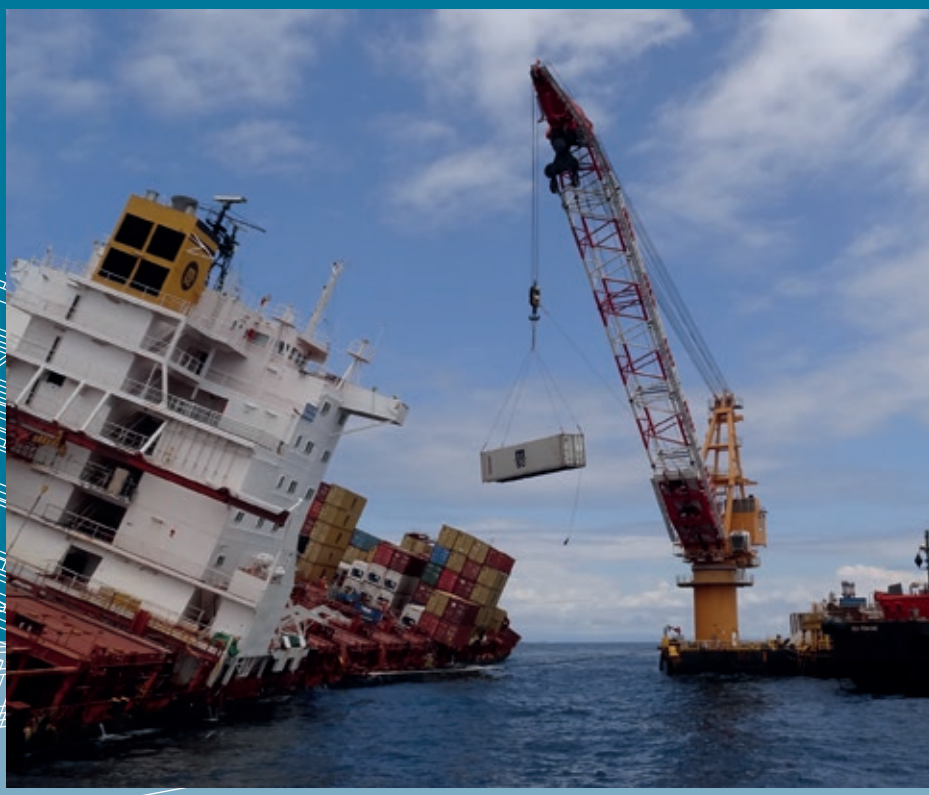
LLOYD'S

THE CHALLENGES AND IMPLICATIONS OF REMOVING SHIPWRECKS IN THE 21ST CENTURY



ABOUT LLOYD'S

Lloyd's is the world's specialist insurance market, conducting business in over 200 countries and territories worldwide – and is often the first to insure new, unusual or complex risks. We bring together an outstanding concentration of specialist underwriting expertise and talent backed by excellent financial ratings which cover the whole market.

ABOUT THE AUTHOR

James Herbert trained as a reporter and worked on regional newspapers before becoming a broadcast journalist at BBC Radio 4, producing a range of current affairs programmes. James then joined the Royal Dutch Shell media team and became Head of Group Media Relations where he worked closely with the Shell tanker fleet and gained much experience of marine casualty and emergency response. After a number of years James moved into the public sector as Director of Communications for one of the divisions of the UK health service. In 2008 he founded Gem Communications Limited providing corporate communications advice to a number of organisations, including the International Salvage Union.

ACKNOWLEDGEMENTS

We would like to thank the IG Large Casualty Working Group for their input and advice on the report.

Lloyd's would also like to thank the members of our review panel below for their input and feedback on the report:

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Contents

Figures

FOREWORD – TOM BOLT, DIRECTOR, PERFORMANCE MANAGEMENT, LLOYD'S

As Lloyd's began life as a marine insurer, it is fitting that in our 325th anniversary year we should publish this report that focuses on a key issue in the marine market today – that of the growing complexity and the rising costs of wreck removal.

From our origins as a marine market, Lloyd's has evolved to become the world's specialist insurance market, underwriting a wide range of often challenging and unique risks right across the world. However, the marine market remains fundamental to the ongoing health and stability of the Lloyd's market with over £3bn of premiums transacted in 2012. Marine insurance provided by the Lloyd's market includes both direct and reinsurance cover for hull, cargo, specie and marine liability risks. It is marine liabilities that is of particular concern to us in the context of this report.

In recent years we have seen a number of high profile marine wrecks, including the MSC Napoli in the English Channel, the Rena, which ran aground off New Zealand, and most recently of course, the Costa Concordia, which sank off the western coast of Italy last year. While raising public awareness of the continued perils of shipping even in this day and age of advanced technology and engineering, these cases highlight an issue of growing concern to marine insurers, shipowners and the wider marine industry. Managing the wreck removal operations for these cases has cost, or is costing in the case of Costa Concordia, large sums of money. These increased expenses have largely been met by marine insurers and their reinsurers. This report examines to what extent these, and other, cases represent a growing trend towards increasing costs of wreck removal operations. It also explores the underlying factors that might be driving up these costs, including in particular the role that government and local authorities might play.

In preparing this report, Lloyd's has worked closely with a panel of marine and insurance experts representing all the key industry constituencies with an interest in wreck removal. The inputs and insight from this group, along with the knowledge and endeavour of our writer, James Herbert, have been invaluable in developing this report and beginning to form a common view on the key wreck removal issues we jointly need to address. We thank them all for their time, commitment and sharing their expertise.

This report does not attempt to solve the issue of rising wreck removal costs, but we hope it encourages further discussion and dialogue among the key stakeholders and goes some way in helping to find a solution for the common good and future health of the marine industry.

Tom Bolt
Director, Performance Management
Lloyd's

FOREWORD – HUGH SHAW, THE SECRETARY OF STATE'S REPRESENTATIVE FOR MARITIME SALVAGE AND INTERVENTION

The shipping industry plays a vital role in the global economy and trade across the world. Lloyd's marine market has a long history of working with and supporting the shipping industry in playing this role.

By providing cover for physical loss and damage and liabilities arising out of shipping casualties, the insurance industry allows companies to take the risks required to operate and grow their businesses. Currently, a significant proportion of global marine premiums are written in Lloyd's.

A shipping casualty and subsequent wreck removal can represent a substantial concentration of risk, such as the sizable hull and liability risks involved in the loss of a large cruise ship, or as presented in a Lloyd's Realistic Disaster Scenario, a collision between a cruise ship and a fully laden oil tanker in an environmentally sensitive area. Ship type, size, location and the nature of the hazard will determine the complexity of each case.

For marine insurers, shipowners, and salvage contractors alike the rising cost of removing wrecks is of equal concern. Wreck removal has not only become more visible and expensive but also more common. Changing attitudes to the environment and media focus mean that there is, in general, a presumption that a wreck should be removed.

These casualties, as well as the others that have occurred through the years, demonstrate the need for insurance professionals specialising in this sector. These individuals must possess a combination of commercial and technical skills to meet the challenges posed by catastrophic losses and, perhaps more importantly, during the periods following major events. While there is no substitute for real-life experience in developing the skills and knowledge to deal with these issues, publications such as this can significantly assist in bringing together the diverse opinions of all stakeholders and their subsequent concerns. This report commissioned by Lloyd's has greatly assisted this process.

I congratulate Lloyd's on commissioning this risk report and bringing together such an impressive panel of specialists from the worlds of marine insurance, salvage and shipping, in addition to experts from legal and governmental backgrounds.

Hugh Shaw
The Secretary of State's Representative for Maritime Salvage and Intervention

GLOSSARY

Accommodation block. The part of a vessel containing the bridge, crew quarters and galley. In most modern commercial ship designs it is towards the stern and above the engine room.

Accommodation unit. A barge with an accommodation block built on it to house workers during offshore operations.

Actual Total Loss (ATL). Where the ship is totally lost or destroyed or so damaged that it is no longer useful as the thing that was insured.

Bathymetric survey. A survey of the topography of the seabed.

Berth. Part of the dockside where a ship may tie up to load or discharge cargo.

Bulk carrier, 'bulker'. A vessel designed and built to carry dry, bulky cargo such as metal ore, or grain.

Bunker fuel, 'bunkers'. The fuel carried by a vessel for its own main engines and auxiliary engines.

Cableway. Also known as a highline. A substantial wire, rigged using gantries to provide aerial access to a vessel, usually from the shore.

Capesize. A vessel too large to transit the Suez Canal and which must therefore pass round the Cape of Good Hope to navigate from Europe to Asia or vice versa.

Casualty. A vessel which has experienced serious structural or machinery damage likely to result in it being declared a constructive total loss, as defined by Lloyd's List intelligence.

Causeway. A solid pathway from shore into the sea and passable by tracked or wheeled vehicles.

Chain cut. To make substantial cuts through a vessel's hull by the reciprocal pulling (sawing action) of a chain using hydraulic rams to move the chain.

Chain puller. A hydraulic ram connected to a mechanism which engages the links in a chain enabling it to be pulled with great force.

Charter party. A vessel chartering contract.

Classification Society. An organisation that sets and maintains technical standards for the construction, maintenance and operation of vessels, and which assesses the compliance of vessels by regular surveys.

Constructive Total Loss (CTL). Where the subject-matter insured is reasonably abandoned on account of its actual total loss appearing to be unavoidable, or because it could not be preserved from actual total loss without an expenditure which would exceed its value when the expenditure had been incurred.

Container. A standard-sized shipping container may be 20 or 40 feet long, may be refrigerated and may be designed to carry liquid.

Container ship. A vessel specifically designed and built to carry standard-sized shipping containers.

Crane barge. A crane built on a barge for heavy lifting. A large crane barge may lift many thousands of tonnes. The crane can usually rotate and may be self-propelled or used with tugs.

Dive support vessel. A specially fitted-out vessel to support diving operations, often with a decompression chamber for use with saturation diving.

Fender. A large pad hung on the side of a ship or dock and designed to prevent damaging impacts.

Flame cutter. Oxy-acetylene metal cutting torch.

Floating sheerlegs. An A-frame crane built on a barge for heaving lifting – typically up to 1,000 tonnes. The A-frame does not rotate and the barge may be self-propelled or used with tugs.

Grinder. A metal cutting disk rotated at high speed by an electric or petrol engine. Usually hand held.

Ground tackle. Wires, pulleys, chains, hooks and so on firmly anchored onshore.

Hawser. Heavy gauge rope or wire for pulling or securing substantial objects.

