. The Association strongly recommends Members to contact the local correspondent or the Association in good time to assist them in engaging the services of a competent and experienced surveyor to act on the Member’s behalf to assist the master both before and during loading operations in order to ensure that the cargo is loaded in compliance with SOLAS and that the IMSBC Code is adhered to.

Freight disputes
Although not directly connected with the safe transport of iron ore fines from India, this seems like an opportune time to highlight this issue.

We understand that some Chinese ports do not allow the discharge of low grade iron ore without an import permit. This can cause considerable delay of vessels and disputes concerning, e.g. freight, demurrage or deadfreight may arise in relation to iron ore from India.

We understand that “China Chamber of Commerce of Metals Minerals and Chemicals Importers and Exporters” and “China Iron & Steel Association” notified their members in April of this year to stop importing iron ore with an Iron (Fe) content below 60%. This has made it difficult to obtain import permits from the government through these two Associations.

It is therefore recommended that before transporting Indian iron ore or iron ore with less than 60% Fe content from other countries into China, shipowners should check with the Charters/Shippers/Cargo Receivers if the Chinese buyers have obtained the import permit so as to avoid unnecessary disputes over freight, demurrage and detention of vessels. Similar caution should also be exercised with respect to spot cargoes of low grade iron ore into China.

1. See Gard Loss Prevention Circular No. 10-07: Loading of iron ore fines in India.
2. Liquefaction of cargoes of Iron ore has also been addressed in Gard News 197 (Feb/April 2010) “Liquefaction of unprocessed mineral ores – Iron ore fines and nickel ore”, by Dr. Martin Jonas, Brookes Bell, Liverpool. The article describes the SOLAS/IMSBC Code Regulations, Certification of TML / moisture content and principles of liquefaction.
3. We are grateful to “Hai Tong and Partners” of Beijing, China for providing the information with respect to the Freight disputes.
A risk assessment should be undertaken by a ship’s officer bearing in mind:

1. The fire hazards in the immediate vicinity or adjacent spaces, especially those not immediately apparent, e.g. combustible gases/vapours.
2. Hot work should be prohibited in the vicinity of tanks or vents to tanks containing flammable liquids/residues, unless completely gas freed.
3. If combustible material cannot be removed from the cargo being secured, the immediate vicinity or adjacent spaces, it should be shielded, preferably with fire retardant material.
4. The need for a constant fire watch in the vicinity of the work and in all adjacent spaces, bearing in mind that sparks can travel some distance and fall into openings which cannot be closed. Screens should be used to confine spark spray. A generous application of water will be needed to cool down the surfaces/molten metal. Having a good fire watch means that the early application of water on the hot sparks/slag/surfaces can prevent the fire spreading.
5. The need to continuously supervise the individuals performing the hot work to ensure that they do not undertake any hot work outside the permitted area where precautions may not yet be in place. If supervision is interrupted the works should be suspended.
6. The need for good communication between the fire watch and the officer in charge.
7. The immediate readiness of fire fighting appliances, such as extinguishers and charged hoses which should be laid out, and be positioned close to hot work and within easy reach for those on fire watch, even in adjacent spaces.
8. Fire detection, alarm systems and fixed fire fighting systems must have undergone recent testing.
9. The need to maintain a fire watch for at least two hours after the hot work has been completed.

Recommendations

A risk assessment should be undertaken by a ship’s officer in charge of the hot work operation. The Master should never allow welding in cargo compartments where cargo is already loaded without all necessary precautions having been taken and the operation being continuously monitored by a responsible and competent person. Following completion of the welding work, a fire watch must be maintained to monitor the situation and prevent any subsequent outbreak of fire.

Charterers as well as owners need to be aware of the dangers of hot work, as the charterer may be contractually responsible for stowage/securing of the cargo under the charterparty.

1 The guidelines to the crew are general yet useful and should not in any way conflict with company procedures or policy.
Update: Container losses from vessels using fully automatic container locks

Background
As a result of several container losses from large container ships in the past six months, the shipping industry has taken the issue of fully automatic container locks (FATs) very seriously. Various investigations of the potential problems with lashing arrangements involving FATs have been initiated to clarify what measures may be necessary to avoid future losses. This circular highlights some of the current activities in this respect in the industry.

Gard’s Member survey
As a part of our investigation of the container losses, Gard conducted a survey amongst some of its members. The survey has revealed that the losses experienced by the members of Gard seem to be limited to one type of FATs available in the market. Our recommendation in Loss Prevention Circular No. 05-06 to contact the respective supplier of such locks to seek clarification of any limitations is therefore still valid. It has been suggested to hold a meeting of International Group’s “Ship Technical Committee” on this issue. It is expected that this meeting will take place this autumn, when more evidence is available from the parties mentioned below. The intention is to also invite the classification societies to attend this meeting.

Actions by Classification societies
In a letter from Germanischer Lloyd dated 16 March 2006, the potential problem was highlighted and future limitations in the use of FATs were discussed. However, in their letter of 27 April 2006, Germanischer Lloyd clarified their current position: The letter states that the approved container stowage plans, with their respective stowage systems, continue to be valid unconditionally and that a general and type independent recommendation for the substitution of FATs should not be issued. GL’s tests also confirmed that FATs with a flange and sufficiently dimensioned locking nose obtained good results. According to the press, GL has at a recent seminar also pointed to other factors such as the placement of heavy containers, inadequate container lashings and the age of the containers as potential causes for the recent losses. None of the other classification societies have so far concluded in this issue.

