

Mega box ship bulletin

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**The Standard
for service and security**



**Standard
Club**



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Introduction

As the size of container ships has steadily increased, so has the level of difficulty in handling casualties involving them. This special edition of the standard bulletin looks at the different legal, technical and practical considerations.

Mega box ship casualty

Ultra large container ships, or mega box ships as they are commonly called, can have a carrying capacity in excess of 20,000 TEU (twenty foot equivalent units) and are frequently in excess of 14,500 TEU.

This can have a considerable impact in the event of a casualty. In particular, the global shipping and insurance markets have expressed concern regarding the firefighting capability of these ships, which has not necessarily kept pace with their increasing size. It can be extremely difficult to find suitable ports of refuge to accommodate these ships and which have infrastructure capable of handling the number of containers on board. There are also

concerns about the difficulty and cost involved in carrying out a salvage or wreck removal of a mega box ship due to their size and the lack of suitable heavy-lift cranes/floating sheerlegs.

P&I club response

The Standard Club has had first-hand experience of dealing with container ship casualties, having handled the *MSC Chitra*, the *MSC Flaminia* and, more recently, the *Maersk Honam*.

On 6 March 2018, the 15,000 TEU *Maersk Honam* (which was carrying 7,860 containers) caught fire whilst sailing in the Arabian Sea, which tragically resulted in the death of five of its crew. It took five days to bring the fire under control and a further seven weeks before the ship could be towed to a suitable port of refuge – Jebel Ali in the United Arab Emirates.

The fire destroyed cargo in almost 2,000 containers in the ship's first three holds and led to a complex and challenging operation to remove and dispose of the waste, which is still ongoing over a year after the incident.

In the event of a mega box ship casualty, the club would take the lead in co-ordinating the initial emergency response in conjunction

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with the member, salvors and relevant authorities. Experienced claims-handling personnel would be deployed to the site to devise a longer-term resolution strategy with the member and the appointed surveyors, salvors, technical experts and lawyers who form the overall casualty management team. The club can also spearhead contractual negotiations to facilitate the removal and disposal of the damaged cargo, the environmental response and the salvage or wreck removal of the ship, as well as handling cargo, personal injury, pollution and property damage claims.

This bulletin

The articles in this bulletin provide an overview of the various legal, technical and practical issues that may arise in a mega box ship casualty.

In the leading article, we provide an outline of how P&I insurance can respond to the various third-party liabilities that can arise from such a casualty. Simon Burnay (Waves Group) then tackles the technical challenges during the initial response phase of the casualty, highlighting the importance

of having an accurate container stowage plan if cargo lightering operations are required to refloat the vessel or tow it to a port of refuge. Nick Barber (Stephenson Harwood) then examines the difficulty of identifying a suitable port of refuge given the size and draft of mega box ships and the number of containers on board. Since General Average (GA) may be declared following such a casualty, Amy O'Neill (RHL) examines the principle of GA and how it will be applied. This is followed by a review of the challenges involved in post-casualty management of the cargo by Gianluca Rolff (TMC). Richard Janssen (SMIT) then provides an insight into handling the casualty from the perspective of a salvor and Nick Haslam (Brookes Bell) describes the role of the Special Casualty Representative (SCR). Daniel Jackson (Burgoyne's) leads us through investigating the causation of a fire on board a mega box ship and Tim Wadsworth (ITOPF) addresses pollution aspects. John Dolan (The Standard Club) follows this up by providing an insight into the shipboard response to the casualty. Marina Taouxi and Tony Goldsmith (Hill Dickinson) summarise the shipowner's

legal right to limit its liability in respect of cargo claims and other liabilities that can arise, including collision, personal injury and wreck removal. Tom Peter Blankestijn (Sea2Cradle) reflects on the implications when the ship itself or hazardous materials on board need to be disposed of under international waste regulations. Lastly, Mark Clark (MTI Network) provides an insight into the role of the media consultant and how they can assist when shipowners are handling such a casualty, since it is likely to provoke intense media scrutiny.

Thank you to all of our authors for their contributions to this bulletin. We hope that all who read it find it useful and informative.

An overview of the insurance implications of a mega box ship casualty

A mega box ship casualty will result in a number of losses and third party liabilities for an owner. This article looks at the major areas of P&I cover that respond to a major casualty incident.



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P&I claims handling

From the outset, the club will work closely with our member and its hull insurers to ensure that prompt action is taken to try and avoid and mitigate any losses and liabilities.

Loss of life and personal injury of crew

The crew's safety and wellbeing is at the forefront of our minds when dealing with any casualty or major incident. Upon notification to the club of any such incident, usually a search and rescue operation is already underway. The club, via its extensive global network of correspondents, will help ensure that the crew members receive the best level of medical treatment and are properly assessed before their repatriation home is arranged. The club is also able to draw on the services of CEGA, a specialist medical management company, part of the Charles Taylor group, in appropriate cases.

The cost of medical treatment and repatriation is covered under an owner's P&I policy as are the costs of the funeral for any crew member who may have died as a result of the incident. P&I cover also responds to a member's responsibility at law and/or under a collective bargaining agreement and the employment contract to compensate the crew member (or their family) for any injury or death in service.

Liability of the owner to crew for the loss of personal effects is also covered.

Collision liability

Typically, a ship's hull underwriter will cover three-fourths of the liability of the insured ship in respect of loss of/damage to another ship and her cargo as a result of a collision. Generally, this means one-fourth of this liability is covered by the ship's P&I policy (although other arrangements are often in place). Hull underwriters and P&I will work together in respect of handling collision liability and the provision of security.

Pollution

Over recent years, there has been a significant increase in an owner's liability for pollution caused as a result of a casualty or incident, such as an escape of cargo and/or bunkers. The club and the owner will work actively with organisations such as ITOPF to try and mitigate the effects of any pollution. P&I cover will respond to an owner's legal liability for such accidental pollution as well as steps to be taken to try and prevent and/or minimise any such pollution following an incident.

The club can also provide security by way of a letter of undertaking for P&I liabilities such as pollution and wreck liabilities to allow a ship to enter a port for refuge.

Wreck liabilities

P&I cover includes liabilities for or incidental to the raising, removal, destruction, lighting or marking of the wreck of the ship (or cargo or property carried on the ship). The value of the wreck and all stores and materials saved will be deducted from any reimbursement payable to members.

Cargo liabilities

A mega box ship has the capacity to carry a huge volume and variety of cargo which means that any casualty or incident involving a mega box ship has the potential for an extraordinary number of cargo claims. Unless different arrangements are agreed in advance with the club, cargo liability cover is given on the basis that the contractual terms of carriage are no more onerous than those of the Hague or Hague-Visby regimes (or Hamburg Rules where applicable by law).

P&I cover also responds to an owner's liability to discharge or dispose of worthless cargo (provided such costs cannot be recovered from any other party). As is discussed later in this publication, local and international regulations must be adhered to when disposing of damaged and often hazardous cargo which can make this process very complicated and expensive.

Cargo's proportion of general average or salvage

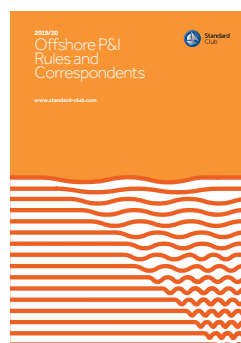
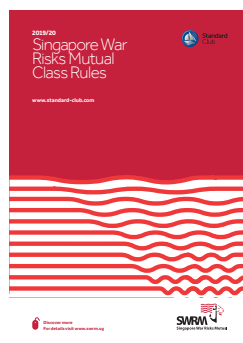
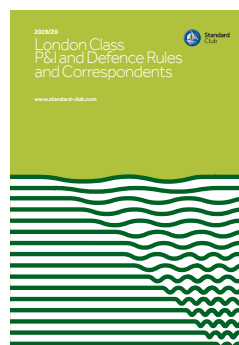
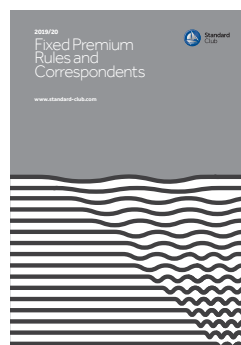
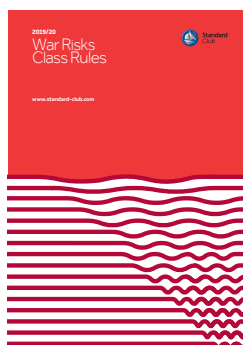
P&I cover extends to the proportion of general average, special charges or salvage which an owner is or would be entitled to claim from cargo interests or another party which is not recoverable solely by reason of a breach of the contract of carriage.

SCOPIC

SCOPIC (or Special Compensation P&I Clause) is an adjunct to the Lloyd's Open Form salvage contract, designed to encourage a salvor to respond where there is a threat to the environment but where the traditional assessment of salvage remuneration may not provide sufficient encouragement. Although P&I cover includes SCOPIC remuneration, owners should be careful to ensure that no side letters are signed with the salvors without first consulting with the club as such side letters could prejudice cover and could render any SCOPIC security provided by the club invalid.



It is to be noted that P&I cover works on the pay to be paid principle hence the club is to reimburse its member once the liability has been settled by the member.



The technical challenges of mega box ship casualties

The increasing size of mega box ships presents a number of important technical challenges in a casualty situation that must be properly considered when assessing and dealing with the ship, in order to minimise loss and damage.



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Condition of ship

In any casualty situation, it is vital in the early stages to understand the ship's condition. Information such as the ship's draft, list angle, trim, condition of tanks and cargo, and type of seabed (if aground) are key. This information can be provided by the ship's crew and will be used by the first responders, ie salvors, naval architects and consultants working with the ship's P&I club.

An initial assessment will be made of the immediate risk to the crew, any potential environmental impact, the ship's structural integrity and residual strength, as well as stability issues and potential cargo loss or damage. If the ship is aground, an estimate of ground reaction forces will be made, together with the required pulling force to free the ship, enabling an appraisal of the number and type of assets required to assist the ship as well as providing an early indication of the potential costs.

During these early stages, when making an initial assessment of the casualty, it is common to use the available data from an existing, similar-sized ship to give an indication of the likely condition of the casualty. Given the recent emergence of ships of this size and the relatively few incidents experienced to date, such information may not be at the naval architect's disposal. Therefore, information contained in the ship's drawings and documentation (such as the pre-incident loading condition, general arrangement drawings, tank capacity plans, stability booklets/ loading manuals, cargo manifest, etc) will be invaluable in the early stages, as it will enable an accurate assessment of the ship's condition and expedite the production of a detailed plan to deal with the casualty. It will also assist in understanding how the ship's compartments are flooding or may flood due to cross flooding or progressive flooding through openings. Having this information to hand at an early stage can allow plans to be made rapidly to prevent this occurring and to minimise the danger to the ship.

It will also help the naval architect to understand the implications of different solutions; for example, using firefighting water to extinguish or cool a fire on board may have adverse consequences on the ship's strength, stability and floating drafts. If the ship is both aground and on fire, the additional weight from firefighting water will impact the ground reaction and residual strength of the ship, thereby complicating the salvage operation.