Hot tapping. Drilling into a vessel and inserting a probe, usually to enable the removal of potential pollutants.

Icebreaker. Powerful vessel specially constructed and designed to break up pack ice to allow passage of ordinary vessels.

IG. The International Group of P&I Clubs.

Inert gas generator. System to generate inert gas such as nitrogen which can be pumped into voids, pipes, tanks and holds where explosive vapour may pose a risk.

Jack-up rig. A floating platform with three or four legs which may be lowered to the seabed enabling the platform to be 'jacked up' the legs out of the water, to create a substantial, stable work platform.

Lee shore. A shore or coastline onto which the prevailing wind is blowing.

Lightening. Removing cargo, stores and, in some cases parts of the vessel to reduce weight and cause it to float higher in the water, for example to enable the vessel to refloat on a rising tide.

Lightering vessel. A vessel brought alongside another vessel and into which cargo, stores, bunker fuel may be transferred.

Lloyd's Open Form (LOF). The most commonly used commercial salvage contract based on the 'no cure, no pay' principle. See Appendix 3.

Notice of Abandonment. The means by which the assured may inform his insurer of his intention to renounce his rights in the property insured.

Oil boom. A long length of plastic skirt made to float vertically in the water. Oil, being lighter than water, will remain on the surface and will be contained by the boom, which may be deployed around a casualty vessel that threatens to leak pollutants. It is less effective in rough seas.

Protection and Indemnity Club (P&I Club). A mutual insurance association providing insurance cover for its member shipowners for their third party liabilities.

Parbuckle. To pull a listing or inverted vessel upright using heavy lifting equipment with a rotational force.

Patching. Welding steel plates over a hole to restore water tightness.

Piecemeal. To cut up a vessel into pieces small enough to be easily removed.

Remotely operated vehicle. A small submarine with robotic tools, cameras and so on, which is controlled remotely from a mother ship by control wires.

RoRo. Roll on, Roll off. A vessel onto which wheeled vehicles may directly drive using access ramps.

Salvage master. Senior figure in charge of a salvage operation.

Salvage. Render services to a casualty vessel in order to prevent it becoming a loss.

Special Compensation P&I Club Clause (SCOPIC). A clause that may be inserted into and invoked in the commonly used Lloyd's Open Form salvage contract. It encourages salvors to intervene in cases where there is a limited chance of success and where there is pollution risk. See Appendix 3.

Secretary of State's Representative for Maritime Salvage and Intervention (SOSREP). The UK Secretary of State's Representative for Salvage and Intervention.

Standby vessel. A multi-purpose vessel kept on station to be ready to respond to an incident, such as pollution or workers falling into the sea.

Twenty-foot equivalent unit (TEU). A standard-sized 20-foot container. The unit by which a container ship's capacity is measured.

Winterised. Equipment and machinery modified to operate at very low temperatures or in extreme climatic conditions.

1. EXECUTIVE SUMMARY

- **THE COST OF DEALING WITH WRECKS HAS GENERALLY RISEN OVER THE PAST TEN YEARS AND THE COSTS ASSOCIATED WITH A SMALL NUMBER OF NOTABLE CASES HAVE RISEN SIGNIFICANTLY**

  Removing wrecks from the coastline or from deeper water is a major undertaking which can incur great cost. Analysis of the most costly wreck removals from the past decade by the Large Casualty Working Group of the International Group of P&I Clubs suggests that the following factors are central to the cost of wreck removal: location; the contractual arrangements; cargo recovery from container ships; effectiveness of contractors and the vessel's special casualty representative; the nature of bunker fuel removal operations; and the influence of government or other authorities. Of all these factors, government influence, reflecting public concern, appears to be the dominant factor in rising costs.

- **THERE ARE INCONSISTENCIES IN THE REGULATORY FRAMEWORK WHICH GOVERNS WRECK REMOVAL REGULATIONS, WHICH CAN CREATE UNCERTAINTY**

  The current regulatory framework is a combination of coastal states' domestic law and relevant international conventions. The International Maritime Organisation (IMO) has recognised the international legal inconsistencies in the treatment of wrecks, and in 2007 adopted the IMO Convention on the Removal of Wrecks. The process of ratification by nation states is still underway. The intention of the Convention is to bring more consistency to states' approaches to wrecks. States may apply their own domestic law inside their own territorial waters, which may still cause inconsistencies in approaches. More consistency and fairness in the approach to wreck removal across different territories is required.

- **THE RELEVANT AUTHORITIES IN COASTAL STATES HAVE AN IMPORTANT ROLE TO PLAY IN THE CONDUCT OF WRECK REMOVAL OPERATIONS**

  The authorities in coastal states are coming under increasing pressure to manage any potential risks relating to wreck removal, and environmental concerns in particular. The UK has a model for command and control in salvage and wreck matters, that is highly regarded for the way it facilitates rapid decision-making, largely free from political interference. Other coastal states may want to consider adopting this approach.

- **ALL WRECK REMOVAL OPERATIONS ARE MAJOR UNDERTAKINGS. SOME MAY BE STRAIGHTFORWARD, BUT OTHERS ARE COMPLEX AND LENGTHY REQUIRING THE USE OF HEAVY LIFTING EQUIPMENT THAT MAY BE SCARCE**

  Operational aspects of wreck removal start with developing an engineering methodology that considers the condition of the vessel, the site, the cargo and available equipment. Most wreck removals are variants on standard approaches. However, technological advances are enabling wreck removals to be carried out in more challenging and extreme environments.

- **ENVIRONMENTAL CONSIDERATIONS ARE A KEY FACTOR IN WRECK REMOVAL OPERATIONS AND WILL HAVE SIGNIFICANT COST IMPACTS**
  Environmental impact from a wreck or its cargo is a risk, and the need to deal with pollution, or to control the potential for pollution, is central to many wreck removal operations. The required approach to bunker fuel removal can have a major impact on costs.

- **THE LOCATION OF A WRECK IS CENTRAL TO THE COST OF REMOVING IT**
  Wrecks in remote locations far from supply bases and sources of necessary equipment are likely to be more expensive. The conditions at the wreck site are also important; a rocky site surrounded by deeper water will present more of a challenge than a gently shelving sandy beach.

- **INCREASING VESSEL SIZE AND GROWING CARGO VOLUMES ARE DRIVING UP WRECK REMOVAL COSTS**
  Vessels have generally increased in size in the past two decades. Larger ships are generally harder to handle as casualties, and will take longer to remove as wrecks, partly because of the larger volume of cargo that will have to be taken off. In the case of container ships, removing cargo can be a long and difficult process, driving up costs. Representatives from shipowners, the ship design industry, the salvage industry and insurers should consider exploring ideas together aimed at the challenges of salvaging mega-ships.

- **THE HUMAN ELEMENT REMAINS A SIGNIFICANT FACTOR IN THE CAUSE OF THE MAJORITY OF CASUALTIES AND THEREFORE WRECKS**
  Technological improvements such as electronic chart systems can help, but ensuring the availability and use of skilled, well trained crews is vital. Shipowners and operators should be encouraged to be vigilant in ensuring seafarers are well trained.

- **AS THE COSTS OF WRECK REMOVAL RISE, SO DO THE COSTS TO INSURERS AND ULTIMATELY SHIPOWNERS**
  If a vessel is insured, the costs of wreck removal are met by the third party liability underwriters, usually the mutual P&I Clubs. The clubs pool their larger risks and buy reinsurance in the commercial market for risks which exceed $70m. Costly cases exceeding this level mean the Lloyd's and company markets have been more frequently and more substantially exposed to reinsurance risk. The cost of reinsurance has therefore risen and this will ultimately be passed on to shipowners.

- **COLLABORATION BETWEEN ALL STAKEHOLDERS IS REQUIRED TO ADDRESS THE ISSUES RELATING TO WRECK REMOVAL**
  It is in the interests of all parties involved in the shipping industry to better understand issues relating to wreck removal and to work together to reduce costs. Shipowners and insurers should consider formally engaging with relevant authorities to discuss mutually beneficial approaches to managing wreck removal operations.

2. INTRODUCTION

The removal of wrecked ships has always been a substantial and expensive undertaking. However, it is widely acknowledged by shipowners, insurers and contractors alike that the cost of such operations has increased in recent years, dramatically so in some instances.

The well-known cases of the container ship MSC Napoli, beached off the south coast of the UK, and the container ship Rena, grounded off the shore of New Zealand, generated worldwide interest. Both cases have recently been eclipsed by the cruise liner Costa Concordia, which is likely to be the most complex and expensive wreck removal operation of its kind. Such cases have raised public awareness of the issue of wreck removal, but the shipping and insurance industries are particularly concerned with the rising cost. The total cost of the top 20 most expensive wreck removals from the past decade currently stands at $2.1bn and is set to increase.[1]

There are typically some 1,000 serious shipping casualties globally each year.[2] Successful intervention means that the majority of these casualties are salvage cases and are towed to safety or refloated, repaired and returned to service. In some cases, the complexity and cost of the salvage and repairs needed to bring the vessel back into service makes doing so uneconomic, and the casualty is declared a total loss with the subsequent removal costs falling on the liability insurers. It is increasingly likely that the relevant coastal state will order a wreck to be removed, especially if it presents a hazard to shipping or if its cargo or fuel threaten to damage the environment.

Wrecks are a third party liability and therefore the cost of dealing with them is usually covered by the shipowner's membership of a mutual Protection and Indemnity Club (P&I Club). However, the most expensive wreck removal cases now regularly exceed the level at which the clubs' reinsurance cover begins – $70m. This can put pressure on reinsurance market capacity, while any consequent rises in the club's reinsurance costs will be passed on to their shipowner members, increasing their operating costs in turn.

The International Group (IG) of P&I Clubs' Large Casualty Working Group has conducted analysis of the most expensive wreck removal operations from the past decade. The IG's preliminary findings established that increasing costs are chiefly the result of the requirements of coastal state authorities – often due to environmental concerns.[3] At the same time, technological developments and more sophisticated engineering approaches have delivered environmental benefits, such as the ability to remove potential pollutants from a wreck lying in deep water, and made previously prolonged or expensive operations more feasible.

The location of a wreck, including local conditions, and the type of vessel, are important considerations in wreck removal. A remote site may increase the duration of the operation and so increase the time for which expensive gear must be chartered.

Increasing ship size and the ability of salvage contractors to handle the largest vessels, either as casualties or wrecks, is a growing challenge for the shipping industry. Larger vessels carry more cargo, that will take longer to deal with, and create more wreckage to remove, increasing the time taken and consequently, the cost. Experience shows that container ships make expensive wrecks, largely because the operation to remove the containers is often slow and complex.