Actions by the industry
Owners, suppliers, authorities and researchers are joining forces in a two year project investigating lashing loads to improve safety and efficiency of container, Ro-Ro and heavy lift transportation. The Joint Industry Project, named Lashing@Sea, was initiated by the Maritime Research Institute Netherlands (MARIN). The project is aiming to improve the safety and efficiency of lashings. This will be achieved by investigating the mechanisms of lashing loads and identifying the key parameters. FATs will be one of many technologies investigated by this project group.

Actions by the manufacturers
One of the major manufacturers of lashing equipment has chosen to recall their FATs from the market. In its press release, this manufacturer stated that they did this as a precaution despite the fact that they had not received reports of equipment failure. We have been informed that at least one major manufacturer continues to sell FATs subsequent to additional testing and approval by Germanischer Lloyd. According to the manufacturer, no container losses have been reported due to using their type of FAT.

No implication on the P&I cover
The use of fully automatic container locks does not have any implication on the scope of P&I cover, as long as the locks used are class approved and the container stowage complies with applicable regulations.

Recommendation
Gard is still of the opinion that it is prudent for shipowners to seek further information from the approving classification society and container lock manufacturer/supplier concerning the suitability and conditions for use of the specific type(s) of fully automatic container lock(s) that are being used or are intended to be used on board their ships, in order to minimise the risk of future losses.
The dangers of carrying Direct Reduced Iron (DRI)

Since the International Group of P&I Clubs’ Circular on Direct Reduced Iron published in 1982, the dangers of DRI have somewhat disappeared from the limelight. Gard P&I has recently been involved in several cases, which have served as a stark reminder of the dangers involved in carrying this hazardous bulk cargo.

Types of DRI
DRI is the raw material used in the production of steel in electric arc furnaces, which form the majority of the steel production facilities worldwide. DRI can be split into two distinct sub-groups; cold moulded pellets or hot moulded briquettes. The IMO Bulk Cargo (BC) Code deal with these two types separately. Hot moulded DRI briquettes are a more refined product, formed by the further processing of cold moulded pellets. Both forms of DRI are considered hazardous when carried in bulk and specific carriage requirements are listed in the BC Code.

DRI properties and dangers
DRI in either form is similar to other steel structures in its susceptibility to rust (re-oxidise) in the presence of oxygen. The rate of oxidation is dependant, to a greater or lesser degree, on the moisture content of the DRI and the atmosphere in which the DRI is carried. The oxidation process generates heat, which in bulk cargoes of DRI can be significant. The process of oxidation is accelerated in the presence of moisture and is substantially increased if the water contains dissolved chlorides, as is the case with seawater. The sponge-like structure of DRI also inhibits the dissipation of heat and DRI in bulk can therefore heat rapidly in isolated pockets.

Hot iron when in contact with water can cause a chemical reaction resulting in the production of hydrogen, which is highly explosive in the correct quantities. The generation of hydrogen is the most dangerous property of DRI and has led to several fatal explosions. In some manufacturing processes, the DRI undergoes one of two processes called either ‘passivation’, whereby the briquettes are coated with sodium silicate or ‘ageing’ in which the briquettes are allowed to form an iron oxide coating. These processes are intended to reduce or inhibit the oxidation process during transit. This additional process is dealt with specifically in the BC Code.

If the atmosphere is inerted, the inerting agent must be nitrogen. Carbon dioxide should not be used, primarily because it can produce carbon monoxide, which is both toxic and flammable. Even on short sea voyages it is recommended that the cargo be fully inerted. Passivation has been shown to effectively reduce oxidation, from fresh water contamination, in the short term, but, over time, the effective protection is reduced. It should be noted that there is little protection from the rapid reactions caused by the ingress of salt water into the cargo spaces. It is therefore recommended that the carriage of DRI should always be undertaken under a nitrogen blanket. The ship’s crew should carry out effective monitoring of the atmosphere in the cargo spaces. Records should be kept of the levels of hydrogen and oxygen in each cargo space.

The condition of the cargo should be monitored during loading. Cargo that is hot or damp should not be loaded. It is also recommended that the temperature of the cargo during loading should be monitored. If the cargo temperature is above the ambient temperature, advice should be obtained from the local Competent Authority. However, cargo with a temperature in excess of 65°C should never be loaded. It is usual for temperature thermocouples to be placed within the cargo holds during loading for the monitoring of cargo temperatures during carriage. It is important that these thermocouples are tested prior to being positioned within the cargo and their location within the cargo recorded.

It is also recommended that the cargo should be properly trimmed in order to reduce the amount of surface area exposed to the atmosphere. Trimming also helps reduce the “funnel” effect by reducing the amount of void spaces in the cargo where hot gases can move upwards while drawing in fresh air.

If the vessel has any doubts about any particular DRI loading it is recommended that independent advice be obtained from an expert. The Association is only too happy to assist in this regard, and in any other way it can.