Lightering operations

A grounded ship of around 20,000 TEU container capacity presents significant challenges if lightering is required to refloat it. In recent grounding cases, such as the *CSCL Indian Ocean* and *CSCL Jupiter* on the River Scheldt, it was fortunate that no cargo lightering operations were required, and the ships were refloated using the pulling force of tugs alone. However, if containers need to be removed before the ship can be refloated, this presents a huge challenge due to the difficulty in bringing suitable cranes alongside the grounded ship. With such large ships, the necessary height and reach of cranes is prodigious, as is the size and draft of the ships needed to support them. A large deck and terminal space will also be required to remove, process and temporarily store a significant number of containers. Furthermore, if the ship has a significant angle of list or trim, the problem of removing the containers from the ship becomes even more challenging.

For cargo lightering operations during a casualty, it is essential to have an accurate container stowage plan detailing the weights and contents of the containers to be removed, whether they contain any dangerous goods and whether they require electrical power for reefer units. This information will assist in assessing the potential environmental impact if containers are lost overboard, either during the casualty or in subsequent efforts to assist the ship.

The cargo manifest and BAPLIE file (which shows where containers are stowed on a ship) are essential information.

Towing to a port of refuge

In many casualties, it is likely that the ship will require assistance by tugs either to refloat it or to tow it to a port of refuge, and therefore a calculation of the towage requirements will be made. Very large container ships will have a very high windage area and will therefore experience significant wind resistance in addition to the resistance of the hull through the water. Again, a detailed container stowage plan is required to enable such a calculation to be accurately made. Depending on the location of the casualty, there may not be sufficient tug capability available to safely tow the ship, which may result in the ship being put at further risk (for

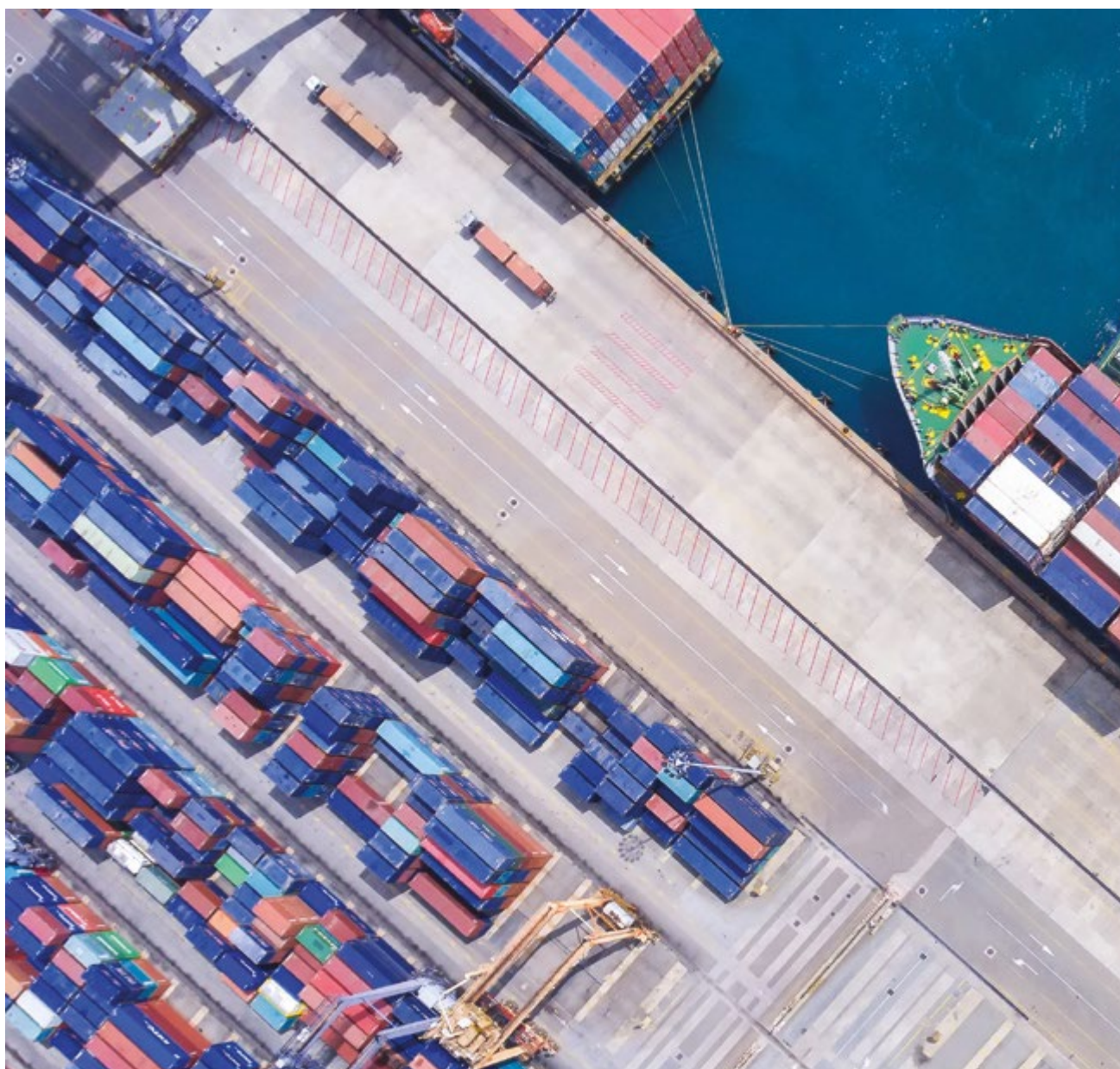
example, grounding/regrounding). A quick response is therefore essential.

Once the casualty has been brought under control and the ship can be taken to a port of refuge, it will be necessary to consider the repairs to be made. Therefore, a suitable repair yard with sufficient berthing/dry-docking facilities large enough to accommodate ships of this size must be found. If the repairs required are significant, it may be necessary to offload any sound cargo on board and trans-ship it by alternative ships to destination. The casualty may then be towed to a suitable location for repairs, which may be thousands of miles away. This must be factored into any potential repair cost estimates and could contribute a significant amount to the repair and cargo costs.

Conclusion

Following a casualty, as much information as possible should be provided to enable a comprehensive assessment of the ship's condition and to assist in formulating a suitable response plan. However, the ever-increasing size of mega box ships has made it more complex and challenging during the initial response phase, especially when cargo lightering operations need to be carried out to refloat the ship or tow it to a port of refuge.

A quick response with accurate data and information is therefore critical to the success of minimising any loss in a casualty.



Finding a port or place of refuge

In the event of a casualty, one of the first issues for the owners and salvors of a mega box ship to grapple with will be to identify a place or port of refuge willing and able to accept the damaged ship and cargo. This article looks at the potential difficulties.



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Issues that can make identifying a place or port of refuge difficult include the risk of the ship sinking in a fairway or harbour and causing substantial economic loss, the size of the ship and height of the container stacks (which make suitable cargo-handling facilities harder to find) and the fact that extinguishing container ship fires can be a drawn-out process.

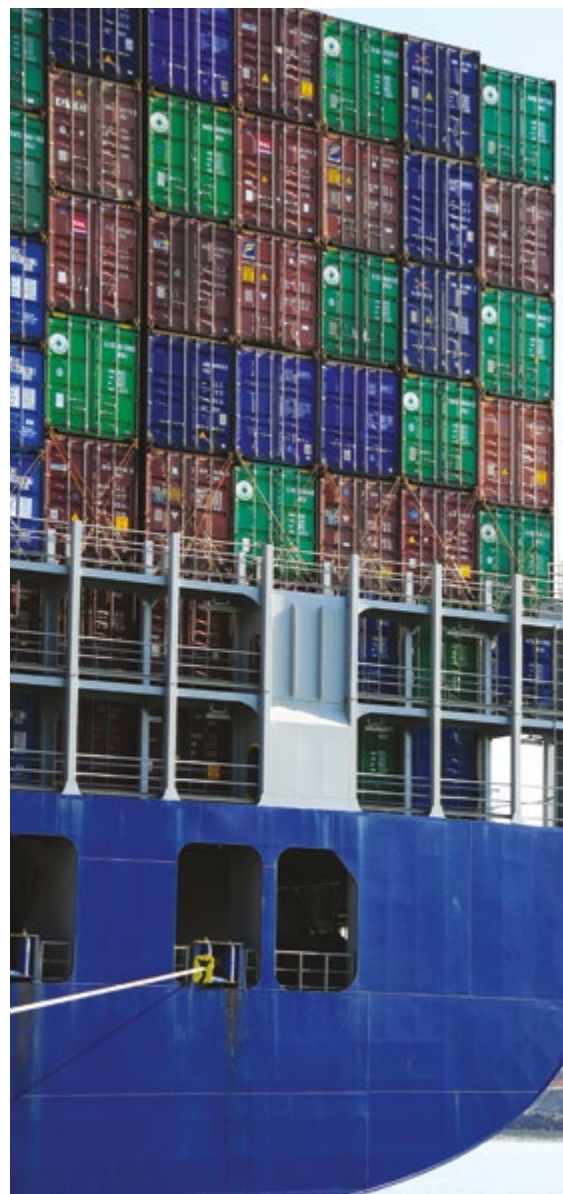
As a result, owners and salvors are frequently faced with the relevant authorities in suitable ports and places of refuge adopting a cautious '*not in my back yard*' stance in relation to providing refuge to a damaged ship. The Salvage Convention 1989 is unhelpful in this regard:

- (i) Article 11 (Co-operation) imposes obligations on state parties to co-operate with salvors and owners to ensure the efficient and successful performance of a salvage operation and prevent damage to the environment, but
- (ii) Article 9 (Rights of Coastal States) provides for the right of state parties to protect their coastlines or related interests from pollution or the threat of pollution.

IMO guidelines

The 2002 *Prestige* casualty and the subsequent oil spill, when a place of refuge was not provided to the ship, brought this issue into sharp focus. Soon after, the IMO Assembly adopted IMO Resolution A.949(23) setting out guidelines on places of refuge, which are intended for use when a ship is in need of assistance, but the safety of life is not involved. These guidelines will have limited application, because the safety of life is generally involved when a ship is in need of a place of refuge.

The guidelines recognise the need to balance the preference for removing cargo and bunkers and repairing the damaged ship in a place of refuge with the economic and environmental risk to coastal states. They acknowledge that, therefore, granting access to a place of refuge '*may involve a political decision which can only be taken on a case-by-case basis*'.



Practical issues

The practical issues faced by owners and salvors when bringing a mega box ship casualty into a port or place of refuge are likely to include:

1. Identifying a place or port of refuge with sufficient draft to accommodate the damaged ship, facilities to handle the cargo, space to separate and survey containers from the damaged ship, and facilities to handle and dispose of any damaged containers, cargo or other debris arising from the casualty. This may include potentially hazardous materials such as contaminated firefighting water.
2. Identifying the various local conditions that must be met for the damaged ship to be allowed into the port or place of refuge. Reassurances and sometimes security must be provided to the relevant local authorities for liabilities such as wreck removal, business interruption, pollution prevention and clean-up expenses, damage to the port or place of refuge, and third-party claims.

Cargo issues

In addition, there are likely to be local legal requirements with regard

to 'importing' cargo, among other things. This may be required in the case of damaged cargo that must be disposed of in the relevant jurisdiction. 'Export' and on-shipment of sound cargo is generally straightforward on the basis that it is not imported in the first place, particularly where bonded storage facilities are available at the port of refuge. However, issues can arise at delivery ports if cargo that is assumed to be sound arrives damaged, because consignees generally have to pay import taxes on the full value of the goods before they are released by customs. Where the goods are in fact damaged or worthless, consignees can face considerable difficulty in being reimbursed by the authorities.