Wreck removal is now the subject of an International Maritime Organisation (IMO) Convention, which is waiting to come into force while coastal states undertake the process of ratification. The Convention is intended to create more certainty and uniformity in the treatment of wrecks, and ensure that governments and claimants have direct access to the shipowners' financial security for their liability in respect of wrecks. However, the likelihood that many states will continue to apply domestic legislation in their own territorial waters means that a degree of uncertainty is likely to continue.

This report examines the issue of wreck removal in depth, exploring the regulatory framework as well as the commercial, operational and human considerations. It investigates the reasons for rising costs, studies the implications for the insurance industry and makes some recommendations for the key stakeholders in the marine industry to consider.

3. WRECK REMOVAL CONSIDERATIONS

Statutory authorities in coastal states can exercise great power in wreck removal and political considerations can have a significant impact on operations.

New Flame sinking off Gibraltar.

Source: Wikimedia Commons

3.1 REGULATORY FRAMEWORK

As with much maritime law, the legal framework under which wrecks are treated has evolved over centuries. Typically, it is a blend of the coastal state's national legal framework and international maritime law, such as relevant United Nations International Maritime Organisation Conventions.

There is therefore a lack of uniformity or commonality in the approach to wreck removal. This can create confusion due to differences between jurisdictions and uncertainty over the geographical extent of responsibility. Moreover, under the 1976 Convention on Limitation of Liability for Marine Claims (LLMC) – which gives shipowners the right to limit their liability – states which ratified the Convention were given the option to opt out of the liability limitation regime in the case of wreck removals, and most ratifying states did so.

There is also the issue of the difficulty of enforcing the law. For example, there can be limited actions that the authorities may take against a one-ship operator with limited financial capability whose vessel becomes a wreck.

Such international variation makes the location of a wreck an important factor in determining how it is treated.

The role of coastal state authorities

Statutory authorities in coastal states can exercise great power in wreck removal, and political considerations can have a significant impact on operations. Multiple tiers of government (local, regional and national) and numerous other agencies can all claim a legitimate role, bringing their respective perspectives to bear, and influencing operational and commercial decisions.

In the case of the container ship MSC Napoli, grounded off the south coast of England in 2007, the following organisations became formally involved in the response: two local resilience forums; two county councils; two district councils directly (and others indirectly); the county police; the county fire and rescue service; the Maritime and Coastguard Agency; the landowners; the National Trust; the Environment Agency and the Department for Transport.[4]

Public concern for protection of the environment appears

ROLE OF THE UK SECRETARY OF STATE'S REPRESENTATIVE FOR MARITIME SALVAGE AND INTERVENTION

The UK Secretary of State's Representative for Maritime Salvage and Intervention (SOSREP) is widely regarded as a good model for the coastal state's role in managing casualties, salvage and wrecks. The role was created in 1999 as part of the UK Government's response to Lord Donaldson's Review of Salvage and Intervention following the wreck of the tanker Sea Empress off Milford Haven in 1996. The SOSREP also represents the Secretary of State for Energy and Climate Change in so far as the role relates to the offshore energy sector on the UK continental shelf. The SOSREP is a civil servant of the Maritime and Coastguard Agency – an agency of the Department for Transport.

On behalf of the Secretary of State, the SOSREP is able to oversee, control and, if necessary, to intervene and exercise ultimate control acting in the overriding interest of the UK in maritime casualty operations in UK jurisdictional waters – the 12 nautical mile limit – for safety and for the whole of the Pollution Control Zone (contiguous with Exclusive Economic Zone) – 200 nautical miles – for pollution concerns. The role encompasses ships and offshore installations including platforms and pipelines, and includes wrecks.[5]

The SOSREP has a responsibility for ensuring that any contractor appointed has the capability and experience to carry out the operation, and also to ensure that the methodology of the proposed approach has fully considered any safety and environmental concerns and that the plan is in the best interests of the State. If the SOSREP is not satisfied that the contractor has the required capability then he may direct the owners or insurers of the casualty or wreck to engage alternative or additional contractors, or to modify their proposed plan.

The SOSREP has no concern with the financial implications of the methodology and will not normally be aware of the commercial arrangements agreed between the contractor and the insurers. The role is to ensure that the contractor and the plan are both fit for purpose.

The key feature of the role is that the post holder is empowered to make crucial, and often time-critical, decisions without delay and without recourse to higher authority.

Lord Donaldson observed that "salvage by committee" was generally ineffective and inefficient. What was needed was a single voice, able to make and enforce decisions on behalf of the UK Government and in the overriding public interest and, if necessary, to override any and all other interested parties. Donaldson said: "We cannot over-emphasise that whilst the Chief Executive and Ministers will ultimately be accountable for the decisions of the SOSREP, whilst operations are in progress they must either back him or sack him".[6] The SOSREP is therefore not subject to local political pressures.

The SOSREP system has been widely applauded for its rapid and effective decision-making and is considered a good model that could be replicated effectively in other territories.

Sea Empress oil spill offshore UK 1996.

to be greater than was the case even two decades ago, and in many parts of the world there is a zero tolerance attitude to any ship-sourced pollution. This applies regardless of the nature of the cargo and, even if there is no risk of any noxious emissions, a wreck's physical impact on the shore – including visual – is likely to be unacceptable to politicians and the public. News media will highlight the case, and stakeholders such as environmental protection groups may campaign for specific actions.

Against this backdrop of increasing environmental concerns, it is not surprising that the demands of authorities have grown and may influence the entire approach to a wreck removal operation. Political and societal considerations, in particular concern with the potential environmental impact, are at the heart of some of the rising costs of wreck removal operations.

Technological developments, including the adoption of equipment and methods from the offshore oil and gas industry, have expanded the frontiers of these operations into ever more challenging environments. This increased capability has enabled more wreck removal operations, but has also encouraged greater intervention from authorities.

In some territories the authorities may exert influence on the choice of contractor hired to conduct the operation. There have been cases in some countries in which shipowners were required to use local contractors when the preferred choice would have been a substantial international organisation with a strong track record.[7]

The 2007 Nairobi International Convention on the Removal of Wrecks[8]

The International Maritime Organisation (IMO) recognised international legal inconsistencies in the treatment of wrecks, and has encouraged the creation of a more uniform international legal framework through the 2007 IMO Convention on the Removal of Wrecks, adopted at a conference held in Nairobi, Kenya. The process of ratification by nation states is still underway. As with most international treaties it is a lengthy process, and the Convention will only come into force 12 months after ten or more states have ratified the Convention through their domestic legislature.[9] To date, there have been six ratifications.[10] See Appendix 1 for the key features of the International Convention on the Removal of Wrecks.

The intention of the IMO wreck removal Convention is to harmonise acceded states' attitudes to wrecks and to give more commonality to decision-making about whether wrecks should be removed.[11] It also intends to create a liability and compensation regime for the removal of wrecks, which is to be paid for by shipowners and their insurers. The Convention applies to a state's Exclusive Economic Zone which extends to 200 nautical miles from shore. States may choose to apply the Convention within their 12 nautical mile territorial waters, but may also apply their own domestic law to those inshore waters. This may yet lead to inconsistency of approach as most wrecks that represent a hazard are likely to be within the 12 mile limit.

Additionally, while the Nairobi Convention allows the shipowner to limit liability for wreck removal costs under any applicable national or international regime, such as the 1976 Limitation of Liability for Marine Claims (LLMC) Convention (as amended), that limitation only applies to states which ratified the LLMC Convention without reservation. The ratifying states did so, on the whole, with reservation. This means that while the Wreck Removal Convention theoretically allows for limitation of liability, in practice there are many cases where shipowners will not be able to do so.

Shipowners and P&I Clubs have publicly argued that international conventions should promote uniformity and certainty of the law and that legislation should be applied to the widest possible extent by states. They have, therefore, urged states, when ratifying the Convention, to extend the application of the convention to wrecks within their territorial seas.[12]

3.2 COMMERCIAL

Salvage and wreck

Nearly all wrecks begin as working vessels which have experienced an incident causing them to become a casualty. At the outset of most casualty situations it is hoped that rapid and effective intervention will allow the vessel and its cargo to be salvaged. That is, after the provision of effective services by a salvor (such as refloating or repair, or towing away from danger), the vessel can be returned to her owners and re-enter service. Salvage operations are usually conducted under 'no cure, no pay' contracts. The salvor voluntarily enters into an agreement to try to save the ship and its cargo at their own financial risk. A successful salvor expects a reward based on the value of the ship and its cargo (the salved fund) and taking account of the peril and complexity of the operation. See Appendix 3 for Introduction to Salvage Law.

To encourage salvors to intervene in cases where the likelihood of success is low and there is a threat of pollution, there is, in addition, the Special Compensation P&I Clause (commonly known as SCOPIC) which parties may incorporate into Lloyd's Open Form (LOF) contracts and invoke according to the circumstances. Once invoked it enables salvors to be paid a daily tariff rate for their work and equipment used in attempting to save a vessel, with a 25% standard bonus (which may be reduced to 10% in some circumstances).[13] Importantly, these payments are made by the liability insurers of the casualty – usually the P&I Clubs. See Appendix 3.

The decision as to whether to persist with the salvage operation lies with the shipowner, their advisers and insurers. The state of the vessel and the anticipated cost of the operation to save and repair it are assessed against the value of the vessel. If that cost makes salvage and repair uneconomic, the vessel may be declared a constructive total loss (CTL). Not all CTLs are wrecks as there may still be some scrap value in the hull and in some cases, such as following a fire, the vessel may still be afloat. In other cases where the casualty is an actual total loss (ATL), the property is clearly beyond recovery and repair. The shipowner will issue a Notice of Abandonment and the hull insurers will be liable to pay the claim for the insured value of the hull and the vessel is declared a total loss. If there is liability to remove the wreck (ie it has not sunk in very deep water), the responsibility for removing the wreck transfers to the owner's third party liability insurers. The associated costs are therefore covered by the shipowner's protection and indemnity insurance cover, usually, but not always, provided by membership of a P&I Club. Some third party liability cover is offered to shipowners by commercial fixed premium P&I providers.

A wrecked vessel may simply be left to the elements, but it is likely that the authorities will want it removed. This will certainly be required if it presents a hazard to other shipping and navigation, or if its cargo or fuel present a threat to the environment.