Carriage Requirements
Carriage requirements are set out in the IMO BC Code. Reference should also be made to the latest published advice and carriage requirements approved by the local Competent Authority and issued by the shipper. The BC Code recommends that the shippers should provide specific instructions for the carriage of DRI, and these should either be:

1. That the cargo spaces be maintained in an inert condition, with the atmosphere containing less than 5 per cent oxygen. The hydrogen content of the cargo spaces should be maintained at less than 1 per cent by volume, OR
2. That the DRI is manufactured or treated with an oxidation inhibiting process to the satisfaction of the Competent Authority.
Manifold monitoring whilst loading liquid cargoes

Introduction
Tankers and terminals are exposed to numerous controls with the aim of ensuring incident-free visits to ports by ships engaged in the transport of cargoes dangerous to both health and environment. Nonetheless, avoidable incidents continue to occur. The following incident illustrates the need for careful planning and monitoring of all operations in port. Complacency is not acceptable and could very easily lead to loss of both life and property.

Course of events
Recently a chemical tanker was loading a cargo of ethyl alcohol in a Brazilian port. The vessel also took bunkers in this port. The loading of bunkers from a barge and loading of cargo from the shore terminal took place simultaneously. Bunkers were loaded without incident. However, a spark from the funnel of the tug, which was standing by to assist the bunker barge in manoeuvring, caused a fire at the vessel’s cargo manifold. This happened due to collection of ethyl alcohol in the manifold drip tray from a leaking loading hose.

Fortunately the vessel’s crew dealt with the fire quickly, but, unwisely, loading was re-started as soon as the fire was put out, apparently with the blessing of the terminal, through the same leaking hose and without checking for hot spots. The result was that the presence of a hot spot caused re-ignition of the ethyl alcohol in the manifold. Once again, the ship’s crew swiftly extinguished the fire.

The second incident resulted in the terminal and local fire brigade requiring that all damaged hoses be replaced and that all traces of cargo be removed from the drip tray. This was followed by a joint inspection of the vessel by the terminal and local fire brigade prior to the vessel being allowed to resume cargo operations. During this period of rectification and inspection, a vessel discharging gas at a neighbouring berth was also required to suspend cargo operations.

Lessons learned
As mentioned previously, this incident was clearly avoidable. It is most surprising that the loading of a chemical cargo was allowed through a leaking hose. Some fundamental lessons to be learned from this case are:

1. It is common practice and a requirement by most, if not all, tanker companies and terminals that a check is carried out on commencement of loading to ensure that, amongst other things, no leaks are present in the transfer of cargo. This practice should always be followed.

2. Any leaks must be rectified prior to resumption of cargo operations. Unfortunately, this is a simple rule that was ignored in the case in question.

3. In addition, the manifold must be continuously monitored. What is most surprising, though, is the fact that in the present case loading was allowed to resume through a leaking hose after the occurrence of the first fire.

4. Safety considerations need to be taken into account for loading of bunkers concurrent with the loading of cargo. Many, with good reason, frown upon this practice. The presence of the bunker barge produces additional risks that may not be readily appreciated or may simply be beyond the control of the relatively limited manning requirements of present times.

5. Loading of bunkers during cargo operations may be acceptable when loading from a shore tank, or if the bunker barge is occupying a berth at the terminal and a shore pipeline is utilised for the transfer. This removes the additional risks present due to the presence of the barge alongside the vessel. Of course, it still requires two operations to be efficiently monitored at the same time. For obvious reasons, it is advisable to prohibit simultaneous bunkering and cargo operations, where the nature of the cargo requires main deck scuppers to be kept open during cargo operations. This normally applies to gas tankers.

Fortunately, in the above-mentioned case the vessel was lucky to escape with just fire damage to some cargo hoses, scorching of main deck paint in the vicinity of the fire and 13 hours lost in rectifying the situation. Things could have been much worse as, at the time of the fires, the vessel had on board parcels such as Ethyl Alcohol, Voranol, Carbon Tetrachloride, Polyethylene glycol USP, and Ethylene Dichloride (EDC).
Loss Prevention Circular No. 11-11  
**Dry docking - responsibilities and contractual issues**

**Introduction**
Gard has seen that questions relating to responsibility, authority and contractual issues can be complicating factors when damage occurs whilst a vessel is at a repair yard or in dry dock. The questions are mostly related to who is responsible for the damage occurring and the resulting repair costs. Is it the vessel’s owners or the yard? In some cases, owners have not even been aware that the yard has limited its liability in the contract.

The purpose of this circular is to address the importance of clearly allocating responsibility in the contract with the yard/dry dock for any damage caused during the docking operation. The circular also highlights the importance of ensuring that both parties have a common understanding of what was agreed in the contract.

**Gard’s experience**
In a recent case a vessel was scheduled for dry docking to perform a substantial overhaul, refit and conversion works. During the initial dock inspection of the vessel’s flat bottom, it was discovered that large parts of the duct keel plating had been dented and deformed over almost its entire length. It was later established that the overload of the vessel’s keel structure was caused by a combination of a) the owners submitting an outdated docking plan; and b) the yard, when unable to use the available docking plan, repositioned the keel blocks without performing additional calculations or conferring with the owners. The result was extensive repair costs, delays and disputes between the owners and yard as to who was liable. Proper planning of the docking process and a clear and concise contract between the owners and yard are important to help avoid such disputes arising, and will protect owners’ interests when liability is an issue.

Planning and preparations to be undertaken prior to docking

Much of the dispute related to the case described above could have been avoided with good planning and preparations focusing on the critical steps and tasks in the docking process.

- All necessary documentation required to complete the docking operation and the expected workload at the repair yard, including an updated docking plan, should be forwarded by owners to the yard well before the work is due to commence. A proper and detailed repair specification made available to the yard in advance could save both time and money.

- Docking blocks should be arranged in accordance with the latest/approved docking plan and the yard’s responsibility for checking the correct positioning of the docking blocks should be clearly stated in the formal contract.