Generally after a fire or flooding, there will be a considerable number of containers that need to be surveyed, sometimes with a number of parties (the General Average surveyor, cargo interests' surveyor, owner's surveyor, salvor's surveyor, slot charterers' or Ship Sharing Agreement Partners' surveyor, and often a port or customs representative) in attendance. Good communication and co-ordination are crucial, and can be achieved by having a highly competent owner's surveyor in control of the process. There may also be conflicting views regarding

the need to investigate causation and preserve evidence on the one hand, and the need to remove and survey the damaged cargo on the other. To inspect the contents of containers, it is necessary to break the seals on the doors. Local customs authorities may object to this and impose fines if it is done without their permission. In addition, it follows that the numbers on the new seals will not match the numbers of the seals on the 'as shipped' cargo documentation and this can lead to difficulties obtaining delivery at discharge ports. Customs requirements vary from jurisdiction to jurisdiction, but it is essential to have good local agents and representation in order to ensure that the process is planned properly and the necessary authorities are kept informed.

Conclusion

It must be borne in mind that for some of the people involved, particularly in the port, it may be the first time that they have had to deal with many of the issues that arise in a major box ship casualty. Addressing these issues requires close co-operation between the owners, salvors, P&I and H&M insurers (and their advisers), local correspondents and the relevant authorities at the place or port of refuge.



If General Average is declared...

In practice, the principles of GA are the same whether the ship is a bulk carrier with one consignment of cargo or a container vessel carrying 20,000 TEU of containerised goods. The practical issues do, however, increase in scope depending on the scale and complexity of the casualty and number of interests involved.



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The concept of General Average (GA) dates back to Rhodian sea law of 800BC; however, it has never been more relevant to marine insurance than it is today. Over time, it has been put under scrutiny and its relevance to modern-day commercial shipping questioned. In spite of issues being raised about the GA process, particularly in respect of its practical application in large multiple bill of lading GA cases, it remains the key framework for dealing with losses, sacrifices and expenditure made or incurred at a time of peril during a common maritime adventure. This is particularly relevant in the context of large box ship casualties, many of which have featured in the press in recent years.

Casualty scenario

Consider the example of a cargo fire on board a ship with 15,000 TEU of containerised cargo during a voyage from Europe to Asia. The shipowner's priority will be to extinguish the fire as quickly as possible to minimise damage to the property involved and prevent the total loss of the ship and cargo at sea.

Once immediate action is undertaken, there are many other practical issues to consider:

- availability of salvors and equipment
- possible ports of refuge that can accommodate a vessel of this size and handle any distressed cargo operations, deal with the disposal or treatment of any extinguishing water, undertake suitable repairs, and discharge and transship cargo
- co-operation of local authorities.

The shipowner will also incur large amounts of expenditure and losses that are over and above any contractual obligations.

Why declare GA?

The key benefit of GA to all parties to the adventure is that it provides a framework that allows for the shipowner to take immediate action at a time of real peril to attempt to save the property involved, with the reassurance that, in due course, once the danger has subsided, these

expenses and losses will be assessed by an independent expert and those allowable as GA will be contributed to by all parties involved on the basis of their arrived values at destination. This is not only for the benefit of the shipowner, it is also of vital importance to the cargo interests whose cargo may have suffered sacrifice damage (such as extinguishing water damage) and who are due credit in GA for any amounts made good. This is clearly of mutual benefit to all involved in the common maritime adventure and is the fundamental principle of GA.

It should also be mentioned that under English law and the York Antwerp Rules, the adjustment of GA and the consequences of fault are kept separate, leading to necessary action being taken at a time of peril, after which the GA adjustment is drawn up leaving any parties to dispute fault as they feel necessary at a later stage.

It is important in any casualty situation for the shipowners to consult with an average adjuster at an early stage so that expert advice can be provided, all options available can be explored and consideration can be given as to whether a GA declaration is required. This depends on the specific circumstances of the case, including the level of GA expenditure incurred by the parties to the adventure and the GA sacrifices made, the insurance

coverage in place and whether there are any alternative ways for interests to recoup their expenses.

If it is established that GA should be declared, the shipowners will appoint the average adjuster to act on behalf of all the parties as an impartial expert in the law and practice of GA, and to perform the GA security collection and, in due course, produce the GA adjustment specifying which amounts are due to which interests.

The GA process

Upon declaration of GA, the cargo interests will be asked to provide an average bond, signed by the owners of the cargo, along with an average guarantee, signed by the cargo insurers. These documents provide an undertaking that the party will pay any GA contribution ultimately due from them under the final adjustment. Shipowners have a possessory lien on cargo for reasonable GA security, which they are required to collect on behalf of all parties to the adventure, including those cargo interests who have sustained GA sacrifice. The adjuster will work to collect and process this security. It is important that the demand for security is made as soon as possible, as many cargo interests delay providing security until the cargo is approaching destination. Cargo should not be released until full security is in place, so clear communications and updates are vital to minimise delays at destination.

Where cargo is insured, the process is straightforward. Cargo insurers and representatives are familiar with the requirements. As such, they are generally comfortable with providing the standard security documentation, which provides an undertaking to pay any amount ascertained to be properly

payable by their interests in GA in due course. One of the complications when handling large GA security collections is the level of uninsured cargo on board container vessels. The latest estimates suggest that uninsured cargo accounts for approximately 10% to 15% of cargo on board. Where there is no insurance, the cargo interests will be requested to pay a percentage of their cargo value as a deposit in respect of their ultimate GA contribution and the GA adjuster will calculate a suitable amount using the facts available. On a mega box ship, the number of cargo interests will be larger and therefore the time taken to contact each will be greater. As a wider issue, it is important that cargo owners insure their cargo against such losses in order to avoid such requests for cash security.

Once the GA security collection is completed and the cargo is delivered, the average adjuster will work to collect all GA expenditure incurred by all parties to the adventure and make appropriate allowances in GA in accordance with the relevant York Antwerp Rules incorporated into the contract of affreightment. They will calculate and agree the contributory values of all property involved, including reviewing cargo claim documents and making allowances for GA sacrifice. The GA is then apportioned over the values of the property, with each party due to pay a percentage of their contributory value in GA. Credit is then given for GA expenses or losses (sacrifices) paid or incurred by the party, the final result being each party is due to pay or receive an amount in GA under the GA adjustment. These amounts are then collected and distributed by the adjuster in accordance with the adjustment, thereby completing the process.

Conclusion

Container ships remain the lowest cost option for transporting cargo globally and it is relatively rare to lose cargo in a serious casualty, so the popularity of this mode of transport is predicted to continue to grow, along with the sizes of the ships involved. When casualties do occur, given the costs involved, there seems little option but to declare GA. The principles of GA remain the most effective and mutually beneficial way of dealing with such cases and there is yet to be suggested any suitable alternative process.

As container ships continue to grow in size, GA and the process itself will continue to develop to meet the increased demands. This is particularly evident in the security collection process, which has been adapted to meet the large number of interests involved, which will only grow. Advances in technology and IT developments will continue to play an increasingly important role in aiding these processes and assisting the experts in their handling of these cases. It appears that until any suitable alternative is proposed, GA is here to stay.

Post-casualty management of the cargo

This article provides practical advice on how to handle the complex logistical task of managing distressed and undamaged containers following a mega box ship incident.



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The post-casualty management of several hundred or thousand distressed containers and cargoes, together with undamaged units, presents an owner with a very complex logistical task which is likely to be expensive and timely to resolve.

For the shipping line to achieve a successful outcome, much depends on the condition of the ship, the location, the infrastructure and facilities of the port of refuge, and the local authorities' willingness and capability to deal with a troubled large ship.

If General Average (GA) has been declared, the ship's owner, through average adjusters, will most likely appoint a GA surveyor who will act in the general interest to assess the type and level of damage.

How can cargo become distressed?

A serious fire will not only lead to burnt cargoes or heat and smoke damage, but also to contamination by fire-fighting water possibly containing chemicals and debris originating from the various wetted products within the wet/flooded holds. A grounding incident and a collision below the waterline could breach the ship's hull, with consequent flooding or a breach of the bunker tanks. Therefore, a serious casualty would most likely lead to a large number of containers/cargoes being distressed.

The distressed cargo can become dangerous to humans and the environment, and therefore will be a concern to the relevant authorities. As such, distressed cargo often requires management input to ensure its safety and to protect its residual value.

Post-casualty management of sound containers/cargoes

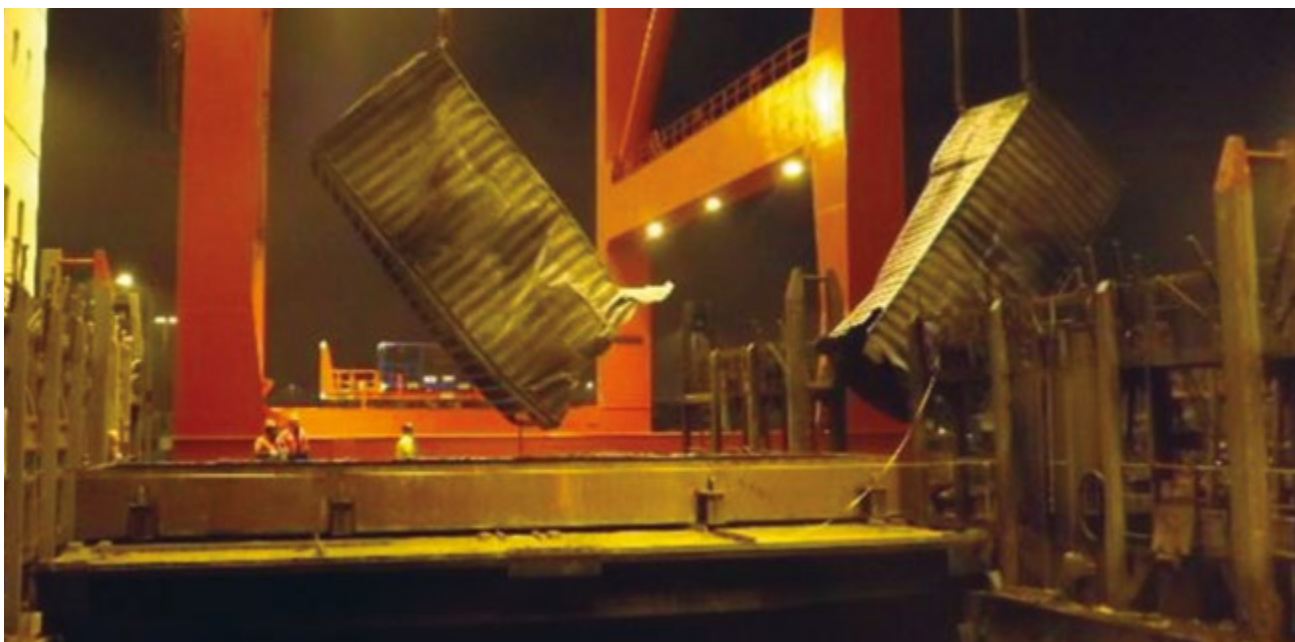
In today's busy world, there are few container terminals that do not suffer from a degree of congestion in their normal daily operation. The lack of wharf and stacking space availability is one of the main challenges a shipping line will face when requesting a port to accept not only several hundred distressed containers but also thousands of sound containers, at short notice, from a mega box ship casualty.

Container terminals also have time constraints. It is not unusual for some South East Asian ports to require thousands of undamaged containers to be moved out within a week, which is a very short time frame. The logistics involved in resolving these issues are costly, and the shipping line may have to divert other container ships to the port of refuge or even charter ships purposely, in order to lift the sound containers at short notice. Furthermore, GA and/or salvage securities may have to be provided by the cargo interests if GA is declared by the owners.