Interim contracts and bunker removal

At the cessation of the salvage operation the authorities may require the owners to put in place caretaker arrangements to mark, guard and, in some cases, stabilise the vessel until the contract for the wreck removal is finalised. This can be an expensive period for the insurers, building up incurred costs on any standby craft and equipment kept on station throughout the tender process, but before the wreck removal itself gets underway.

It is often the case that the casualty's main engine and auxiliary engine fuel (known as bunker fuel) is required to be removed at this stage. This fuel represents a substantial pollution hazard – in many cases the greatest pollution threat. A fully-fuelled vessel may carry thousands of tonnes of fuel.

Contractors may be engaged on a separate contract – often a BIMCO Wreckhire[14] contract suitably amended – to remove the bunkers, with the operation undertaken in parallel with the main wreck removal contract tender process. The bunker removal contractor's primary concern is that there should be no spillage during the operation, which can be delicate and complicated and may require rigging of temporary pipework and fuel heating systems. In modern salvage, contractors may use 'hot tapping' (carefully drilling into the fuel tanks from the exterior and inserting probes and hoses to extract the pollutant). This approach can be used to remove fuel from wrecks lying in considerable water depth. The cost of bunker fuel removal from a wreck lies with the shipowner's P&I Club and can form a large part of the incurred cost of dealing with a wreck.

Wreck removal contracts

Wreck removal operations are chiefly conducted under commercial contracts that usually fall into the category of a lump sum or fixed price for the job – sometimes with staged payments according to progress – or a daily hire rate for the personnel, craft and equipment required to complete the job. In the past, use of 'no cure, no pay' arrangements akin to salvage contracts was common.

The most common contracts are in standard form as produced by the shipping association, the Baltic and International Maritime Council (BIMCO). These are the daily hire contract, Wreckhire, and the lump sum contract, Wreckfixed, and its staged payment version, Wreckstage.

Traditionally, daily hire contracts were considered potentially to offer the insurer poor value for money because of the risk of limited cost control associated with the open-ended nature of the arrangement. At the same time, fixed price contracts were considered risky for the contractor, given that wreck removals are often subject to uncertainties until the job is underway, and also subject to bad weather which could extend the time of the job with no additional compensation for the contractor.

The latest, 2010, edition of the BIMCO Wreckhire contract attempts to deal with these concerns by introducing a

BALTIC ACE

In December 2012 the RoRo car carrier Baltic Ace (148m, 7,787 tonnes deadweight)[15] was involved in a collision with the container ship Corvus J in the Southern North Sea while underway from Zeebrugge, Belgium to Finland, carrying a cargo of more than 1,400 cars. The incident took place some 50 kilometres off the Dutch coast west of Rotterdam.

After the collision the Baltic Ace began taking on water, capsized and sank within 15 minutes. The weather conditions, with three-metre waves and snow, made the rescue operation difficult. Thirteen crew members, including the ship's captain, were winched to safety by helicopters or picked up by nearby ships. The bodies of six crew members were subsequently recovered from the sea; the remaining five crew members are still listed as missing.[16]

A contractor was rapidly engaged to remove several hundred tonnes of fuel oil, and suitable vessels and equipment were mobilised to start the operation.

However, once the operation began, it was discovered that the fuel had solidified, meaning that different equipment would be required. With no immediate risk of the solid fuel leaking, both parties agreed to terminate the contract, leaving the Dutch authorities, owners and insurers to consider the best approach to the wreck and its bunkers.[17]

The Dutch authorities have not yet decided whether the wreck of the Baltic Ace is to be removed: despite sitting in the navigation channel and being only 6m below the water surface.[18]

The incident has strong echoes of the sinking of the car carrier, Tricolor, which sank off France following a collision with a container ship in 2002, while on passage from Zeebrugge to Southampton with a cargo of 3,000 cars.[19]

The authorities ordered the removal of that wreck as it was a major hazard to navigation. A consortium of contractors conducted the lengthy and costly wreck removal operation.[20]

The car carrier, Baltic Ace, in Bremerhaven, Germany.

Source: Wikimedia Commons

WHO ARE THE CONTRACTORS, WHAT ARE THEIR CAPABILITIES?

Riverdance on the beach at Blackpool, Northern England.

Much skill, experience and equipment is required to handle the removal of a substantial wreck. It can be a high-risk business both physically and financially. This generally means that the organisations capable of safely carrying out major wreck removal are a relatively small group, often, but not always, the marine salvage contractors which are members of the trade association, the International Salvage Union.

These organisations can be put into one of three categories:

- Small local operators with limited equipment but good local experience, contacts and knowledge.
- Regional players with considerable experience and some of their own assets.
- Major international organisations (often subsidiaries of larger groups) that are well-capitalised, own and operate substantial assets, and have extensive experience of a wide range of projects.

Individual consultants, often former senior staff of a marine salvage company, may sometimes secure wreck removal contracts, using their experience and contacts to draw on a team of sub-contractors.

In addition, wreck removal can be performed by civil engineering and demolition firms. The contract for the removal of the wreck of the MV Riverdance from Blackpool beach in the UK in 2008 was, for example, conducted by a local firm of demolition contractors – an example of the insurers and authorities choosing a creative solution.[21]

The IG considers the competence of contractors to be of a high standard. It has praised the innovative, problem solving approach of the contractors and their ability to come up with creative solutions, even if existing equipment is not necessarily suitable for the job.[22]

There are, however, concerns within the salvage industry over the diminishing number of competent personnel, particularly in Europe, entering the salvage and wreck removal industry. The level of competition, particularly from the offshore support sector,[23] could potentially lead to a capability and skills gap.[24]

Riverdance being cut up by the demolition contractor.
Source: PGC Demolition

bonus incentive scheme. The scheme provides a carrot and stick approach to encourage the contractor to complete the operation within agreed time limits. A bonus will be paid if the contractors are able to complete the task within the specified period, but pro-rata on a sliding scale from the agreed date until the final date for completion. If the contractors do not finish by the completion date, the bonus will be lost and they will also be faced with a reduced daily rate of hire. The means of dealing with disputes has also been updated with the introduction of a new way of dealing with operational issues which require a rapid decision on site, as well as traditional arbitration.[25]

3.3 OPERATIONAL

When an invitation to tender for a wreck removal is issued, interested contractors will wish to deploy teams to the site of the wreck to conduct their own analysis of the condition of the vessel and the nature of the ground where it is lying. It can require the services of divers, salvage masters, surveyors, naval architects and environmental specialists. Salvage vessels, work boats and helicopters may need to be chartered and bathymetric surveys carried out.

The costs of mounting a bid for a major wreck removal can be very high. One contractor bidding for the work to remove the wreck of the cruise liner Costa Concordia spent €500,000 in the preparation of its unsuccessful bid.[26] As unsuccessful firms are not compensated for these costs, contractors may decide it is uneconomic to mount a bid.

Would-be contractors additionally often have little opportunity to carry out a full wreck survey because of time pressure or access difficulties. Even if they do, it is unlikely to be comprehensive and the wreck may subsequently reveal unpleasant surprises. It is in this context that 'no cure, no pay' arrangements are unpopular with contractors for large wreck removals, and it may affect the authorities' consideration of proposed methodologies.

The insurers will generally employ experienced marine consultants to assist with the preparation of the invitation to tender and will assist with evaluating the bids, seeking the approval of the coastal state authorities as necessary. These consultants are often retained to manage the wreck removal contract.

Engineering

A wreck removal plan must be developed by the contractor, supported by appropriate engineering, to create a methodology that is economic, safe and acceptable to relevant authorities. Complex calculations may need to be carried out, though in some cases the required approach is simple and clear from the outset.

Key engineering considerations include the stability of the vessel, its construction and structural integrity, and the nature of the ground on which the vessel lies. The weather prospects, typical sea conditions and proximity to population centres must also be taken into account.

There must also be consideration of particular environmental concerns including the cargo and bunkers and the possibility of hazardous or noxious substances. The plan will be influenced by the availability of suitable resources such as heavy lifting gear and the distance from supply bases.[27]

Methods of wreck removal

The removal of each wreck requires a bespoke solution, which will generally be variants of a number of standard approaches outlined below:

- Refloating the vessel intact – possibly requiring the righting of a capsized vessel in the first instance. This may require strengthening and patching to make the vessel watertight. Refloating may be achieved simply by lightening and pulling from the grounding site using powerful tugs or ground tackle. This may require buoyancy improvements using air bags, buoyancy aids or compressed air in the holds. For example, the container ship Angeln was refloated in the Caribbean using compressed air.[28]

The container ship Angeln is refloated with compressed air.
Source: Resolve Marine

- Partial removal leaving some portion of the wreck in place. For example, removing superstructure and cranes to leave a safe water depth above the vessel in a navigable channel. This was the approach taken with the bulk carrier, California, lost in the Malacca Straits in 2006.[29] Wrecks may also be buried deeper into the sea bed by dredging a hollow next to the wreck and settling it in. Partial removal might require only the extraction of potential pollutants. Modern technology enables this to be conducted remotely at considerable depth.
- Pulling ashore using ground tackle and dismantling for recycling. For example, this happened off South Korea with the car carrier Morning Sun in 2008.[30]
- Parbuckling – inserting strops under the wreck and pulling the vessel upright using heavy lift sheerlegs or a crane. This is intended for the Costa Concordia, off Italy.[31]
- Piecemeal removal – cutting up in situ into small sections which are removed by crane, or other means, including helicopter, for disposal. For example, this was the approach with the Riverdance in 2008, on the beach in Northern England.[32]
- Cutting up in situ into large sections using chain cutting or explosives which are lifted on to deck barges, or making watertight, floating and towing for disposal. Examples of this method include the MSC Napoli, wrecked off the Southern UK coast in 2007.[33]
- Lifting complete for smaller wrecks. For example, the Marinero 1 was lifted complete offshore Croatia in 2009.[34] [35]

The Marinero 1 being lifted complete from the seabed. Source: Multraship

Handling cargo

A key issue for the contractors and the authorities will be whether to keep the cargo in the vessel or to discharge it. They will need to consider whether the vessel can be safely removed without risk of the cargo spilling. Handling the cargo from most casualties presents serious challenges and may be the most complex and lengthy part of the operation.

Cargo handling considerations include: the risk of pollution from cargo, the state of the cargo, its potential hazard and what value may reside in it. For example, some seemingly benign products may become dangerous when mixed with water. There is also the possibility of toxic fumes or gases, while corrosive cargos such as acids may need to be discharged into special stainless steel tanks.

The wreck of the TK Bremen is cut up piecemeal on the beach in Western France.