- Meetings between the owners’ representative and the yard/docking master should be held prior to the vessel entering the dock. Prior to the meeting the owners of the vessel should carry out a proper risk assessment based on the scheduled scope of work in order to identify critical steps and tasks in the docking process. During the meeting, measures to control the process should be defined and agreed and the documentation can be discussed and any uncertainties clarified.

- Clear communication lines between the yard and the owners’ representative should be agreed in the contract at a corresponding level of authority. Normally the repair manager at the yard and superintendent of the vessel represent the parties. The main correspondence during the vessel’s stay at the yard should be through these parties and any deviations from this procedure should be agreed and documented.

- Owners and yards respectively normally base their work and requirements on general terms and conditions. However, they do not necessarily correspond with each other and can vary substantially from one yard to another. Disputes commonly arise because owners and yards believe their terms and conditions apply and not the other party’s. It is therefore prudent for vessel owners to review the terms and conditions of the yard to identify potential areas of dispute prior to commencement of any work and it may be necessary to negotiate some of them, such as the limitation liability amount and delayed delivery penalty clause.

**Use of sub-contractors**

There is an increasing trend to use external subcontractors during work at a yard, both by the yard and vessel owners. If the contractual relationships between the yard, subcontractor and owners are unclear, this may lead to very complex liability issues in the event of any damage caused by the yard or one of the subcontractors.

For subcontractors engaged by owners directly, it is important to ensure that they are thoroughly briefed on owners’ standards (safety and other), on the content of the detailed repair specification and on the agreed contractual terms and conditions. When it comes to subcontractors engaged directly by the yard, they should be the responsibility of the yard, so the owners’ main contract with the yard/repairer will govern the matter if a dispute should arise.

Work at the yard in many cases will be carried out by a combination of the yard’s personnel (including their subcontractors) and owner’s directly engaged subcontractors. It is therefore important to have a good understanding of the various applicable contractual liabilities between the parties involved prior to the commencement of any work.

**Summary and recommendation**

In summary, before and after a repair yard has been selected:

- Proper planning and preparations focusing on the critical steps and tasks in the docking process is important to avoid damage occurring and claims arising.
• To avoid disputes if damages occur, it should be ensured that everyone has a clear understanding of all the agreed contractual terms and conditions between the owners and the yard. Owners should be prepared to negotiate contractual terms and conditions in order to achieve more favourable division of liability and compensation provisions.

• Where subcontractors are used by owners, responsibilities between subcontractor and owners should be clarified between the parties.

Additional recommendations:

• Use of additional owners’ personnel to follow-up during the yard stay should be considered as a preventive measure in order to avoid unforeseen damage, extra repair costs and delays. Extra costs for superintendents or other owners’ representatives may be covered by insurers depending on the terms of the policy.

• Final testing and commissioning after completed repair work by the yard/subcontractor is often supervised or even performed by owners’ representatives. An important issue for owners to be aware of in this context is the potential transfer of liability for damages occurring during and/or after testing and commissioning.
**Background**
When dealing with liability claims in shipping one often come across terminology unfamiliar to those not working with claims on a regular basis.

The above abbreviations are typical examples often causing confusion and misunderstandings. They are often regarded as names for documents needed when things go wrong, but many have no idea what they contain or which effect they have. It is also often the case that the content of such documents can be legalistic and detailed.

This Circular explains what these documents are for and the kind of content they should contain in order to protect one’s interests.

**LOI – Letter of Indemnity**
When one party wants the other to deviate from a normal or regulated practice, it may be necessary to give an indemnity. A Letter of Indemnity is a document which purports to give a party a right of recovery against the LOI issuer for any liabilities, losses, costs or expenses arising from following the specific requests/orders contained within the LOI.

A typical shipping example is a charterer’s order to a carrier to discharge cargo at a discharge port without the receiver providing an original bill of lading in exchange for the goods being delivered to him. In these circumstances, the carrier’s consequential liability for following such an order is excluded from its P&I insurance. The International Group of P&I Clubs has, however, drafted a standard form LOI, under which an indemnity is created in favour of the carrier. The issue of insurance cover remains unchanged but the LOI gives the carrier an express right of recourse against the charterer.

A Letter of Indemnity should normally include:
- reason for issue with a description of the circumstances,
- indemnity for a list of specific risks,
- agreement to provide funds to defend claims,
- agreement to provide security if vessel or assets are arrested,
- full list of parties jointly liable under the LOI,
- law and jurisdiction of the LOI.

It is important to remember that LOIs are not a fix-all solution for any kind of problem. Equally important, some LOIs are unenforceable at law, for example an LOI received in return for issuing a clean on board bill of lading despite the fact that the document was known to contain an incorrect description of the cargo or its quantity or its condition. Furthermore, any LOI is only as good as the party providing it. Hence, accepting an LOI does mean a risk of incurring an uninsured loss.

**LOU - Letter of Undertaking**
While the LOI is a document whereby the provider promises the receiver of it to reimburse his financial loss for carrying out certain actions, a Letter of Undertaking is a document whereby the provider promises the receiver of it to reimburse financial loss incurred as a result of a shipping incident.

An LOU is a guarantee often issued by a P&I Club on behalf of its Member to a claimant who allegedly has suffered a loss for which the Member is liable and covered under its P&I insurance. In most cases, a Club LOU is issued on the threat of arrest or detention of a vessel. The terms of a Club LOU will include that, once accepted by the receiver as security for his claim, he must release the ship from arrest or detention and promise not to re-arrest the ship or take any action against other assets to obtain security for the same claim.