What is distressed cargo?

Distressed cargo is cargo shipped by sea that may not reach its specified consignee in its original state due to the misadventure of the ship engaged in its carriage.



Containers stuffed with cargoes that have absorbed water will have their weight considerably increased and may break upon lifting, with cargo falling into the holds

If long delays occur at the port of refuge, the cargo interests may abandon their sound consignments to the shipping line, for instance when goods have a fast approaching expiry date or if the delay would affect the market conditions at the destination. In these cases, a shipping line may task surveyors to establish whether the consignments retain residual value in alternative markets, which requires exploration of salvage sale avenues.

Cargo documentation required

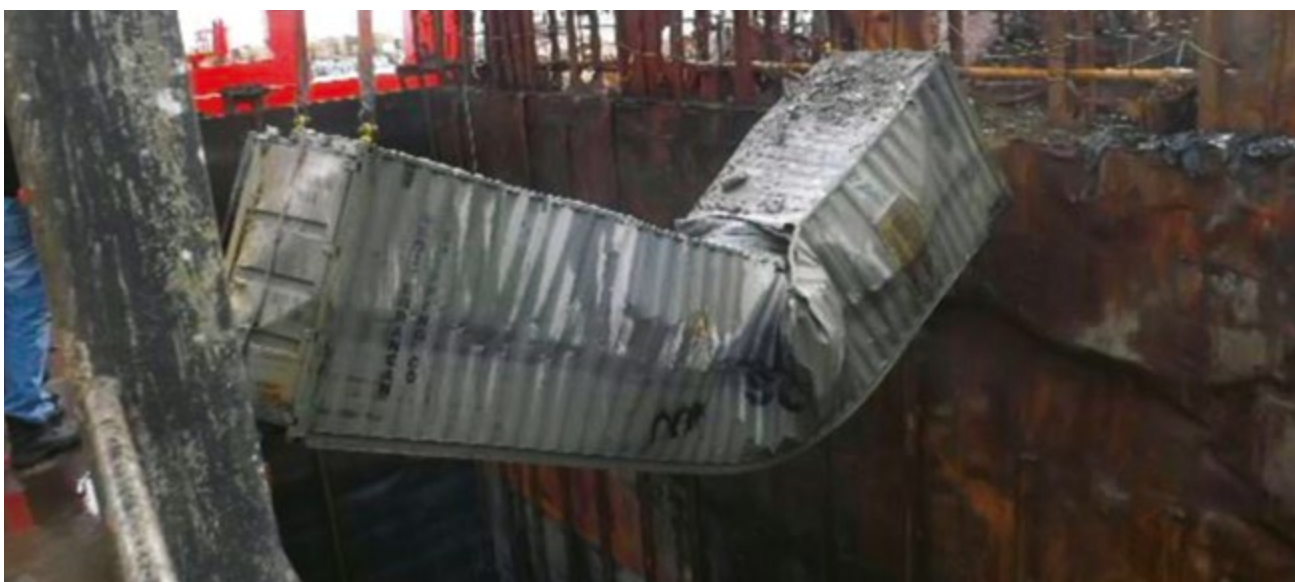
In order to have full knowledge of the types of cargo on board the ship, for the purpose of its post-casualty management, a number of cargo documents must be made available. From experience,

fundamental documentation such as cargo manifests may prove to be quite hard to obtain, especially at the initial stages of the incident. Owners or head charterers may not have a general manifest readily available or may be reluctant to provide it.

Additionally, when several slot charterers are involved, cargo information is often provided in different formats and may well be incomplete. It usually takes several days to create a database on a workable document that allows for a full understanding of the cargoes under review and provides the basis of how to manage the damaged goods on board and ashore.

Once the cargo manifests are obtained, these can be 'married' to the BAPLIE file. A BAPLIE file is an electronic information file holding information about every slot occupied on board the containership. It is typically exchanged between the container terminal operator, the ship operator, the shipping line and the ship's master.

The BAPLIE does not indicate the container's cargo, which is usually found in the manifest. The two documents are therefore complementary when planning the management of the distressed cargo.



Containers that have been submerged for several weeks may have their longitudinal strength compromised and may bend upon lifting



Hazardous firefighting water inside flooded holds



Authorities may require that the wetted containers be handled within purposely built trays in order to avoid water dripping on the quayside

Shipboard operations

Practical risks

Once the ship is made safe for distressed cargo operations at the port of refuge or perhaps at anchorage, the shipping line will be faced with several practical difficulties. For example, can the containers be handled or lifted safely? There may be distorted container guides in the cellular hold. There could be physical or mechanical damage to the units. Flooded and submerged containers may be stuffed with water-absorbing commodities, which would render the units bulging and overweight to the extent that their longitudinal and transversal strength is compromised. They could break up upon lifting, whilst floors might give away and cargo might fall into the ship's holds.

Environmental risks

Is the water in the flooded hold hazardous due to possible heavy fuel oil contamination or from chemicals released by wetted commodities? This would pose a problem in containing the contaminated water dripping from the units that are being discharged. Environmental safeguards will have to be set up accordingly.

Health and safety risks

Wetting to 'organic' cargoes (especially if prolonged, ie through submersion in flooded holds), aside from developing mould spores and possible insect infestation, would, in some instances, trigger a process of self-heating and fermentation – the latter being in terms of decomposition, generally accompanied by the evolution of gas. Wet damaged organic cargoes having high oil content have a tendency to self-heat or even suffer spontaneous combustion.

Different organic cargoes display various degrees of biotic activity, but under normal circumstances, CO₂ (carbon dioxide – an asphyxiant gas) would evolve. Organic commodities when wetted and submersed in seawater for long periods of time would produce other dangerous gases such as:

- H₂S (hydrogen sulphide – a colourless, flammable, highly toxic gas with a 'rotten egg' smell)
- HCN (hydrogen cyanide – a colourless poisonous and flammable gas resulting from the combustion of organic materials)
- CH₄ (carbon tetrahydride, better known as methane – a non-toxic but extremely flammable gas)
- CO (carbon monoxide – a poisonous colourless, odourless and tasteless gas).

Certain chemical cargoes, if carried dry, pose no harm, but if they come in contact with water, chemical reaction could alter their state and they could become dangerous.

Shore operations

Shoreside preparation

The handling and unloading operation of the distressed cargo from the ship must be synchronised with the operation ashore. The shore site must be ready to receive the distressed cargo. In particular:

- Equipment and materials must be available and ready.
- Contractors must be tasked and properly instructed for the challenge ahead.
- Wharf space and storage space may be limited.
- Local laws and regulations are usually restrictive.

Surveyor liaison

Another important part of distressed cargo management is dealing with the many surveyors, who make representations on behalf of the various shipping lines and the cargo interests. The volume of email communications is usually extremely large and the co-ordination and planning of the surveys can be very time-consuming.

During the survey work, container door-end inspections are generally carried out in order to take swift on-the-spot decisions regarding whether cargoes are to be declared total losses or whether they can be reworked in order to realise any full or residual value, possibly at final destination or perhaps by way of arranging salvage sales, if local laws allow. Follow-up surveys may need to be carried out at the time of reworking/ cross-stuffing, ie unpacking for repacking into replacement containers where the original units are no longer suitable for onward shipment.

Waste disposal

Disposal of waste (whether this is cargo or container shells) will also need to be managed, and prior to proceeding with this exercise, the affected units may need to be cleaned and the total loss consignments may need to undergo separation of materials for recycling (eg wooden pallets, plastic wrapping, cardboard cartons, metal, glass, chemicals, etc).

Conclusion

In summary, a great deal of co-ordination and constant control is required in order to ensure a successful cargo management operation which covers both shipboard and shoreside logistics. Consideration of economic, environmental, logistic, administrative and legal parameters is critical, as are excellent and expeditious communication and relationship management skills.



Cleaning basin: Containers may need to be washed in order to be further transported



Disposal basin: Containers/cargoes that are considered a total loss will need to be destroyed for final disposal



Bird's eye view of a distressed cargo shore operation: A considerable space on the quayside is needed to set up a successful operation

Responding to a mega box ship casualty – a salvor's perspective

This article gives a personal view of the most important considerations for shipowners and salvors when faced with a mega box ship casualty.



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Generally speaking new transportation concepts are treated with a fair degree of caution by the majority of people in the shipping industry – let's say 'guilty until proven innocent'. Fifty years ago, no one could have imagined the tremendous impact that containerisation would have on the way that goods are still being shipped around the world today. Another phenomenon is the 'go large' drive that shipping has embraced when being presented with jumbo-sized ships that could help liners, amongst others, in their tough operating environment. However, during the last ten years, serious concerns have been voiced by the underwriting community about their possible exposure in the event of a major maritime emergency situation involving a mega box ship, due to the presumed lack of response capability due to, again presumed, lack of investment by salvage companies.

However, it is the very same community that enjoys the buyers' market that results in considerable pressure on the salvors' margins over the last five years or so and, unfortunately, the shipping community has not engaged with the salvage industry to assess a possible capacity gap and ways to close it.

New types of risk

There are of course a number of different types of casualty situation. The traditional ones most looked at when assessing risks are failure of equipment or machinery, and navigational errors, leading to possible hull damage, groundings, environmental impact, etc. Emerging risks such as cyber security, the use of LNG as fuel and autonomous ships were, until recently, regarded as "tomorrow's problems".

Dangerous cargo

In the context of a mega box ship casualty, the most interesting risk to explore is 'what is actually in those containers?'

When I started working in the salvage industry in 1999, my first encounter with a then large container ship was the collision between the *Ever Decent* with the cruise ship *Norwegian Dream*. Before our team had been able to assess the situation on board the casualty, we had the representatives of a chemical manufacturer in our office explaining how close the passengers on board the cruise ship and the coastal communities had come to a disaster. It

turned out that, because of up to where the bow of the ship had entered the hold of the container ship, their product was loaded in the collision area.

A number of container fire cases that year, for example, the *Aconcagua*, the *DG Harmony*, but in particular, the *CMA Djakarta*, focused on the way that calcium hypochlorite was transported, which by then had led to a hive of activity for salvage companies due to the combustion of this cargo in certain circumstances. Other major fire cases were the *Hanjin Pennsylvania* and *Huynhai Furtune*. Fast forward a few years and prudent operators who were considering their larger new build container vessels tasked Smit to look into ways of increasing the effectiveness and range of fire-fighting tools on-board before 'the cavalry', professional salvors, would arrive on-site. Recommendations were made but investments were decided against by them leading to a competitive disadvantage over the life of the ship versus the chance of experiencing a fire on-board and no discount on the hull premium.

Fighting fires

Well-known container casualties such as the *MSC Napoli* (structural failure), *MSC Chitra* (collision), *Rena* (grounding), *MSC Flaminia* (fire and explosion) and, of course more recently, the *Kea Trader* (grounding) have attracted a lot of attention, due to their respective high costs of salvage and subsequent wreck removal. However, the fire on board the *MSC Flaminia*

was characterised by the high costs incurred in respect of the treatment and disposal of the firefighting water as well as her affected cargo, thereby making it of the utmost importance for a salvor to not only look at putting the fire out but also be sensitive towards the post firefighting scope of work (and associated costs).