EQUIPMENT REQUIRED

The equipment required to undertake wreck removals includes a large number of portable items, substantial assets and craft and, in some cases, heavy lift equipment. The more remote and the more complex the job, the longer the equipment will be required and the greater the costs.

A typical inventory of portable equipment might include: pumps and hoses; welding equipment; drilling and cutting equipment – grinders and flame cutters; inert gas generators; compressors; hydraulic systems; generators, cabling and distribution boards; diving gear including decompression systems; 'hot tapping' systems; chains and shackles; air lift systems; winches; lighting; pollution control equipment such as oil booms and fenders.[36]

Heavy equipment might include powerful tugs; dive support vessels; standby vessels; deck barges; hold barges; work barges; accommodation units; lightering craft; utility jack-up rigs; heavy lifting gear including sheerlegs and heavy lift crane barges; a chartered heavy lift helicopter; remotely operated vehicles; large-scale cutting gear – chain pullers, abrasive wire and hydraulic rams; mechanical grabs and industrial magnets.

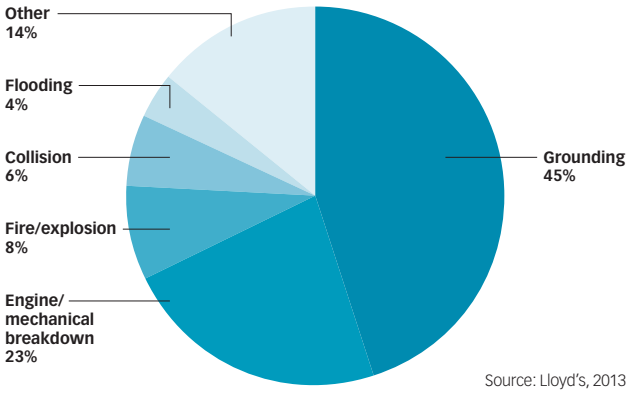
It will need to be decided whether the cargo can be jettisoned or whether it can be discharged ashore or into a barge or lightering vessel. The latter may require floating cranes and lightering vessels standing by, while the former may require the engineering of complex systems such as cableways or causeways. Liquid cargo may be pumped into lightering vessels or pumped ashore. Plans for discharging containers from a container ship must be developed – this can be a slow and difficult operation and is likely to increase costs.

3.4 HUMAN ELEMENTS

There have been demonstrable improvements in ship and operational safety over the past quarter of a century, but the root cause of more than 75% of casualties, and therefore many wrecks, remains human factors.[37] Fatigue, poor communication, lack of technical knowledge, inadequate knowledge of a ship's systems, poor ship handling and poor maintenance are all examples of human factors that could cause ship casualties and wrecks.

Shipping casualties may be caused by grounding, mechanical breakdown, fire and collision – the weather can also be important. Grounding is the most common cause of reported LOF salvage cases. However, only a small proportion of these will go on to become total losses or wrecks.[38] Human elements, both on and offshore, can often lie behind these causes of shipping casualties. For example, failure to keep a proper lookout on the bridge can lead to a collision, or mis-declaring hazardous cargo might lead to explosion and fire, as with the Hyundai Fortune in 2006.

Figure 1: Causes of marine casualty in Lloyd's Open Form salvage cases, 2000-2010



Source: Lloyd's, 2013

Improvements, such as the introduction of Electronic Chart Display and Information System (ECDIS) and more sophisticated and more widely applied Vessel Traffic Management (VTM) systems will help, but shipowners and operators are also likely to benefit from retaining trained and competent personnel on board in order to ensure casualties are avoided.

Vessel age is also a notable factor, with older vessels being more prone to casualty and loss.[39] Standards tend to decline as vessels migrate during their lifespan to lower quality operators, or are under ship management where the allocation of monies received from the shipowner may not leave enough in the budget for maintenance.[40]

CASE STUDY: MSC NAPOLI

The container ship MSC Napoli, laden with 2,300 containers, was severely damaged in the English Channel during bad weather in 2007 with wave heights at the time reaching nine metres. The vessel – which had grounded in the past and suffered damage which was subsequently repaired – sustained a serious fracture to her hull forward of the engine room. The crew took to the lifeboat and were picked up by helicopter, leaving the abandoned vessel at the mercy of the seas.[41] Given the weakened state of the casualty, and following discussions with French authorities, the UK SOSREP decided that the best course of action was to take the vessel into UK waters. SOSREP subsequently allowed the deliberate grounding of the vessel off the south coast of the UK to prevent her sinking in deep water.[42]

The contracted Smit Salvage team removed more than 3,500 tonnes of bunker fuel and the containers were removed in an operation which took more than five months. After patching and pumping, she was refloated and taken to anchor offshore from the grounding position. However, at the time of refloating there was no approved disposal option and, due to her severely damaged condition, the decision was taken to re-ground the vessel. The vessel was then cut into two sections using explosives. The forward section was towed away for scrapping. Part of the stern section was treated under a different contract. The accommodation block was cut away and removed, before the remainder was cut into sections of around 300 tonnes for removal by barges to a recycling facility in the Netherlands.[43]

MSC Napoli Source: Wikimedia Commons – public domain

If the vessel could have been disposed of after she was initially refloated, the total cost of the wreck removal would have been significantly less than the eventual $135m cost.[44]

MSC Napoli off Southern England.

CASE STUDY: NEW FLAME

New Flame off Gibraltar.

The casualty occurred in August 2007 when the New Flame was involved in a collision with the Torm Gertrud off Gibraltar and sank, partially submerged. Tsavliris Salvage was awarded a Lloyd's Open Form (LOF) with SCOPIC invoked (see Appendix 3 Salvage Law) to salve the vessel. However, in December the casualty broke in two and salvage was no longer viable. LOF was terminated and a wreck removal tender issued, with considerable pressure from the Gibraltarian authorities to remove the vessel and its cargo as soon as possible.

Titan Salvage was awarded a BIMCO Wreckhire daily rate contract with incentives to meet agreed milestones. Bad weather forced plans to change, and the operation started with the recovery of most of the cargo of 42,000 tonnes of scrap metal using a mechanical grab and an underwater magnet. The cargo was trans-shipped into a total of 12 coastal vessels for recycling. Export licences had to be obtained from the Gibraltar Government before any of the scrap cargo could be loaded. The operation proceeded with the removal of the accommodation block. However, it was a requirement of the authorities that the wreckage was taken into Gibraltar port for recycling, but at a shipyard which would not usually undertake such recycling, which increased the costs.

The next phase was recovery of the forward section using a chain cut and sheerleg lifting before depositing it ashore for recycling. The remaining stern section was a challenge; to raise it without removing the main engine meant a lift in excess of 2,500 tonnes. By chance, the 3,000 tonne-capacity floating crane Rambiz was available nearby and lifted the stern section in one piece, which was set down on a massive barge and taken to Belgium for recycling. The final phase of the operation was straightforward and the remains of the vessel were removed, but only insofar as was required to create a minimum clearance of 17.7m over the wreck.[45]

The challenges

The New Flame sank in an exposed location in an area of strong currents, which meant that diving operations in particular were difficult and extended the time taken to complete the job. Bad weather dramatically altered the condition of the wreck during the operation.

The nature of the operation was uncertain, with a number of unknowns. A lump sum contract would arguably have been too risky commercially for any contractor, and the chosen contractor agreed to undertake the job on the basis of discounted daily rates, in return for bonus payments for meeting clearly identified targets. The targets and bonuses were redefined when circumstances, such as bad weather, caused interruptions. These ideas helped inform the new 2010 BIMCO Wreckhire contract (see 3.2 wreck removal contracts).

International politics played its part due to the long-running dispute between the UK and Spain over the sovereignty of Gibraltar, and local politicians were heavily involved throughout the wreck removal operation. They required licensing for certain operations and refused to allow the export of some sections of the wreck, insisting they had to be recycled in Gibraltar.

Environmental concerns of the national authorities required the maintenance of a high degree of pollution-control equipment on standby throughout the operation, at considerable expense. The contractors felt that this requirement was excessive because, once the fuel had been extracted, the threat of a significant oil spill had been removed.[46]

4. WHAT UNDERLIES RISING COSTS IN WRECK REMOVAL?

Proximity to major shipping centres where salvage assets and heavy equipment are located will be a factor in how long the operation takes and its cost.

The wreck of the SS America off the coast of Fuerteventura in the Canary Islands.

Source: Wikimedia Commons – Wollex Germany

The Large Casualty Working Group of the IG of P&I Clubs has conducted analysis of the 20 most costly wreck removal cases insured by the clubs in the past decade.

According to their study, the total cost of the top 20 most expensive wreck removals is currently some $2.1bn and set to rise.[47] The preliminary findings indicate that the following factors potentially drive the total incurred costs of a casualty that may become a wreck:

- Impact of location
- Contractual arrangements
- Impact of cargo removal from incidents involving container ships
- Bunker removal operations
- Impact of government or other authority on operations[48]

4.1 THE IMPORTANCE OF LOCATION

Worldwide

Where in the world a wreck occurs has a major bearing on the duration, complexity and cost of removing it. The jurisdiction and attitudes of the relevant shore-based authorities with wreck site responsibility are extremely important and will influence the methodology chosen.

Proximity to major shipping centres, where salvage assets and heavy equipment are located, will be a factor in how long the operation takes and its cost. Experts can be rapidly flown to most locations and a certain amount of equipment can be air-freighted to the site. However, it is a different matter with heavy equipment – particularly heavy lifting gear which is in limited supply and not always suitable for transit in open oceans.[49]

Availability of suitable gear is not guaranteed, with competition for usage coming from the offshore construction and energy sectors. Such equipment tends to be concentrated in Europe, Singapore, North East China, Japan and the Gulf of Mexico[50] (see Figure 4). Assuming it

Figure 2: International Group top 20 wreck cases for the combined cost in each case of salvage, SCOPIC and wreck removal

IG top 20 salvage/SCOPIC/ROW incidents 2002-2012

Year	Club	Vessel name	ROW/Scopic (US$)
2002	Gard	TRICOLOR	54,742,493
2003	WoE	CP VALOUR	44,553,142
2004	UK	HYUNDAI NO 105	57,664,127
2004	Swedish	SELENDANG AYU	148,118,187
2005	Japan	TWIN STAR	33,751,367
2006	WoE	OCEAN VICTORY	52,155,913
2006	Swedish	ROKIA DELMAS	73,284,457
2006	Japan	GIANT STEP	38,887,613
2006	American	CALIFORNIA	44,066,473
2006	London	MSC NAPOLI	135,301,307
2007	Swedish	NEW FLAME	177,372,321
2007	WoE	SEA DIAMOND	57,983,161
2007	Japan	EASTERN BRIGHT	58,513,442
2008	American	FEDRA	66,162,281
2010	UK	JOLLY AMARANTO	43,517,545
2010	Standard	MSC CHITRA	102,474,886
2011	Swedish	B OCEANIA	55,080,527
2011	Swedish	RENA	243,972,652
2011	Standard	COSTA CONCORDIA	561,636,615
2012	Gard	BARELI	54,327,008
		TOTAL	**2,103,565,517**

Source: IG at 20 February 2013

This table has been reproduced with the kind permission of the IG's Large Casualty Working Group. The values of vessel in the Salvage/SCOPIC/ROW column are correct at the time of going to print; however some of the more recent casualties are still open cases and the values may be subject to change.