The main advantages of a Club LOU from the Member's and Club’s perspective lie in its ease of issue and flexibility regarding content. Once a security demand is put forward, a Club LOU can be issued as soon its terms have been agreed, formulated and signed, then faxed or e-mailed around the globe in minutes. The main advantage of a Club LOU from the claimant’s perspective is that he obtains a right to recover his claim directly from the Club. It is important that a Club LOU balances the respective interests, i.e. securing the claim without jeopardizing the defendant’s rights and defences.

A Club LOU should normally include:
- identity of parties,
- details of the claim,
- reason for issue,
- reference to the contract or circumstances under which it is given,
- maximum amount of security,
- triggers for payment,
- provision preserving Member’s rights and defences,
- law and jurisdiction for the claim and for any enforcement of the LOU.

Normally, the trigger for payment under a Club LOU is a settlement agreement between the parties or a final and enforceable court judgment or arbitration award.

Important limitations to keep in mind: P&I Clubs have no obligation to provide LOUs, they are purely discretionary; Club LOUs may not be accepted in some jurisdictions or by the claimant, and the claim may be outside P&I cover.

**BLG - Bank Letter of Guarantee**
Bank Guarantees have a long tradition for securing claims. As with any form of security, it is important that the terms included are in line with our recommendations for Club LOUs. Due to the costs and time involved in issuing Bank Guarantees, especially where more than one bank is involved, there are many advantages in having a Club LOU issued rather than a Bank Guarantee where possible. It should also be remembered that banks are not immune from financial failure and that a Bank Guarantee is not necessarily “better” security.

See Gard News issues 162 and 155 for further information.
Loss Prevention Circular No. 08-09
Measures to prevent drug smuggling

General
Drug smuggling constitutes a very serious crime almost anywhere in the world. Affected parties can expect extensive investigations, interrogation, detention and possibly criminal prosecution, conviction and imprisonment. Moreover, assets may be seized as security for hefty fines and penalties and ultimately confiscated and/or sold.

Gard has recently seen an increase in the number of reported drug detection incidents involving merchant ships calling at ports in Venezuela, Colombia and Ecuador, as well as the Caribbean. It is believed that the latter is increasingly being used as a staging post for drug trafficking, with no shortage of volunteers due to the decline in traditional industries. It is suspected that the drugs were bound for the US, Europe and/or Russia. The purpose of this Circular is to alert Members and Clients to the risks, and suggest measures to prevent similar incidents occurring.

Measures to prevent drug smuggling
The general aim in all instances is to prevent the illegal substances from coming on board the vessel in the first place. The following are some general guidelines for precautionary measures to be taken before entry into port, whilst in port and after departure.

Before entry
• Crew going ashore should be informed of the risk that possible drug traffickers may seek to befriend them in order to achieve their co-operation to smuggle drugs. The crew must understand that, apart from violating company policy, this could be potentially dangerous for themselves, their families, fellow crewmembers etc. Moreover, local authorities are likely to act forcefully against any crewmember who is considered to be associated with drug traffickers.

- Warning posters describing the risks involved in the carriage of drugs should be clearly displayed at the point of the entry/exit to the vessel and within the accommodation areas.

- The ship should keep accurate records of all activities observed and the actions taken by local authorities, stevedores and other shore-based personnel and crew before entry into port, during the stay and immediately after departure.

While in port or at anchor
• The master and crew must take all possible precautions to limit access to the vessel and monitor the surrounding area adjacent to the vessel whilst in port. Individuals who have no legitimate requirement for being onboard must not be allowed onboard. The crew should keep a log at the point of entry/exit, and the Master or Chief Officer should be informed if the watch is uncertain as to whether an individual has legitimate reasons to be onboard.

- A permanent watchman should be present in areas where stevedores or repair technicians are working onboard the ship. During hours of darkness all areas should be well lit in order to facilitate visual monitoring of activities. Any suspicious activities conducted by third parties on board should be reported to the Master. Attention should be paid to small boats approaching the ship and any suspicious activity in the vicinity of the ship which may warrant further investigation. The use of a searchlight during the hours of darkness should be considered.

- The crew should perform regular shipboard inspections throughout the duration of the port call. In ports particularly prone to drug smuggling, it should be considered to employ additional security guards from an approved supplier. When broken/missing seals for compartments, lockers, containers etc., are discovered an investigation should be conducted and if nothing is found the seals should be replaced by the crew. A record should be made in the logbook together with a note of the outcome of the investigation/search and the relevant seal numbers.

- Once cargo operations are completed, the crew should perform a full search of the vessel. In addition to looking for illegal substances, the crew should be on the lookout for stowaways. If there are any suspicions that drugs may have been placed onboard, the Master should request a comprehensive vessel inspection, including inspection of the vessel’s hull below the waterline, before departure. The most common measure is the anti-smuggling sub-aquatic survey to ascertain that no illegal substances are attached to the vessel below her waterline.

After departure
• Once the vessel has sailed and the outbound pilot has disembarked, a thorough search of all compartments should be conducted and the results recorded in the logbook.