These aforementioned ships were actually all relatively small compared to those that we would like to think of when talking about the big ships that Maersk, MSC, CMA CGM, Cosco, China Shipping and others operate. So, coming back to the question 'what is actually in those containers?'. This became one of the most important topics that raised awareness about proper stowage and misdeclaration of cargo. There have been a number of fire cases that could have become major catastrophes, for example, the *Hanjin Green Earth* and the *CCNE Arauco*, had it not been for the professionalism of the crew, the shore organisation and the appointed salvors. Whilst lessons learned from previous cases were implemented throughout the shipping industry, the availability of the actual cargo information remains a challenge, even today. Of course there is the cargo manifest and identified IMO cargo but for the salvage team and experts to properly assess "what is where" the individual Bills of Lading give the best picture, yet only if cargo is declared properly of course.

Timing remains key

While one would like to think that possible constraints to rendering salvage assistance to these container hulks can for instance be defined as availability of necessary response resources (based on quantity, location and suitability), track record, relevant skillset, training, etc, experience clearly demonstrates that the biggest constraints are actually time and

decisive leadership. Please allow me to expand on this further. In salvage, time is one's worst enemy; it is similar to medical emergencies where one talks about 'the golden hour'. Couple this to the question 'when do I inform my boss?' and one has the opening of a potential disaster scenario.

With any incident on board a ship, it is common that the crew will first try to assess and deal with the problem themselves before they notify the Designated Person Ashore and/or the competent authorities. Assessments and recommendations are being made by the shipowners/managers, possibly supported by external experts, such as, but not limited to, classification societies and, hopefully, they will inform their insurance broker at that time as well. Subsequently, a surveyor will be appointed, a lawyer retained and, depending on the type of emergency, one may appoint a tug and salvage broker to canvas the tug market for the best possible terms.

Obviously subject to the type of emergency, a towage and salvage company will become aware of the situation sooner or later. Sometimes the process above actually starts with a phone call from a salvor to a shipowner to notify him of the problem.

Now, combining all of the aforementioned aspects, shipping in a depressed market, salvors' margins under pressure, ultra large vessels, mis-declared cargo, involvement of owners, charterers, underwriters, surveyors, class, brokers, lawyers, authorities, coastal communities and other stakeholders certainly makes for an interesting pressure cooker under which one endeavours to obtain the relevant operational / situational information in order to negotiate a salvage contract and render the required emergency

response services. Of course, there are different types of contracts available that can be used in different circumstances and each case will have its own characteristics on which an owner will ultimately decide what is best for his ship, his crew and his clients hence the best recommendation: be ready and prepared. Several owners and operators have call-off arrangements with leading salvors which can vary from having the salvor's 24/7 emergency number incorporated into their ISM documentation and in full sight on the bridge of the ship, to the salvor being fully integrated into the shipowner's/manager's response organisation, having joint training for emergencies, and familiarisation with each other's processes, fleet, classification society, underwriters, risk mitigation measures, etc, all with the aim to optimise the response time and minimise (further) financial and reputational exposure.

Unfortunately, accidents do not only happen to others. Therefore, the best recommendation, regardless of the size of ship, is to be ready and prepared.

The role of the SCR in the salvage of mega box ships

This article uses an SCR's insight to consider the salvage priorities for a mega box ship casualty.



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Definition of an SCR

The role of the Special Casualty Representative (SCR) is to monitor the salvage services and operation then provide a final salvage report, which forms the basis for the settlement of any claim for SCOPIC remuneration (under the Special Compensation P&I Clause) that the salvor might have with the shipowner. Whilst usually appointed by the shipowner and/or its P&I club, the SCR performs this role on behalf of all parties and their insurers, including all property interests.

Salvage operations generally operate on a 'no cure no pay' basis so a salvage reward will only be payable where there is sufficient value in the property salvaged. As transportation of the quantities of oil and other potential pollutants has increased over the years, so too has the potential for damage to the environment. In order to properly incentivise and remunerate salvors for actions and steps taken to prevent damage to the environment, the 1989 Salvage Convention introduced special compensation under Article 14.

Article 14 allows salvors to receive special compensation for their expenses and equipment where salvors assist ships in situations where there is a threat of damage to the environment. Under Article 14, salvors can recover their expenses and with the possibility of an uplift where environmental damage was prevented. However, such payment is only payable under Article 14 to the extent it exceeds the traditional Article 13 property based salvage award.

Concerns in respect of Article 14 being overly cumbersome and whether it was in fact disincentivising salvors were raised. Accordingly, in 1999 the Special

Compensation P&I Clause (SCOPIC) was introduced into the LOF contract. SCOPIC sought to simplify matters by introducing a tariff to calculate the salvor's special compensation together with an uplift fixed at 25%. Article 13 awards will be discounted by 25% of the amount by which any Article 13 award exceeds the SCOPIC remuneration.

It is important to note that the incorporation of the SCOPIC clause is optional under the LOF contract and must be incorporated by way of reference. If SCOPIC is not incorporated, Article 14 will apply, if relevant. If SCOPIC is incorporated but not invoked, Article 14 will not apply.

Once SCOPIC is invoked, an owner must provide SCOPIC security in the sum of \$3m within 2 working days of the clause being invoked. SCOPIC remuneration is payable for the sum in excess of the traditional salvage award under Article 13. As it is assessed by reference to an agreed tariff of daily hire rates for equipment and personnel, it is essential that a Special Casualty Representative (SCR) is appointed in order to monitor operations and costs.

Engaging an SCR

The SCR must be appointed from the SCR Panel. The SCR is normally appointed by the P&I club on behalf of the owner of the ship. The SCR performs this role on behalf of all parties and their insurers, including all property interests. Similar to the salvor, the SCR is to use their best endeavours to assist in the salvage of the ship and the property thereon, and in so doing, to prevent and minimise damage to the environment. However, the salvage master remains in overall charge of the operation, makes all final decisions as to what they think is best and remains responsible for the operation.

The role of the SCR is to monitor the salvage services and liabilities and provide a final salvage report which forms the basis for settlement of any claim for SCOPIC remuneration which the salvor might have against the ship owner. Day to day the SCR will work with and scrutinise the salvage master's plan and check the accuracy of the daily progress reports and the daily running cost sheet. An SCR should be appointed as soon as SCOPIC is invoked to ensure that they are present at the casualty from the outset. The objective is for the SCR to be fully conversant with the operation and conditions; to be available to consult with the salvage master and to be able to comment and assist as necessary. It is expected that the SCR will be aboard during any major salvage activity.

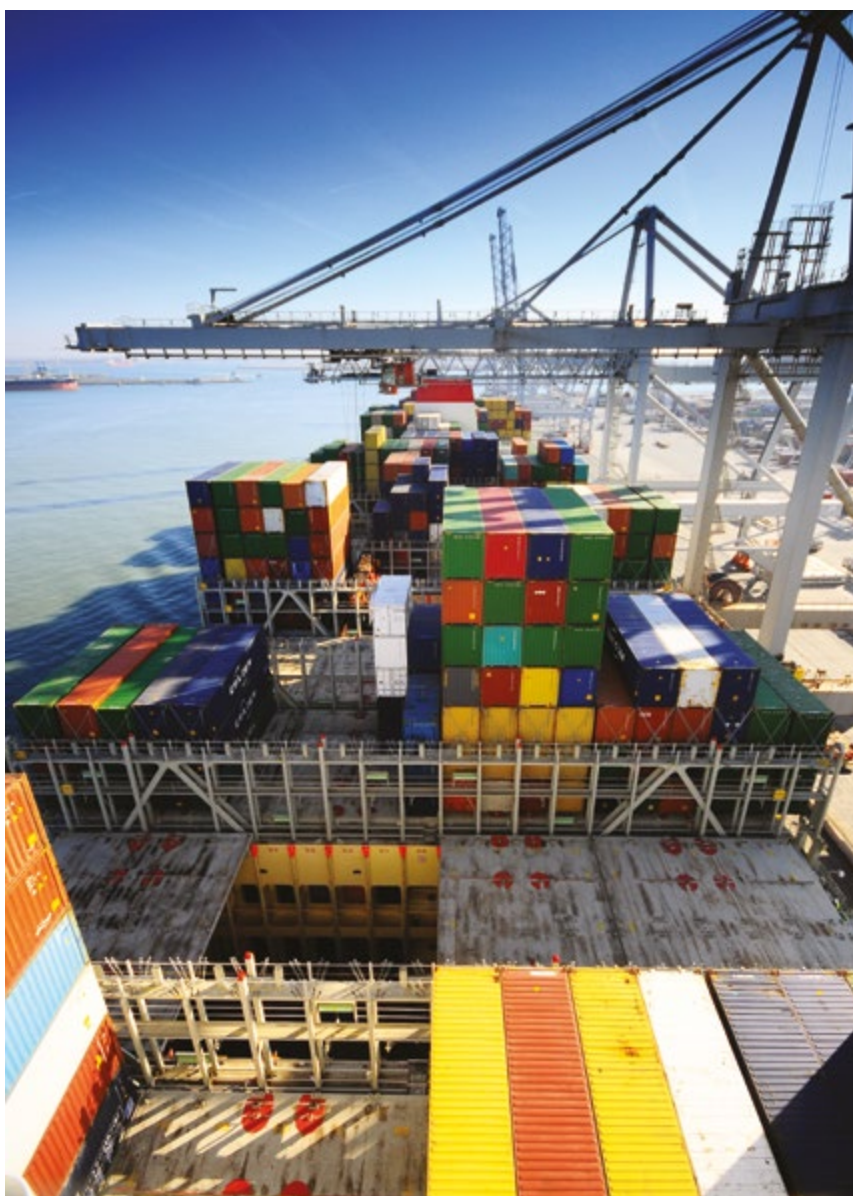
Manifests should be provided to them at the time of their appointment so that analysis of the various International Maritime Dangerous Goods (IMDG) cargoes can commence whilst mobilising. The volatility of the various dangerous goods carried on board mega box ships can and does cause serious problems for salvors. The SCR will work closely with the salvage master to identify the potential risks from the various cargoes and ensure that suitable measures and actions are promptly taken.

Parameters of the Role

The SCR has a duty to report, observe and consult with the salvage master and to endorse and circulate the salvage master's daily salvage reports to interested parties. If the SCR disapproves of the way the salvage operation is being conducted, or the type or number of craft, personnel and equipment being used, they should inform the salvage master in writing as soon as possible and, if not satisfied with the salvage master's daily salvage report, publish a dissenting report to be issued to all parties. Likewise, the SCR should also endorse and circulate the final salvage report to interested parties.

However, the SCR has no power to direct the salvage master to employ more or less resources in the salvage operation and this decision must remain at the salvage master's discretion. The SCR similarly cannot bind the owner of a ship or cargo to any particular course of action.

The SCR must not be requested by any party, nor volunteer themselves, to provide expert opinion either during the operation or subsequently which would undermine the independence of the role. An SCR can give evidence of fact with regard to salvage issues, but should not give evidence of opinion.



Investigating fires in box ship casualties

The investigation of the cause of a cargo fire or explosion on a mega box ship can be a complex affair involving a number of different scientific disciplines. This article outlines some key considerations.



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The larger modern-day container ships typically carry several hundred individual containers in each hold, with many more on deck, and the outbreak of a fire can have catastrophic consequences, particularly during sea passage when firefighting resources are limited to those on board. There may be flammable liquids or oxidising solids stowed on board, which whilst they may not have caused the fire, can greatly enhance its ferocity and rate of spread. With large numbers of diverse cargoes, many of which will be combustible, the extent and severity of the damage can therefore be significant and, in the worst cases, extend to adjacent holds, deck cargo, or accommodation and machinery spaces.