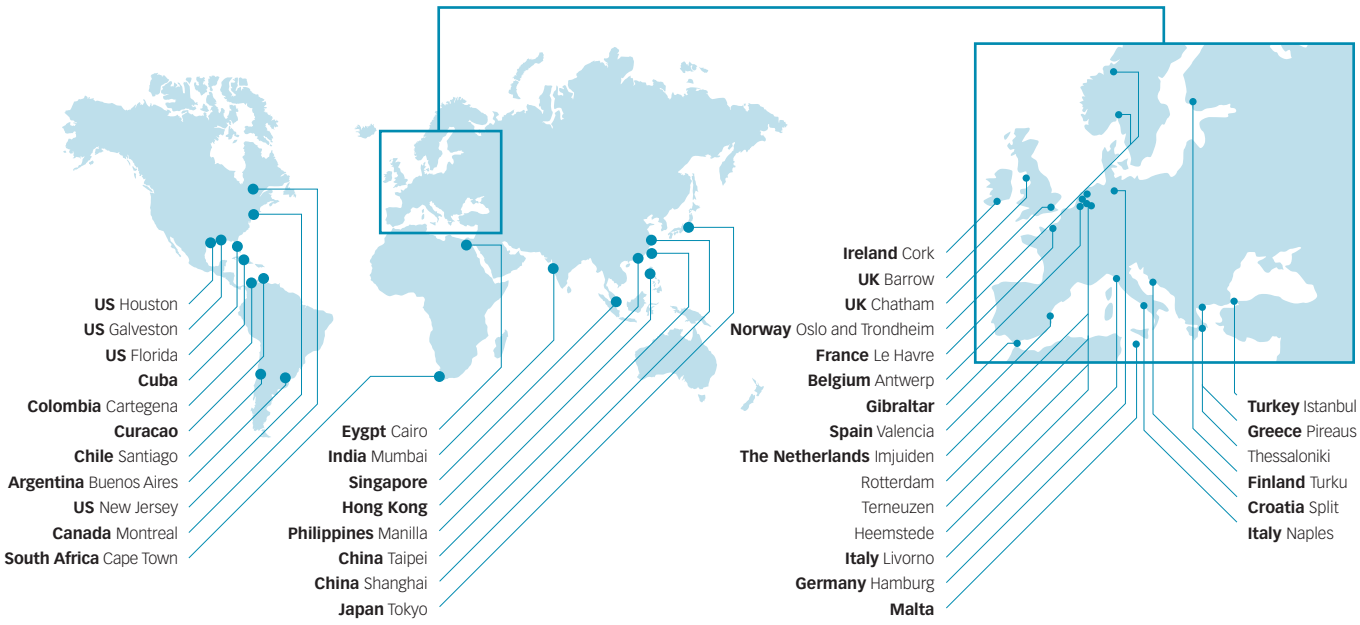
is available, the equipment will therefore need a deep sea tow to many locations, which will slow the response time and may increase cost, as well as allow the condition of the wreck to deteriorate. In the case of the Rena, for example, the nearest available heavy lift equipment to the casualty site in New Zealand was in Singapore, causing a delay of six weeks, during which heavy weather caused the casualty to further deteriorate.[51]

Local

Locally, the nature of the ground where the wreck lies is a key factor in determining the complexity of the operation. A wreck lying in shallow water or beached on a sandy bottom, such as the TK Bremen off Western France, will present a simpler case than a vessel wrecked on a rocky reef surrounded by deep water as with the Rena, off New Zealand.

The weather conditions at the location are also important. For example, whether the wreck site is a lee shore exposed to prevailing winds and waves, or whether it is in a sheltered location. Similarly, whether the tide, or waves will scour the sand or mud from under the wreck, causing instability, could be an important factor. A wreck occurring in the approaches to a major port or close to active berths could represent additional risk in the form of major business interruption.

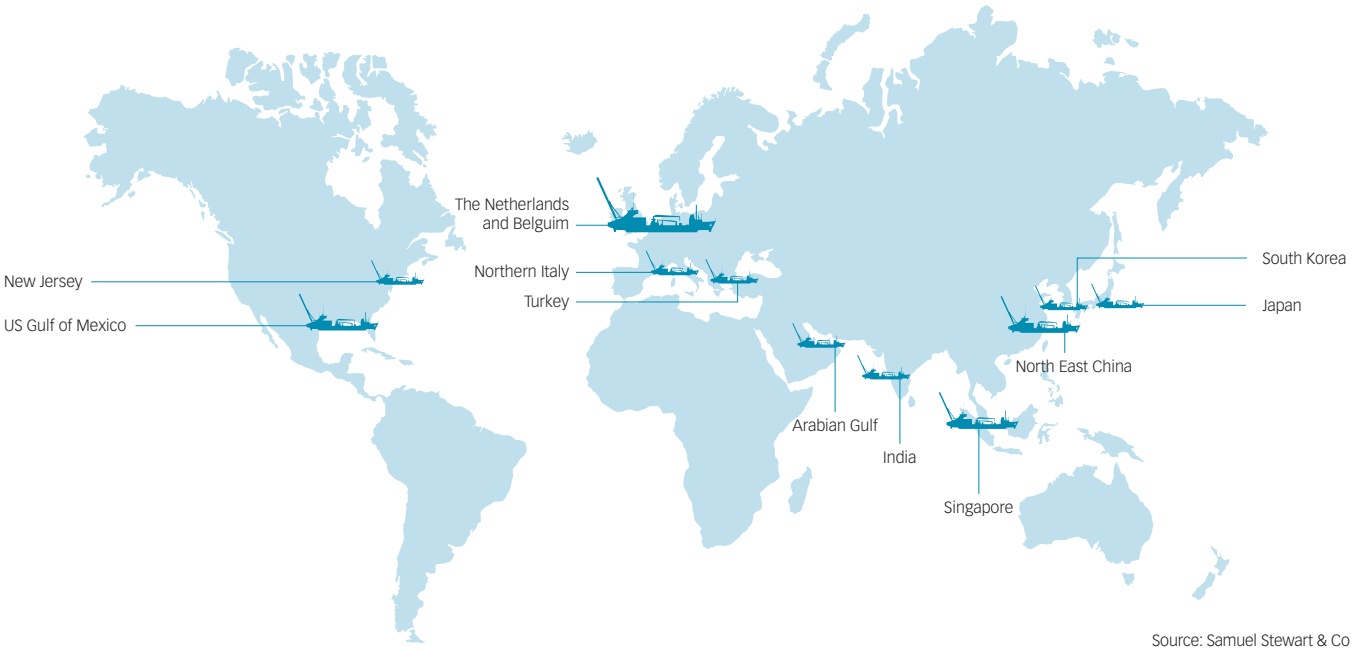
Figure 3. Principal location of salvage companies



Source: International Salvage Union[52]

Locations of main offices of member companies of the International Salvage Union. Note: locations shown are head offices and companies may also have satellite locations

Figure 4: Principal base location of heavy lifting gear



Source: Samuel Stewart & Co

Wrecks on coral reefs can pose a significant environmental risk. For example, movement of the vessel could cause damage to delicate coral, while any hawsers or chains and anchors on the seabed can also cause major damage.

Polar regions present a particular challenge, and maritime traffic in the Arctic is already considerable and growing, as noted in the Lloyd's publication *Arctic Opening: Opportunity and Risk in the High North*.[53] Much of this activity is currently re-supply movements. However, product tankers, bulk ore carriers and a liquefied natural gas (LNG) vessel have used the Northern Sea Route between Europe and Asia. Although there is a high potential threat to the Arctic environment if a casualty or a wreck occurs, it has been noted that much Arctic shipping is currently carefully controlled with vessels under the direction of coastal states, particularly Russia, and usually following large icebreakers.

Seasonal conditions vary across the Arctic, but the trend for the extension of the shipping season due to loss of sea ice means traffic is expected to increase in the future as owners try to take advantage of the shorter route.[54]

Pollution response, salvage and wreck removal are difficult in the Arctic. The combination of extreme cold conditions, ice and a lack of available 'winterised' assets can hamper operations. Oil spill clean-up, particularly in ice-covered areas, presents multiple challenges as well as significant physical and reputational risks.[55] Oil and gas development and its associated shipping requirements have raised concerns, particularly among environmental non-governmental organisations (NGOs).[56]

TK Bremen grounded in Western France.

Rena, grounded off New Zealand.