Action to be taken if drugs are found onboard
If drugs are found on board the Master should immediately take steps as set out in the vessel’s Emergency Contingency Plan (as per the ISM Code) and/or the Ship’s Security Plan (as per the ISPS Code), one of which should include steps to be taken with regard to notification to the local authorities. The following general guidelines can also be given:

- The drugs must not be touched.
- Photograph or video the area of the ship where the drugs were found, but leave it untouched and seal it off to prevent any unauthorised access.
- Inform the P&I insurer, the local P&I correspondent and the shipowner/manager.
Loss Prevention Circular No. 06-03

Straight bills of lading – Do your bills use clear words? (Part II)

Introduction
Since Gard Services Loss Prevention Circular No. 13-02 was published in December 2002, the case referred to at footnote 4 of that circular – the RAFAELA S – has been appealed in the English Courts. The Court of Appeal’s judgment contains some very important and useful guidance on how the English courts have, in the past, and now ought to view straight bills of lading under English law. The case also made reference to the Voss Peer case mentioned in Circular No. 13-02 and to leading decisions in the courts of other countries, such as Germany and the Netherlands.

Although the RAFAELA S mostly dealt with the question of whether straight bills ought to be considered “documents of title” for the purposes of the Hague/Hague Visby Rules, the case clarifies how English law ought now view the carrier’s delivery obligations under such bills. One can also detect from the appeal a certain amount of criticism towards carriers for ambiguous wordings in their own bill of lading forms and for not using waybills instead of straight bills. It is particularly important to note the following:

Printed words requiring surrender of a bill of lading to take delivery
Reference was made in Circular No. 13-02 to printed words commonly appearing on the face of most bills of lading, and which in the RAFAELA S were:

“In witness whereof the number of Original Bills of Lading stated above [viz 3] all of this tenor and date, has been signed, one of which being accomplished, the others to stand void. One of the Bills of Lading must be surrendered duly endorsed in exchange for the goods or delivery order”.

At first instance these words were interpreted to apply only when the bill was negotiable. The Court of Appeal however disagreed and were persuaded that the better view was that the words reflected a requirement by the carrier that any bill presented should apparently entitle the holder to claim delivery (as with a bearer bill). The leading judge in the Court of Appeal (Lord Justice Rix) went onto to say:

“…I do not regard it as a happy matter that the omission of adding words “or order” in the consignee box in this case (or the omission to add a notify party in the form used in the CHITRAL!), either of which could have happened without deliberation at all, should have the effect of transforming a contractual document which in every respect looks and reads like a bill of lading into a sea waybill, when a sea waybill commonly takes a totally different form”

“If it had been intended that it [the printed paragraph containing the above words] should not apply when the bill was used in non-negotiable form, then it could very easily have said so. Against the background of common forms of sea waybills, it is truly remarkable that it does not say so”

“Everyone seems to be agreed that if a straight bill expressly provides, as it commonly does, that its surrender is required for delivery to take place, then it is a document of title”

Therefore, if words such as those mentioned above appear in a straight (and therefore non-negotiable) bill they will be interpreted under English law as giving the bill the function of document of title and with that a requirement for the production of an original bill to take delivery.

The absence of printed words requiring surrender of a bill of lading to take delivery
Whilst it was not necessary to do so, Lord Justice Rix went onto to give the view (obiter) that a straight bill of lading was, in principle, a document of title even in the absence of an express provision requiring its production to obtain delivery. Rix went onto say:

“A shipper needs the carrier to assist him policing his security in retention of the bill. He is entitled to redirect the consignment on notice to the carrier, and although notice is required, a rule of production of the bill is the only safe way for the carrier as well as the shipper, to police such new instructions. In any event, if proof of identity is necessary, as in practice it is, what is wrong with the bill itself as a leading form of proof. This is of course an inconvenient rule where the carriage is very short … and that is why sea waybills are used in such trades. But it is clear that straight bills are used in intercontinental carriage and therefore the inconvenience argument fails”

Therefore, regardless of whether words requiring production to take delivery appear in a straight (and therefore non-negotiable) bill, such a bill is likely to be regarded, at least in principle under English law, to be a document of title and with that will be a requirement for the production of an original bill to take delivery.

Words permitting delivery without surrender of a bill of lading
It is somewhat disappointing that the Court of Appeal did not go as far as to consider the position when a straight (and therefore non-negotiable) bill does expressly provide that delivery can take place without surrender of an original bill of lading, much in the same way as a waybill does. The Court of Appeal only went so far as to say:

“…it seems to be common ground that a document which does not have to be presented to the carrier to obtain delivery of the goods cannot be called a document of title”

“…whatever may be the position as a matter of principle and in the absence of express agreement, [our emphasis] the practice appears to be that a straight bill of lading, unlike a mere sea waybill, is written in the form of an otherwise classic bill and
requires production of the bill on delivery, and therefore transfer to a consignee to enable him to obtain delivery.”

“If it had been intended that it [the printed paragraph containing the above words] should not apply when the bill was used in non-negotiable form, then it could very easily have said so. Against the background of common forms of sea waybills, it is truly remarkable that it does not say so.”

There is nothing in the RAFAELA S case, which suggests any intention on the part of the English Courts to deviate from properly constructing a contract as agreed between the parties (i.e. a carrier and a shipper). In another notable recent “package limitation” case – The Kapetan Petko Voiveda⁴ - the Court of Appeal recognised that shippers have the option to negotiate acceptable carriage terms. There is no reason why this should not extend to any requirement for the production of an original bill of lading under a straight (and therefore non-negotiable) bill. Accordingly, the remark suggested in Circular No. 13-02 to be inserted in a straight (and therefore non-negotiable) bill of lading ought to minimise the risk, under English law, of a carrier being found liable for misdelivery by delivering cargo without production of an original bill.