Causes

Many such incidents are the result of cargo self-heating or self-reaction. Some cargoes naturally undergo

chemical reactions, such as oxidation in air (for example, charcoal) or a natural but slow decomposition (for example, calcium hypochlorite), and these processes are often exothermic (heat producing). If the heat that is produced cannot be safely dissipated, because of the insulating effect of immediately adjacent material, dunnage, packaging or even other containers, the increase in temperature can lead to an increase in the rate of reaction, which then further increases the amount of heat produced. As a rule of thumb, the rate of chemical reactions will double for every 10°C in temperature rise. Under these circumstances, the material can begin to self-heat and conditions for thermal runaway, where the rate of reaction and heat production rise uncontrollably and beyond 'the point of no return', might then be achieved.

Chemicals susceptible to decomposition in this manner can be characterised by a self-accelerating decomposition temperature (SADT), defined as the lowest ambient temperature at which self-accelerating decomposition may occur in a substance in the packaging as used in transport. The SADT is influenced by many factors, such as the type and size of individual packages, the method of stowage and the presence of moisture or impurities. In combination, those factors can lead to the depression of the SADT, below the ambient temperatures experienced in a typical ship's hold for example, and the onset of a violent reaction.

Other chemicals may be susceptible to hazardous polymerisation, in which the individual molecules react together to form long chains, or polymers, with the evolution of heat. Similar to the SADT, materials subject to polymerisation may be characterised by a self-accelerating polymerisation temperature (SAPT), defined as the lowest temperature at which the reaction may occur in a substance in the packaging as offered for transport. There are standard UN Test procedures for both SADT and SAPT.

In some cases, and particularly with chemical decompositions, huge quantities of gaseous products can be liberated, generating an overpressure within the container that results in its violent and explosive rupture and it is not unusual to find debris scattered at considerable distances from the source. Many of these gaseous products are also highly toxic which greatly limits or precludes firefighting. The decomposition of calcium hypochlorite and other oxidising solids is particularly problematic as those processes are not only highly exothermic but generate their own supply of oxygen or other oxidising gas. This combination of heat and oxygen enrichment can readily cause ignition of nearby combustible materials. Moreover, the generation of an oxidising environment means that traditional hold fire suppression systems employing carbon dioxide gas, which work by diluting atmospheric oxygen, may be rendered ineffective.

Misdeclaration

Despite the best endeavours of carriers to ensure that dangerous goods are stowed correctly and segregated from other incompatible materials, in line with the guidance set out in the International Maritime Dangerous Goods (IMDG) Code, the risks can be impossible to manage if the cargoes have been incorrectly declared. All dangerous goods have special stowage provisions, which set out measures such as whether that cargo can be stowed under deck or whether that cargo should be kept away from sources of heat. Thus, incorrect declarations frequently lead to situations where dangerous goods are stowed inappropriately, such as having heat-sensitive cargoes placed in direct sunlight or adjacent to heated heavy fuel oil tanks. This has been recognised as a primary factor in a number of containership casualties.

Investigation

The investigation of fires and explosions on board container ships centres, of course, on a visual inspection of the stow, which is usually best achieved during the discharge of containers and debris. In some cases, the location of origin may be visually apparent, involving perhaps the outward bulging of the shell of a violently ruptured incident container coupled with the inward creasing of adjacent boxes. In cases where a fire has burned for a prolonged period, the overall damage might be so extensive that definitive physical evidence to demonstrate the container of origin is very difficult to obtain. In all cases involving fires in containerised cargoes, knowledge of the chemistry of the substances in question is crucial in order to determine their propensity to react and the factors that may have promoted that reaction to a state of self-acceleration. Crew accounts and interrogation of electronic data may also provide useful evidence.

In order to establish liability, it is essential to determine all factors that may have contributed to the onset of self-heating or other uncontrolled cargo reactions. As mentioned above, misdeclaration can lead to heat sensitive cargoes being inappropriately stowed adjacent to heated fuel tanks for example.

However, the development of self-heating to the point of thermal runaway may be solely due to the inherent properties of the cargo itself, irrespective of stowage position, conditions on board and segregation from other cargoes. Factors such as excess moisture in the formulation, impurities or contamination with incompatible materials can promote exothermic reactions and lead ultimately to uncontrolled heating.

Whilst chemical analysis can assist in this regard, the cargoes in question may have been totally consumed during the reaction and ensuing fire, in which case the investigation must consider analysis of the residues from the decomposition reaction, which may provide useful indicators of the precursor materials from which they might have derived.

Conclusion

In summary, the investigation of the cause of containerised cargo fires and explosions is typically a complex affair that involves many different aspects across a range of scientific disciplines, from the traditional forensic fire investigation techniques to the interpretation of complex analytical results. A detailed knowledge of the chemistry of unstable materials is required, and in addition to keeping on top of the various enquiries, the investigator must also be prepared to take into account many other issues, such as the serious safety hazards arising from the generation of toxic gases, the practical difficulties of discharging distorted container shells, and the disposal of contaminated firefighting water and other debris.



The pollution risk from mega box ships

A mega box ship has an environmental risk commensurate with its size. Following an incident, the pollution response would need to match.



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ITOPF is celebrating 50 years of involvement with ship-source pollution incidents and, during this period, has provided technical advice to more than 100 investigations of incidents involving container ships. A number of these incidents resulted in a release of bunker fuel only, some the loss of containers overboard and others a loss of both bunkers and container cargoes. These latter examples have given rise to some of the most complex casualties attended by ITOPF.

The rise in containerised shipping and in the size of container ships has resulted in efficiencies of transport unheralded 50 years ago. In this same period, the combined efforts of the shipping industry and governments have led to an overall decrease in shipping casualties. Nonetheless, accidents cannot be ruled out and this article considers the potential for pollution from an incident involving a mega box ship.

The risks

The largest mega box ships have the capability to carry as much bunker fuel oil as a small tanker, with the latest G-class container ships, of over 21,000 TEU, having bunker tanks with a capacity in excess of 14,000m³. Only in the most catastrophic of incidents might this amount of oil be released from such a ship, but nonetheless, the potential for release of a significant volume of fuel oil exists. The persistence of fuel oil when spilled into the marine environment may result in a protracted clean-up response, with the effects of the oil on economic activities, primarily fisheries and tourism, generating substantial third-party claims, in addition to environmental damage. ITOPF is regularly asked to provide advice on oil spills and has built a wealth of experience to assist shipowners, insurers, governments and others who may be affected.

These same ships might be expected to have upwards of 10,000 to 15,000 individual containers on board. While a proportion of the containers may be empty, these mega box ships can have a broad range of products on board and this may include a percentage of isotanks or 'tanktainers' for the carriage of bulk liquids.

Initial response – dangerous goods

An initial focus for responders to a casualty will be the presence of dangerous goods. Even if only 1% of containers on board have dangerous goods, the possibility exists for greater than 150 containers with contents that pose a potential for harmful effects, if breached.

When ITOPF is notified of a casualty with the potential for damage to containerised cargo, an initial task will be to obtain the ship's manifest and stowage plans to locate those containers identified as holding dangerous goods. Once identified, the location of these containers on board will require analysis to understand whether an identified dangerous goods container has been damaged or lost, or is at risk of falling overboard or becoming submerged if the ship develops a list. ITOPF would expect to work closely with salvors in this regard.

With this information to hand, ITOPF technical advisers will gather information on the physical state of each of the hazardous substances while transported (for example, whether it is transported as a solid, a liquid or a gas) and its behaviour if released (for example, whether it will sink, dissolve, float or evaporate upon release). In addition, the potential for reaction of the substances if exposed to air or water or the contents of other containers will be sought, particularly if different dangerous goods are located in close proximity on board. Similarly, a knowledge of the toxicity, flammability, explosivity, corrosiveness and irritability of the substances and their reaction products is important. A fire on board the casualty would further add to the complexity and threats posed by the cargoes.

To assist ITOPF in this situation, an arrangement is in place with the National Chemical Emergency Centre (NCEC), in Oxford, UK, to allow ITOPF to obtain this important information as rapidly as possible. ITOPF holds regular exercises with the NCEC to ensure the effectiveness of this service.

The presence of dangerous goods on board a stricken container ship will compound an already complex situation. Spilled oil may be the most visible pollutant and while slicks can

cause widespread damage, they rarely present a threat to life in the way that hazardous substances can. The immediate concerns will be the potential risks to local populations, for example, by direct inhalation or through contaminated water supplies. Dissolved or floating chemicals may pose a threat to local fisheries and mariculture. ITOPF can assist with sampling and analysis regimes to ensure compliance with food safety standards. At the same time, the presence of hazardous substances may affect the ability of responders to work at sea or to clean affected shorelines. In such instances, risk assessments and monitoring equipment may be required before work can continue.

The ship's manifest is crucial to this process and co-operation would be sought from the shipowner and shipping agencies to obtain this as rapidly as possible. Nonetheless, incorrectly declared container contents will result in a manifest that does not accurately reflect the cargoes on board and will introduce further complications to the emergency response.

Other cargoes

Other containerised cargoes may be considered to be innocuous and inert. Nonetheless, such cargoes may become a pollutant if released from

breached containers, particularly if contaminated by spilled oil. Incidents attended by ITOPF have included a billion nurdles (small plastic pellets) distributed over South African shores, thousands of oily packets of biscuits on the French shoreline and heavily oiled waste plastic stranded in mangroves in India. Considerable time and effort were required to remove, transport and dispose of these items. Perishable goods in refrigerated containers may degrade to produce noxious gases that can be a concern, particularly when containers are recovered and opened to check for integrity. Released containers and their contents may sink to the seabed with a potential to affect benthic organisms and to damage seabed fisheries. The use of divers to recover items can be time-consuming. The logistics for dealing with recovered containers and cargo can itself be complex, requiring careful management, secure bonded areas, waste handling, etc.

Conclusion

Fortunately, the experience of ITOPF has been limited to incidents with relatively small-sized container ships. While ITOPF has the experience and knowledge on which to base advice for future incidents, it is clear that the scale and complexity posed by very large container ships could result in a challenging and costly response.



Investigating damaged containers can require full personal protective equipment where the potential for danger to human health exists – Image courtesy of ITOPF



Oiled waste plastic strips released from a damaged container and covered with spilled bunker oil stranded in mangroves. Considerable effort was required to clean the area – Image courtesy of ITOPF



Plastic nurdles spilled from a damaged container are recovered from a beach and sieved to separate the sand to minimise the amount of waste generated – Image courtesy of ITOPF

Mega box ship casualty – the shipboard response

The master and crew of a mega box ship must be suitably prepared for the potential risks faced at sea.



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As world trade continues to grow, the world fleets continue to develop and respond to the transportation demand. The commodity nature of international marine transport particularly requires cost leadership and economies of scale from its shipowners in order to survive and thrive. This strategy is evident in the container shipping sector, where the sizes of new ships continue to increase, replicating similar developments in the oil and dry bulk shipping sectors over the past 40 years.

The mega box ship, carrying in excess of 14,500 individual containers, is now a familiar sight, plying the principal trade routes from the Far East to Europe and back again. Despite their size, mega box ships are still subject to the usual marine perils such as fires and severe storms that can strike a ship at any time on its voyage, posing a great risk to the ship, its crew and cargo. Therefore, it is imperative that the master and crew are prepared for such emergencies.