Source: Maritime New Zealand

4.2 INCREASING SIZE OF VESSELS

Mega-ships

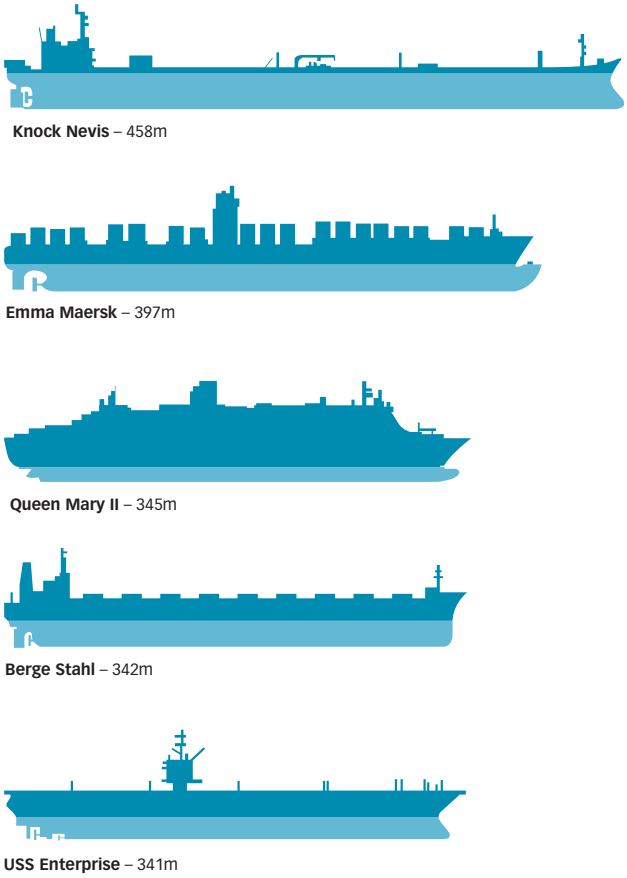
Very Large Crude Carriers (VLCCs) and Ultra Large Crude Carriers (ULCCs) with deadweights of more than 300,000 tonnes have been in service for some 30 years. Other classes of vessel have increased in size dramatically in the past 20 years.[57]

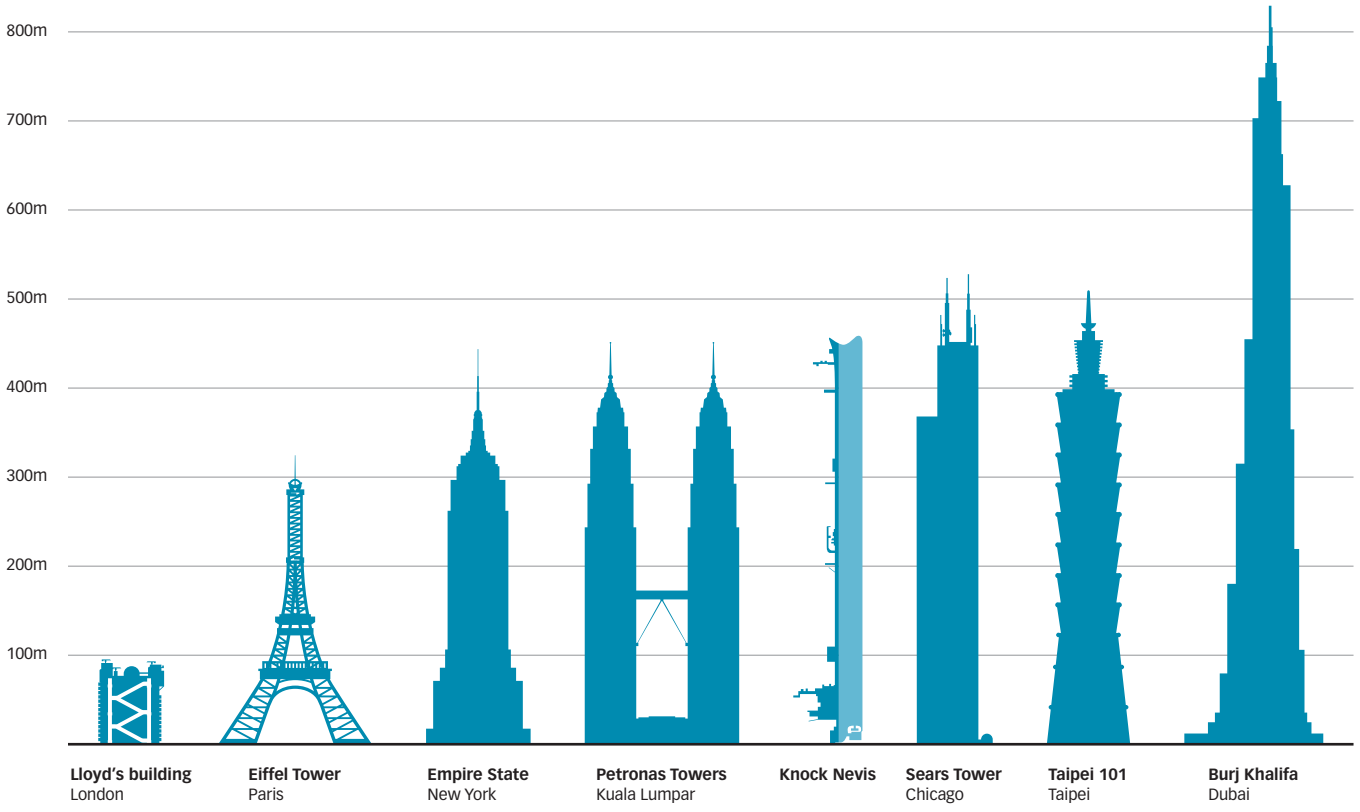
Dry bulk carriers have grown significantly. The new class of Very Large Ore Carriers (VLOCs) have a deadweight of some 400,000 tonnes and, while vessels of this size remain rare, the number of Capesize bulkers in service at deadweights of greater than 80,000 tonnes has increased significantly. There are currently 138 bulkers in service at deadweights of greater than 250,000 tonnes.[58]

Passenger vessels have also greatly increased in size. The world's largest cruise ship, Oasis of the Seas, has 16 decks and is 225,282 gross registered tonnes. She carries up to 6,360 passengers and a further 2,394 crew.[59]

In the cruise sector there are 51 vessels currently in service of greater than 100,000 gross tonnes, a further seven under construction and more on order. By comparison, in 2007, there were 40 such vessels in service or under construction.[60]

Figure 5. Ship size comparison





CASE STUDY: COSTA CONCORDIA

In early 2012 the Costa Concordia captured the attention of the world. The cruise liner, 290m long and 130,000 gross tonnes, carrying 4,200 passengers and crew, hit rocks, took on water and subsequently grounded on her side off the western Italian island of Giglio. Thirty-two passengers and crew lost their lives.[61]

The exact circumstances of the incident are still subject to investigation, and criminal action has begun against the captain. SMIT Salvage working with Fratelli Neri was contracted to undertake the removal of bunkers and waste water, and more than 2,000 tonnes of oil were safely removed and the tanks closed and sealed off. Divers and hot tapping were extensively used during the operation, which was disrupted by poor weather.

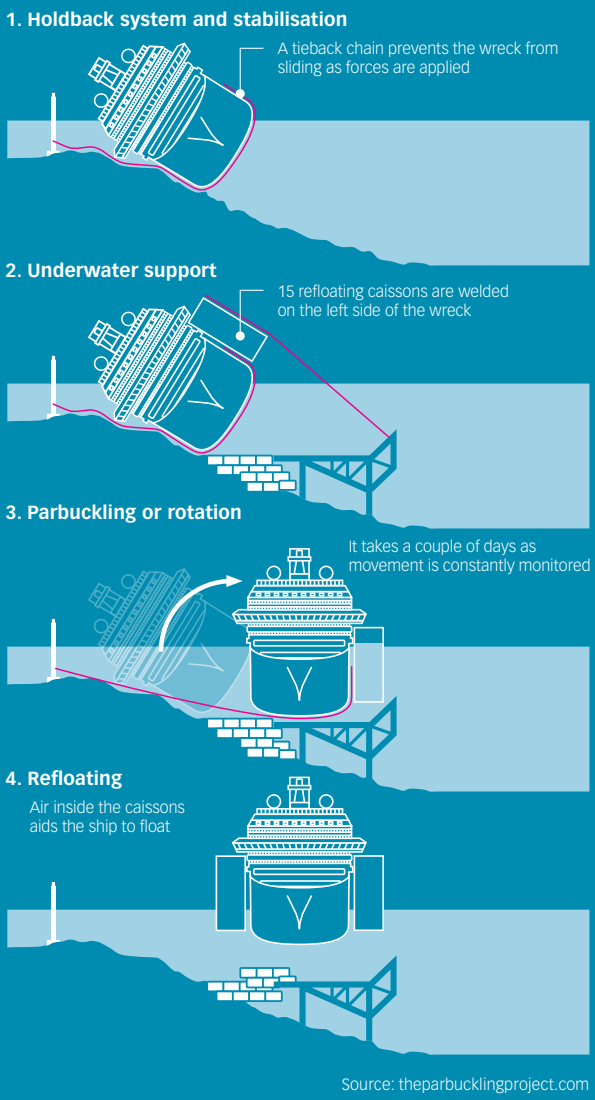
Following a tender process, a wreck removal contract was agreed between the owners, insurers and Titan Salvage working with the Italian firm, Micoperi, to right the vessel by parbuckling, refloating and removing the vessel. Throughout the wreck removal operation, environmental protection will be a key consideration. When the main work is complete, it is intended that the sea bottom will be cleaned and marine flora replanted. It has been suggested that cutting up the vessel in situ would have been significantly less costly, but environmental concerns meant that this option was not favoured by the committee assessing the wreck removal, including the Italian authorities.[62]

The wreck removal plan has four stages:[63]

- Stabilise the ship and construct an underwater platform for the vessel to rest on. Then watertight boxes, or caissons, will be fixed to the side of the ship that is above water.
- Cranes will pull the ship upright, helped by the weight of the caissons, which will be filled with water.
- When the ship is upright, caissons will be fixed to the other side of the hull to stabilize it.
- Finally, the caissons on both sides will be emptied (after the water inside has been purified to protect the marine environment) and filled with air, and the wreck floated and towed to an Italian port and dealt with in accordance with the requirements of the Italian authorities.[64] Preparations for the refloating are ongoing and the total incurred cost for dealing with the wreck is already in excess of $560m and expected to rise.[65]

The Costa Concordia illustrates a number of the key factors that can influence the cost of wreck removal: a massive vessel wrecked at a difficult location, rocky ground above deeper water, combined with environmental concerns leading the authorities to require a complex, heavily engineered solution.