General

Lord Justice Rix concluded: -

“I am not unhappy to come to these conclusions. It seems to me that the use of these hybrid forms of bill of lading is an unfortunate development and has spawned litigation over the years … Carriers should not use bill of lading forms if they want to invite shippers to do to to enter into sea waybill type contracts. It may be that ultimately it is up to the shipper to ensure that the boxes in these hybrid forms are filled up in the best way that best suits themselves, but in practice I suspect serendipity prevails. In any event, these forms invite error and litigation, which is best avoided by a simple rule”

Summary

Whilst the recommendations in Circular No. 13-02 still stand good, the judgment of the Court of Appeal in the RAFAELA S must be considered a stark warning to carriers delivering cargo under straight (and therefore non-negotiable) bills without production of an original bill. An agreement between the carrier and shipper to do so will be required, along the lines suggested, in order to minimise the carrier’s exposure to claims for misdelivery.

The case also supports a firm recommendation to carriers and shippers to use waybills instead of straight bills in circumstances where the functions of document of title (with the security that gives for the shipper) and negotiability are not needed.

According to Rule 34 of Gard’s Statutes and Rules cover is excluded for “… liabilities, costs and expenses arising out of the delivery of cargo under a negotiable Bill of Lading without production of that Bill of Lading by the person to whom delivery is made except where cargo has been carried on the Ship under the terms of a non-negotiable Bill of Lading, waybill or other non-negotiable document, and has been properly delivered as required by that document…”

2 If a straight bill were not deemed a document of title, the Hague/Hague Visby Rules would not apply under English law and the carrier would be free to contract on terms more favourably than such Rules. If those Rules had not applied in the RAFAELA S the more liberal package limitation under the US Carriage of Goods by Sea Act would have applied.
Straight bills of lading – Delivery – Do your bills use clear words?

Introduction
There have recently been a number of court cases questioning the status and functions of a straight bill of lading. A straight bill of lading is generally accepted to be one completed in such a way that delivery is to be made to the named consignee only. Accordingly, it is not a transferable or negotiable document of title, which can be used to transfer title (the right to possession) to the goods, covered by that document. Bills of lading that are made out “to order” are, by endorsement, negotiable documents of title. Bearer bills of lading are negotiable without endorsement.

The commonly held view is that, whilst delivery under a negotiable bill of lading should only be against production of an original bill, such production is not necessary under a straight (non-negotiable) bill of lading, i.e., delivery need only be made to the properly identified named consignee. As mentioned in Gard’s Guidance on Bills of Lading, however, and in light of recent case law, this view is over-simplistic and indeed dangerous. If care is not taken, the carrier risks facing claims for misdelivery.

The problem
In a recent case before the English courts, THE HAPPY RANGER, the bill of lading appeared to be a straight bill - the consignee box showed only a named consignee and did not contain the words “to order” or others similar. However, the face of the bill contained, in another body of text, the printed words “consignee or to his or their assigns” and these were the only words on the face of the bill indicating negotiability or otherwise. Since those words are accepted to mean “to order”, the court decided that made the bill negotiable.

Whilst this case did not concern a misdelivery claim, it nevertheless demonstrates that, if the intention is to issue a straight non-negotiable bill, clear words must be used (and other words should not conflict with them) to show that the bill is in fact a straight non-negotiable bill. If not, the bill will probably be deemed to be negotiable and the carrier will be obliged to deliver the goods only against production of an original bill. In another recent case, which did concern misdelivery, the carrier had delivered the cargo without production of an original bill. The shipper had retained the original bills (all three) because the buyer/consignee had not yet paid in full, and when he failed to do so, the shipper sued the carrier. The case, Voss Peer v APL Co Pte Ltd, was brought before the Singapore courts.

The bill of lading form was, as is increasingly commonplace, designed for various circumstances including when the bill is to be negotiable and when it is to be non-negotiable. It was accepted that the bill was a straight bill. Notably, the bill of lading contained printed words elsewhere on its face such as “Upon surrender to the Carrier of any one negotiable bill of lading, properly endorsed, all others to stand void”. Under English law such words were recently interpreted to apply only when the bill was negotiable. By implication therefore, under a straight non-negotiable bill, the carrier was not prevented from delivering the goods without production of an original bill. The Singapore Courts disagreed and decided that “clear words were required” to reflect the intention of the parties to contract out of delivering the goods without production of an original bill.

As a result, the Singapore courts found the carrier liable for the misdelivery claim. Less recent English case law suggests that the requirement for clear words may be correct. Carriers should therefore ensure that, where the bill is a straight non-negotiable bill, it contains clear words permitting the carrier to deliver the goods without production of an original bill.