Key factors in loss prevention

We know well that 'prevention is always better than cure', but when disaster strikes, strong leadership, prompt response and effective deployment of resources are essential. The critical factor is to minimise the response time in making a rapid assessment of the situation, mustering and deploying responders on board, and preparing/transmitting the initial reports to the ship managers. Today, there is a much closer relationship between ship and shore, aided by the extraordinary development in communications technology and connectivity.

Training

Each major emergency is unique. However, the International Safety Management (ISM) Code requires shipowners and managers to identify the major hazards and risks associated with the operation of their ships and to prepare and train their crews to respond to emergencies if and when they occur. This training and preparation is vitally important and can make the difference between success and spectacular failure.

Prudent owners, operators and their crews place great importance on having training regimes and response procedures in place. For example, in the event of a ship grounding, the immediate response of the master and crew will be to determine if the ship's hull has been breached. This can be done by prompt sounding of the tanks

and cargo spaces. At the same time, the master will prepare and send a first communication to their technical managers and Designated Person Ashore (DPA) which, in a prescribed format, will list the ship name, date, time, location and speed at which the ship grounded, any injuries to personnel, the ship's condition (ie laden or in ballast), current and forecast weather conditions, cargo on board, water ingress (if known), pollution/bunker losses, the various drafts around the ship and the nature of the seabed. This information is critically important to the shore managers as they mobilise their emergency response team and prepare to assist the master and the stricken ship.

Reporting

The ship's Safety Management System (SMS) and emergency response manual will usually prescribe the reporting format and frequency that the master should use to update their technical managers. The club has seen cases where such reports are sent at hourly intervals during the first three hours of the casualty and at three-hourly intervals thereafter. However, this schedule will be amended to reflect the prevailing circumstances, e.g. deteriorating weather conditions, imminent danger of further major damage to the hull due to a falling tide and the emergence of any other risks as the casualty incident unfolds.

The master will submit subsequent reports detailing the cargo, ballast and bunker weight distributions on board with the stability calculation, the weather conditions, whether salvors have arrived on scene, whether the ship's machinery is still functional, whether tow lines have been connected, and what activities or changes have occurred since the previous report. The master and crew will also perform the important task of collecting and retaining all evidence and documentation, and keep detailed records of all events and facts. Evidence of the casualty will be required in due course to assist the investigation, so photographs and witness statements should be taken at appropriate times.

Communication

Ashore, the managers will be responding in real time to the information received from the master and will organise appropriate salvage assistance. They will also be communicating with the major stakeholders in the voyage, ie the charterers, insurers, flag state administration as well as the families of the crew and the coastal state authorities, and updating them regarding the situation. Some managers have full in-house technical capability to model and assess the potential damage to the ship, based on the reports from the master. Other operators will, however, seek the immediate technical support of the ship's classification society to guide their response to the master and salvors.

Industry response

The container shipping industry recognises that mega box ships present a special class of operational and salvage risk, given their physical size and magnitude of cargo on board. Therefore, a working group has been established by the shipping industry to examine the specific challenges associated with salvaging such a ship. The Standard Club participates in this group and one of the important outcomes has been the development of an initial assessment form that masters and ship managers can use in an emergency to guide salvors' initial response efforts. A copy of the form can be obtained from The Standard Club. As time is of the essence in reacting to emergencies, the initial assessment form captures the critical information required in a brief, accurate, timely and actionable format. It is hoped that this format or similar will be widely adopted in the industry so that the master is relieved of the relentless demands for information from disparate parties as the emergency unfolds. The managers ashore can perform and control this necessary task whilst the master and crew can focus their efforts, experience and expertise on solving the crisis.

Conclusion

Clearly, it is only practical to describe one possible emergency scenario in this article. Fire, collision, machinery breakdown and structural failure all present their own specific challenges. However, in every case, being prepared, having clear emergency response procedures and maintaining an alert and fully trained crew should help to manage the incident.



Legal implications of a mega box ship casualty: Limitation and cargo claims

Limitation of liability is always a crucial consideration for a shipowner following any major casualty. Where a casualty involves a large container ship, limitation often becomes particularly relevant.



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The number of containers and values involved means limitation is especially important for the shipowner of a mega box ship. Added complexities arise from the fact that several different carriers may have cargo on board. Such carriers could be the ship's charterer, slot charterer, forwarder or NVOCCs (non-vessel operating common carriers), each of which will have its own individual bill of lading terms and conditions.

Means to limit

Bearing in mind the potential for numerous claims aggregating to high value and consequent underlying costs, there are typically two distinct but interlinked means of limiting liability that are available to a sea carrier:

- i. The carrier's right to rely on a tonnage limitation regime arises under convention or statute governing the limitation of liability of owners of seagoing ships. Although different jurisdictions have different bases for calculating limits, this form of limitation applies not only to claims arising from the carriage of goods, but also to other claims that may arise from a casualty, such as hull and property damage or personal injury. Cargo claims will rank on an equal footing with other claims arising from the same incident¹.
- ii. The package limitation under Article IV, Rule 5 of the Hague Rules and

Hague-Visby Rules and Article 6 of the Hamburg Rules. This right of limitation is restricted to claims for loss or damage to the cargo and the limit is calculated by reference to the specifics of the cargo.

These regimes are not mutually exclusive. Therefore, a carrier that seeks to limit liability under package limitation is potentially also entitled to limit liability under the applicable tonnage regime.

Tonnage limitation

At the relatively early stages of a major casualty, the owner's interests will be weighing up whether the potential claims against them are likely to be sufficiently substantial, to justify constituting a limitation fund in an appropriate jurisdiction. Cargo claims are often one of the main category of claims that owners would face, but there could well be significant other claims from charterers or third parties.

Most jurisdictions incorporate one of the international conventions on the Limitation of Liability for Maritime Claims (Limitation Conventions) into their domestic law². These calculate the limitation fund based on the ship's gross tonnage, hence the use of the phrase 'tonnage limitation'³. The establishment of a limitation fund (or an alternative permitted in the relative jurisdiction) means that all successful claims will be paid out of the fund on a pro-rated basis.

¹ Claims for loss of life or personal injury are subject to a separate fund.

² International Convention relating to the Limitation of the Liability of Owners of Sea-Going Ships 1957 (Brussels Convention); Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC Convention); 1996 Protocol to the LLMC Convention; and 2012 Amended 1996 Protocol to the LLMC.

³ The US incorporates a different limitation regime based on the vessel's value.

Property claims for 150,000 gross tonnes container ship

1957 Brussels Convention: (appropriate calculation using 85,000 net tonnage plus 19,000 E/R)	US\$9,384,047
1976 Convention on the Limitation of Liability for Maritime Claims (LLMC):	US\$23,092,230
1996 Protocol to the LLMC:	US\$55,476,000
2012 Amended 1996 Protocol to the LLMC:	US\$83,768,760

* SDR valuations used as of May 2019 (1 SDR = US\$1.38)

For a given gross tonnage, the limitation fund will differ based on the jurisdiction as it will be dependent on which Limitation Convention applies.

By way of illustration, the table above demonstrates the differences on the size of the limitation funds between the various conventions for a large container ship.

A party contemplating the establishment of a limitation fund will inevitably need to consider the limitation regime in the jurisdictions associated with the casualty in question, or any alternative potentially available jurisdictions.

Where a party is facing claims in various countries, it will also be important to assess whether claims in one jurisdiction will be subject to limitation by reason of the establishment of a limitation fund in another. In this regard, it is important to note that not all countries are signatories to a Limitation Convention. For example, China has not ratified any Limitation Convention (although it incorporates some similar wording to the 1976 Convention into domestic law), so where a party is facing claims in China and England, establishing a limitation fund in China will not suffice to limit liability in respect of proceedings brought in England⁴.

Slot charterers

At any one time, container ships normally carry containers for a number of liner operators. It is common industry practice for liner operators to have joint service agreements in place, whereby the different operators agree to swap charter space on each other's ships. Slot charterers may therefore also face substantial cargo claims in the event of a casualty.

The position under English law is now clear that charterers and also slot charterers are entitled to: (i) limit liability by constituting a limitation fund themselves or (ii) rely on the protection afforded by the limitation fund constituted by the owner even where the slot charterers have no direct contractual relationship with the owner⁵. However, NVOCCs and freight forwarders are not afforded the same protection and may only rely on package limitation.

Package limitation

A carrier may limit liability for loss or damage to the cargo under the package limitation regime of the Hague Rules, the Hague-Visby Rules or the Hamburg Rules.

For example, Article IV, Rule 5 of the Hague-Visby Rules states:

- '(a)... neither the carrier nor the ship shall in any event be or become liable for any loss or damage to or in connection with the goods in an amount exceeding 666.67 [SDR] (special drawing right)⁶ per package or unit or 2 [SDR] per kilogramme of gross weight of the goods lost or damaged, whichever is the higher...
- (c) Where a container, pallet or similar article of transport is used to consolidate goods, the number of packages or units enumerated in the bill of lading as packed in such article of transport shall be deemed the number of packages or units for the purpose of this paragraph as far as these packages or units are concerned. Except as aforesaid such article of transport shall be considered the package or unit.'

When calculating the package limitation for containerised cargo, the description and weight of the

cargo as described on the bill of lading must be taken into account. Under English Law, a container will not be considered to be the relevant 'package or unit'. It is sufficient for the cargo to be accurately stated in the bill of lading and there is no additional requirement for the physical items of cargo to be described 'as packed'⁷.

In practice, the package limitation regime usually only assists a carrier for reasonably high value cargoes. Also, local laws and practice in the jurisdiction where cargo interests commence proceedings will often dictate whether a carrier can use the package limitation regime to limit liability.

Summary

Limitation of liability is an important and often complex aspect of a container ship casualty. Parties affected by such incidents will need to carefully consider their potential exposure at an early stage and take into account the different limitation regimes and jurisdictions when assessing whether to constitute a limitation fund. Package limitation will potentially be available to a carrier regardless of whether the tonnage limitation regime is called upon, but whether a carrier can limit liability will depend on the value, weight and particulars of the cargo as described in the bill of lading.

⁴ Article 11 of the LLMC Convention 1976 refers to the constitution of a fund in a *State Party*. Thus a country which has not ratified the convention is not considered to be a *State Party* where a fund can be established.

⁵ *Metvale Ltd v Monsanto International Srl and others* ("MSC Napoli") [2008] EWHC 3002

⁶ 1 SDR = US\$1.38 as of May 2019. SDR currency valuations can be obtained on https://www.imf.org/external/np/fin/data/rms_five.aspx

⁷ *Kyokuyo Co Ltd v. A.P. Møller-Maersk A/S (Maersk Tangier)* [2018] EWCA Civ 778

Transboundary movement of waste

Shipping of waste or hazardous materials internationally is a regular but also regulatory affair. But how is this affected when the ship itself is the waste?



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We often think that importing and exporting materials is just a matter of customs and paying taxes. However, in reality, it is more complicated. There is various legislation (at regional, national and international level) that decides how to handle the shipment of waste from one country to another.

How waste is defined

What about ships? They operate under their own power with valid certificates. Is a ship considered waste, or not? Under normal circumstances, it is legally not viewed as waste. A ship can freely operate and sail towards every port in the world. However, if the shipowner decides to sell the ship for dismantling and starts to act accordingly, the ship becomes 'waste' under the terms of the Basel

Convention and/or the European Waste Shipment Regulation ((EC) no. 1013/2016). The Basel Convention regulates the transboundary movement of waste globally, which includes the disposal of ships or waste generated from ships. It has been implemented into EU law under the EU Waste Shipment Regulation.

The ship as waste

Under this legislation, a legal notification process needs to be followed to import and export the ship (the so-called 'Prior Informed Consent Procedure'). The location of the ship at that moment in time determines the country of export, and the location of the recycling facility determines the country of import. In reality, some shipowners circumvent the above regulations by taking the decision to recycle when the ship is in international waters or in countries that do not fall within their scope. In that case, the location of the ship will fall outside the jurisdiction of a country of export.

What happens to ships which were involved in a collision or need to be salvaged? These ships are taken to a port of refuge or deviate to their next port in order to be inspected by surveyors to determine the extent of the damage sustained and to estimate the repair costs or determine whether the damage amounts to a constructive total loss. These ports or locations are normally not designed



to deal with all sorts of waste, but they serve as a safe place to prevent further damage. The repairs can result in materials needing to be removed, which can include hazardous materials. A judgement call needs to be made as to whether these materials can be disposed of in a waste disposal facility in the country of repair or whether the waste management, including final disposal of these materials, needs to be arranged elsewhere. If this is outside the country, these hazardous materials need to be exported and imported to a country where they can be handled according to the Basel Convention/ EU Waste Shipment Regulation.

Additional considerations

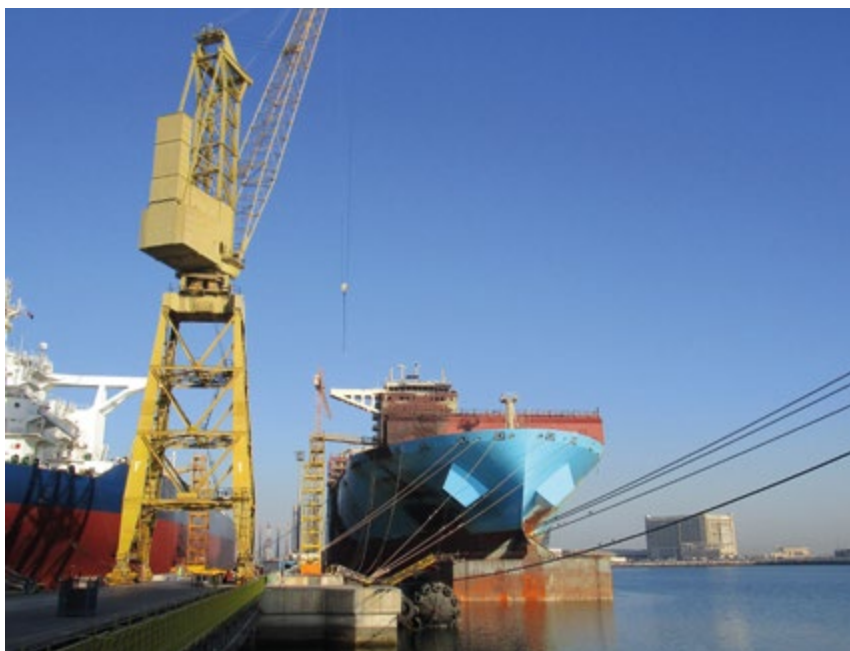
The situation can get extremely complicated if a ship has had a huge fire and cargo loss is involved. In such cases, not only the materials on board need to be identified in terms of the amount and their particular hazards, but also the materials that have melted and are half burnt need to be checked for any new hazardous substances. For example, fire and firefighting water can result in chemical reactions which will create new hazardous materials. This process of identification requires a proper sampling plan, delicate removal procedures, arranging temporary storage and waste handling. This process will apply up to the moment the (hazardous) waste can be disposed of safely. Also, notification requirements for import and export of these materials needs to be arranged in case of transboundary movement.

All these notification procedures take time, but if arranged properly, this should only involve selecting an appropriate certified waste disposal facility, concluding a contract with the facility and arranging the required paperwork with the authorities in the countries of export and import. This is not a difficult task, but one that is time-consuming and requires a good understanding of the materials involved.

These precautions for the shipment of waste have a big cost element and need to be managed accordingly. Risk analysis is required to keep full control of these often unique and complicated operations.

Conclusion

We can conclude that a ship in itself is not waste, but it generates, creates and becomes waste during its operation, as a result of a casualty or as a result of a final decision being made regarding its disposal.



Losing control of the beach was just the icing on the cake

For the diverse global media, a large mega box ship casualty with its plethora of goods being carried will be a gift that keeps on giving. A coordinated media response is a necessity.



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From the *MSC Napoli*, which occurred in January 2007, to the container ship groundings today, the many lessons that incidents with box ships of varying sizes have taught us about being responsible for the co-ordination of media management are worth repeating for any future major casualty.

Case study

In 2007, I was Head of Communications at the UK Maritime & Coastguard Agency (MCA), when the *MSC Napoli* developed large cracks in its engine room whilst en route to Sines in Portugal. The 62,000-tonne ship took in water through a hole in its side during a storm in the English Channel and the crew were forced to abandon ship. Salvage efforts over the following few days did not go to plan and the ship had to be beached off the East Devon coast in the UK after her back broke. Everyone recognised that had she been allowed to sink mid-channel, it would have been a catastrophe for both the English and French coastlines.

Let's also not forget that, in 2007, just 12 short years ago, Facebook was still in its infancy and there was no Twitter, no Snapchat and only very limited capability smartphones. In short, there was no social media to really mess up your day and provide instant criticism and analysis on the go.

In the present day, as a rescue helicopter reaches a ship to assist in evacuating its crew, news organisations will immediately start tweeting updates.

However, even in the early stages of the *MSC Napoli* incident, the media were speculating that various town councils in Northern France had pressurised the French government to ensure that the casualty came ashore on the UK side of the English Channel, despite our protestations that this had nothing to do with tourism issues and all to do with the UK's undersea topography!

The *MSC Napoli* was carrying 2,323 containers, 158 of which were classed as having potentially hazardous contents, although the ship's overall capacity was more than 4,400 TEU. Built in 1991, at the time, it represented one of the largest container ships on the high seas.

However, due to the step change in capacity that has occurred over the past ten years, the *MSC Napoli* was nothing like one of the 20,000-plus TEU behemoths that might one day find itself on a beach near you.

After the *MSC Napoli* grounded, the logistical issues were immediate and apparent as they would be in any mega box ship casualty, but the sheer size of mega ships and the huge quantities they transport mean that these problems will be magnified.

What are the immediate issues?

- Where to house the journalists
 - A main briefing room for journalists (to host live media conferences, etc) will need to be arranged as well as rooms for plans, technical back-up, maps, and a communications infrastructure and someone to run, support and maintain it (ie arrange WiFi, routers, power, links, a car park for satellite trucks, etc). In 2007, whilst working for the MCA and responding to the *MSC Napoli* casualty, I 'took over' a local hotel and booked out its main function room for a couple of weeks, providing journalists with immediate access to food and drink, toilets, etc.
 - Expect journalists and news crews to come from all over the world if the casualty has a televisual impact. In the case of the *MSC Napoli*, automotive plants began to run out of car parts in South Africa and some workers were put on 'short time'. This was enough for yet another TV crew to fly over from the region, especially to follow a story where jobs and livelihoods were being affected.

- It is important to actively co-ordinate the shipowner's response to the casualty via the media and ensure that the messages are accurate and verified, as well as manage the media on which they are carried, whether social or mainstream.
- Social and mainstream medias need to be monitored 24/7 to provide prompt rebuttal if the stories grow even more outlandish as journalists and other individuals, who by and large won't know much about shipping, seek new angles and stories.
- Ensure that the key personnel from the various agencies and authorities have the opportunity to discuss options and issues. If one agency fails spectacularly, then the blame is shared equally, with adverse reputational risks for every player regardless of their efforts.
- Significant administrative back-up is also required for any large casualty.

Maintaining security

In the case of the *MSC Napoli*, the containers washed ashore became a magnet for public and media interest, initially for the curious, then the opportunistic local pilferer. When newspapers printed maps of the location, it helped gangs carry off huge quantities of the beached cargo, which included automotive parts and wine barrels. This was aided and abetted by the lack of knowledge of UK law by both the public and media in such situations. 'Finders keepers' became the norm, rather than considering it as blatant theft from the beach.

Immediate security of the affected area would also need to be uppermost in any early decision-making.

Cargo operations

There were two major difficulties that we didn't share with the media at the time of the *MSC Napoli* casualty: one was the immediacy of sourcing suitable equipment for the emergency discharge of over 3,600 tonnes of

heavy fuel oil. Another major problem was to find space to land the containers for 'triage'. The MCA needed to inspect and weigh the discharged containers on a piece of land formerly used as a football ground but swiftly concreted over for container reception, before onward transport to their destination or for disposal if they were considered beyond saving.

Another finding, well known to the industry, was the significant amount of overweight triaged containers compared to the manifest.

The sheer volume of discharged containers brought ashore by barge caused serious difficulties at the nearby port of Portland. Unknown to the media at the time, we were within 15 containers of closing the port.

This was from a box ship carrying 2,323 containers. For argument's sake, what would you do with the other 18,000 containers today if your mega box ship ends up in the same condition?

Few ports have the emergency facilities and space required to land, assess and turn around thousands of containers from a casualty. In future cases involving a mega box ship, this will be a major critical factor and one which will undoubtedly draw the eye of the media.

Pollution aspects

Environmental concerns will take a huge amount of time and effort, and in the *MSC Napoli*'s case, we also had to deal with concerns that were being expressed about the 900 guillemots and 200 gulls which had been found suffering from the effects of oil. Some had been found up to 25 miles away, and we needed to explain our co-ordination efforts with the environmental agencies to recover and clean any affected birds. The cleaning and care of affected wildlife was slow and expensive. It was probably money well spent for reputational purposes, but I wonder how many birds were saved?

Interest from the mainstream media gradually lessened, and we endeavoured to turn the whole episode into a routine work site. But, nevertheless, the story remained somewhere in the news for over a year.

Managing the media

Our media priorities at that time would be the same for such a large casualty today:

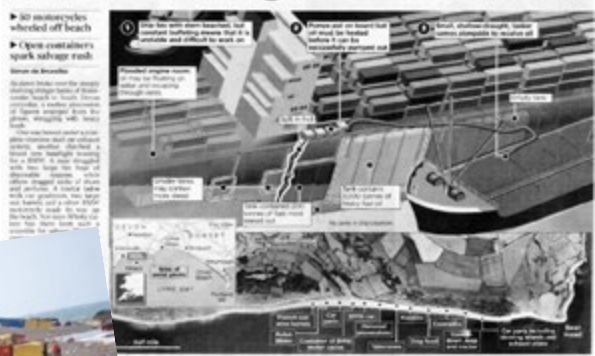
- turn the news into a routine story
- identify the shipowner's key partners/stakeholders
- respond to concerns relating to protection of the environment
- maintain a core script and a definitive Q&A
- identify key spokesmen
- establish hotline telephone numbers.

Conclusion

The *MSC Napoli* had everything the media wanted. No one was hurt or worse throughout the incident; striking pictures; human stories; people grabbing anything they could pick up and carry away in the cold and wet of an English beach; stormy weather conditions; stunning pictures of a ship in distress. In the event of a mega ship casualty now, the media stories will be about pollution risks, clean-up, the environment and the way we transport the massive amounts of goods we need for our 'just in time' economies. – just as they were in 2007.



Dawn breaks, and the treasure hunters emerge with their haul



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