Recommendations
In consideration of the above recent court cases, Gard Services recommends Members and clients to:

– Check their standard form bills, particularly those designed for various circumstances including when the bill is to be negotiable and when it is to be non-negotiable.
– Ensure that printed words in the bill make it clear in what circumstances the bill will be a straight non-negotiable bill. For example, use of the words “(B/L not negotiable unless “order”)” in the consignee box.
– Ensure that other printed words, particularly on the face of the bill, such as those in THE HAPPY RANGER, do not conflict with a bill which is intended to be non-negotiable. If those words cannot be deleted, or others more appropriate used, it should be made clear that they only apply where the bill is negotiable.
– The document issued should of course properly reflect what has been agreed with the shipper. If a non-negotiable document is sufficient, a sea waybill will usually be most appropriate. If a sea waybill cannot be issued, it is suggested that the straight bill should also contain words (handwritten or stamped to give preference over printed words) such as “where non-transferable/negotiable, the carrier is entitled to deliver the goods to the named consignee without surrender of an original bill of lading, and is obliged to do so unless the shipper requests otherwise before delivery takes place”.
– Where it is agreed that a non-negotiable document is to be issued, that, together with the carrier’s delivery obligations thereunder, should preferably be reflected in booking confirmations.
– In case of doubt, cargo under straight bills should not be delivered without production of an original bill, unless and until written consent has been obtained from the shipper.

Gard will be happy to review Members’ bills of lading and to provide guidance in light of the above. A more in-depth commentary on the cases referred to in this loss prevention circular appears in Gard News 169 (February 2003).

3 It contained the printed words “(non-negotiable unless consigned to Order)” and the words “to order” did not appear in the bill that was issued, either next to the named consignee or elsewhere.
4 See for example the RAFAELA S [2002] 2 Lloyd’s Rep. 403.
5 Sea waybills expressly state they are non-negotiable and that delivery does not require production of an original sea waybill.
Loss Prevention Circular No. 05-01

Bills of Lading: Is the shipper’s stowage request always compulsory?

Introduction
Bills of lading in a wording which may seem harmless until a claim arises can create problems for shipowners on wording. This circular outlines one such case where the bill of lading was clause to include a particular request for stowage of containers. For further information, please refer to the Gard Guidance on Bills of Lading which can be found on the Gard Services website at www.gard.no.

Course of events
At the port of New York, 9 containers said to contain (s.t.c.) 18 coils of aluminum sheet (2 coils per container), were loaded on board a containership for carriage to Santos, Brazil. The bill of lading was worded such that, in the event of having to determine the carrier’s liability for damage or loss of the cargo, each coil was considered a package.

The shipper’s instructions regarding the stowage of cargo on board should be followed. However, if for any reason the carriage cannot follow the instructions, the should ensure that the bill of lading is properly clause to protect his position.

The cargo underwriters argued that they were entitled to 100 per cent of the amount they had paid to their assured. They stated that the carrier had not complied with the terms of the relevant bill of lading as the cargo had not been carried under deck as requested by the shipper, and therefore would not be entitled to limit his liability. The cargo underwriters threatened to start legal proceedings in the United States as the shipment originated in New York. At some stage, cargo underwriters offered to settle the claim at the level of 70 per cent of the USD 184,000 claimed.

The shipowner had a potentially difficult case, as he had not stowed the cargo below deck as requested by the shippers. The affected containers were effectively loaded on deck. The shipowner continued searching for the best solution to the claim. As he was faced with the cargo underwriters looking to commence proceedings in the United States, he considered pieces of legislation which may help him resolve the matter.

The shipowner discovered a decision made in a prior case Insurance Company of North America v. Blue Star (North America) Ltd., where a similar situation had arisen. In the BLUE STAR case, a forty-foot container was loaded on the deck of a containership pursuant to a bill of lading stating “below deck stowage requested”. The case was heard at the Southern District of New York and the court concluded that the “stowage on deck of a containership is not an unreasonable deviation”. This decision of the court meant that the carrier was entitled to all the exceptions and limitations provided by U.S. Carriage of Goods by Sea Act, 1936 (COGSA). US COGSA applies to all inbound and outbound cargoes to and from the United States.

Furthermore, the court went on to analyse the meaning of the clause “below deck stowage requested” and concluded that the “bill of lading did not require below-deck stowage”, as the word “request” had been used in the bill of lading, and “request” was interpreted to mean “asking or petition”. There was no contract as only a petition had been made and “in order for there to be a contract, there must be mutual assent”.

A copy of this decision of the Southern District of New York was forwarded to the cargo underwriters with an offer to settle the claim based on the package limitation according to US COGSA, i.e. USD 500/package. Since the bill of lading stated that the packages were the individual coils (2 lost per container), an offer of USD 2,000 was put forward. After consideration, the cargo underwriters accepted the shipowner’s offer and the case was amicably settled for USD 2,000.

Recommendations
1. Shipper’s instructions regarding the stowage of cargo on board should be followed. However, if for any reason the carrier cannot follow the instructions, he should ensure that the bill of lading is properly clause to protect his position.

2. The wording of the clause stamped on the face of the bill of lading benefited the shipowner. By using the word “request” as opposed to “mandatory”, “compulsory”, “required” etc., the shipowner’s liability was significantly reduced. This reinforces the need to exercise considerable care when clausing a bill of lading even though the “request” of the shippers is the same.

3. The shipowner’s bill of lading had a clause on the reverse side giving the carrier the liberty to carry the containers on or below deck by saying “Goods, whether or not carried in containers, may be carried on deck or under deck without notice to the Merchant or any annotation on the face hereof... “ The shipowner should ensure that any bill of lading used by containerships in the liner trade includes this clause or similar wording.

4. All preventive recommendations should be adhered to as a precautionary measure. The Insurance Company of North America v. Blue Star (North America) Ltd. case was of assistance to the shipowner in this instance. However, it was a lower court decision. The possibility of higher court decisions in the future may lead to a different result that does not favour the shipowner.
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