Figure 6. Costa Concordia removal method



Source: theparbucklingproject.com

Container ships

The most notable increase in size in a comparatively short space of time has been with container ships. The Large Casualty Working Group's analysis of rising costs identifies the removal of containers from container ships as being particularly complex, lengthy and therefore expensive.[66]

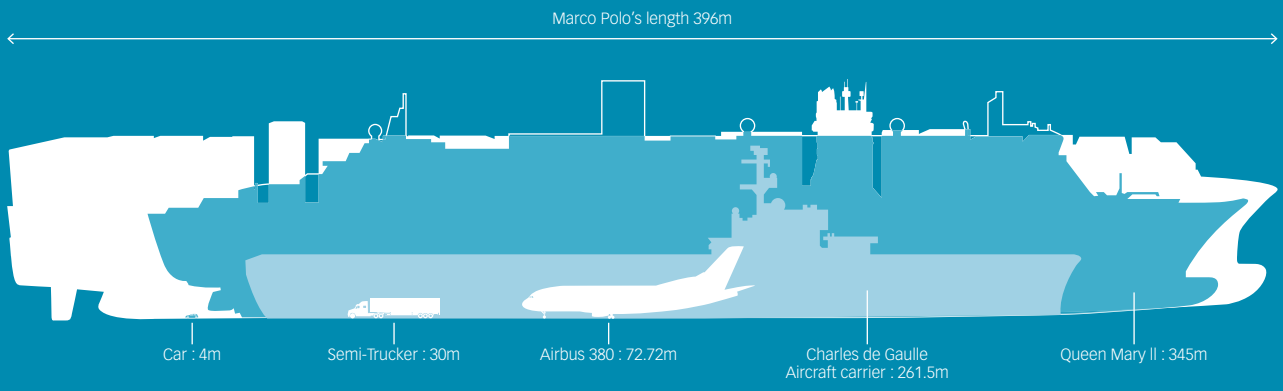
GIANT CONTAINER SHIPS

In the 1990s the common size for a large container vessel was an ability to carry some 5,000 'twenty-foot equivalent units' (teu). By the mid-2000s container ships with a capacity of 12,000 teu were coming into service. Currently the largest container ship in service has a capacity of 16,000 units. The Marco Polo was built for French operator CMA-CGM and is 396m long and 54m wide with a draft of 16m.[67] The Maersk Triple E class are similar in size and there are a number of equally large vessels under construction. The Triple E class, the Emma Maersk, experienced engine room flooding and lost power in early 2013 at Suez. The vessel had to be assisted into port to discharge cargo.[68] Naval architects have said that there is no reason why vessels of greater than 20,000 teu should not be constructed.[69]

Discharging containers is one of the key rate limiting factors in the speed of dealing with a wrecked container ship[70] and is a major determinant of rising cost. Removing containers from within cellular holds when the vessel lies at an angle is difficult and slow. This has been shown clearly in the cases of the MSC Napoli and the Rena. Neither vessel was large by modern standards and neither was fully laden. The Napoli had some 2,300 teu aboard and the Rena some 1,300, yet in both cases extracting the containers took months.[71 72]

Once off the wreck, the containers have to be taken ashore. A suitable landing site with enough space for a large volume of boxes, including the possibility of handling hazardous or noxious substances, is required, but may not be readily available or near to the wreck.

Figure 7. CMA-CGM Marco Polo comparison



Source: CMA-CGM

There may also be uncertainty over the accuracy of the cargo manifest and the risk of mis-declared cargo.

Rena with crane barge. Source: Maritime New Zealand

4.3 MEGA-SHIPS AND THE SALVAGE 'CAPABILITY GAP'

The United Nations Convention on Safety of Life at Sea (SOLAS) 1974[73] has, among other initiatives, helped to improve ship design and operational safety, and contributed to the downward trend in the frequency of marine casualties. However, it could be argued that the shipping industry has focussed on preventing accidents more than managing their aftermath. For example, most ships are built to standards in accordance with the International Association of Classification Society (IACS) rules,[74] and therefore they are designed to safely carry the maximum amount of cargo. The difficulty of salving a wrecked ship is not a design consideration.

Leading figures in the salvage industry believe that increasing vessel size is one of the key risks in the field of salvage and wreck removal, because the capability in techniques, equipment and experience has not kept pace with vessel-size increases.[75] A large vessel is generally harder to salve and a large wreck will typically carry more cargo, which will take longer to deal with and therefore be more expensive to remove.[76] Furthermore, large-scale equipment will be required which may not be readily available.

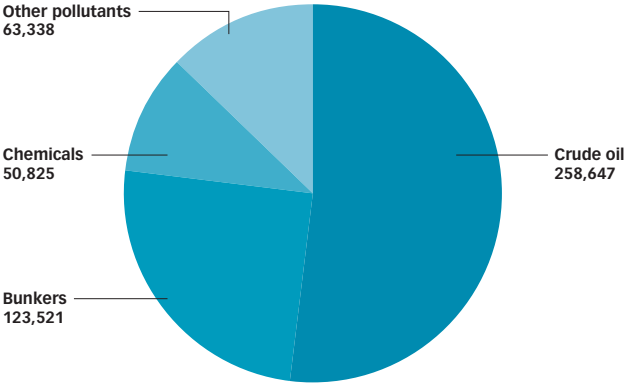
Figure 8: CMA – CGM Marco Polo compared with typical heavy lift sheerleg

The above diagram is only indicative

Source: Author

Figure 9: International Salvage Union members, pollutants salved in 2011

Total salved: 496,331 tonnes



Source: International Salvage Union

as from the physical damage that the casualty or wreck may cause to local habitats.

Each year the International Salvage Union conducts a survey of its members' success in preventing pollution. The survey began in 1994 and in the 17 years to the end of 2011, ISU members salved 17,047,014 tonnes of potential pollutants from casualty vessels – an average of more than one million tonnes each year.[76] Not all of the pollutants were at imminent risk of leaking into the sea. Nevertheless, it illustrates the significant potential environmental risk from casualties and wrecks.

4.4 ENVIRONMENTAL RISK

Environmental risk comes chiefly from ship-source pollution – from the cargo, bunker fuel or other sources. High profile tanker cases, such as the Exxon Valdez off Alaska in 1989, the Sea Empress off the UK in 1996 and the Prestige off Spain in 2002, raised public awareness of the environmental damage caused by oil spills. Yet environmental risk also comes from many other types of cargo, such as chemicals, coal, refined products, as well

4.5 MEDIA SCRUTINY

Shipping disasters are often highly visual with dramatic images. Media scrutiny during casualty and wreck operations can be intense and the incident will, in many cases, be played out in real-time. However, this level of media coverage also presents an opportunity for responders to communicate, explain their actions and build public confidence in the response.

With increasing mobile phone use and social media trends, even in remote parts of the world, there is a strong likelihood that images of an incident will be available long before traditional media deploys its news-gathering resources. Users of social media can circulate opinion and information about an incident rapidly and informally, with potentially great impact.

Poor, defensive or evasive communication, particularly in the early stages of an operation, can undermine the authorities' confidence in the responders. High levels of media coverage can also increase the pressure on politicians and the authorities to be seen to respond quickly and firmly to any incident.

Shipowners should plan for communicating effectively during a major incident and should regularly test their capability in this regard.

4.6 IMPACT OF GOVERNMENT OR OTHER AUTHORITY INFLUENCE DURING OPERATIONS

Media coverage combined with pressure from NGOs, especially environmental groups, increases pressure on national and local politicians and authorities at the wreck location.

The Large Casualty Working Group identified that in three particularly costly cases – the container ships MSC Napoli, Rena and the cruise liner, Costa Concordia – the influence of the authorities was the most significant factor in increasing the cost of the operation and may, overall, be the key factor in determining the cost of wreck removals.[77]

In the case of Rena, for example, the Swedish Club has said that the authorities issued a directive that SCOPIC (see Appendix 3) could not be terminated without their consent which, they say, in their preliminary calculation, added some $10m to the aggregate cost, in addition to bunker removal costs of $25m.[78]

In the case of Costa Concordia, cutting up in situ may arguably be less costly than the chosen method of parbuckling and refloating. However, environmental concerns meant that the preferred option of the committee considering the wreck removal – including the Italian authorities – is to have the ship removed in one piece.[79] Total incurred costs of dealing with the Costa Concordia wreck are already more than $560m and likely to rise[80].

Costa Concordia.

Source: Wikimedia Commons

Separately from the IG of P&I Clubs' Large Casualty Working Group findings there are other examples of authorities' requirements driving up cost. In 2012 the bulker Ocean Breeze went aground off Chile. She was carrying 36,000 tonnes of grain and was beached broadside to the weather, pounded by Pacific breakers. Salvors were quickly airlifted to the casualty and their assessment was that lightening the vessel by jettisoning the cargo was the most appropriate action to enable rapid refloating. However, the authorities made bunker removal the priority and required the grain to be carefully removed.[81]

Conditions meant it was difficult to bring lightering vessels alongside and so the cargo would have to be discharged to shore. With the expected time and cost of the salvage operation, the vessel was therefore declared a CTL.[82]

Further influence that the authorities can bring to bear is in determining how to dispose of the wreckage. Often this will be dictated by national legislation, but additionally the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) and its 1996 Protocol can also be relevant and guide the requirements of the authorities.[83]

In some increasingly rare situations the authorities may permit a wrecked vessel, once emptied of pollutants and removed, to be towed to deep water and scuttled. There are many examples in the energy industry in the Gulf of Mexico of the 'wrecks to reefs' programme, where the authorities allow a wreck to become a reef, provided it is not in any way a navigational hazard. However, in shipping, it is increasingly more likely that wreckage will need to be transported to recycling facilities under strict controls.

4.7 BUNKER REMOVAL

Bunker fuel can be the biggest potential pollution hazard in wreck removal operations. Managing the threat of pollution and removing bunkers is one part of the parcel of risks covered by the P&I Clubs and is often the first significant cost to occur when dealing with a wreck.

In all the cases analysed by the IG Large Casualty Working Group, bunker fuel was ordered to be removed by the state or relevant authorities, leading to additional cost.[84] Additionally, bunker removal costs are rising: the Large Casualty Working Group suggests that in the early 2000s a typical bunker removal operation might have cost between $1m and $4m. By 2012 that cost – particularly if the operation is conducted under SCOPIC or another daily rate contract – might be more than $20m.[85] In the case of Costa Concordia, removal of the bunkers cost some $25m.[86] It can drive costs towards the $60m P&I retention level ($70m since February 2013) before the substantive wreck removal operation begins.

Ocean Breeze. Source: Nippon Salvage/Ultratug

5. IMPLICATIONS AND CHALLENGES FOR THE INSURANCE INDUSTRY

Although the IG clubs compete with each other for business, it is beneficial for all shipowners insured by the clubs, for those clubs to pool their larger risks.

Source: iStock photography

Before we consider the more general implications and challenges for the marine insurance industry, it is perhaps useful to first provide some background on the current structure of (re)insurance arrangements, which respond to losses such as wreck removal.

5.1 STRUCTURE OF MARINE INSURANCE ARRANGEMENTS

Parties engaged in a commercial shipping venture are usually insured against most elements of loss. A vessel will have insurance cover for physical loss and damage to hull and machinery, the cargo it is carrying and against the liability the ship has to third parties. The first two kinds of insurance are provided by insurance companies, including Lloyd's syndicates. Third party liability insurance is usually provided by the shipowner joining an independent, not-for-profit mutual insurance association, called a Protection and Indemnity Club (P&I Club). Each club is controlled by its own members and administered by a management company. It is also possible for shipowners to purchase third party liability cover from commercial fixed premium providers.

P&I Clubs cover a wide range of liabilities including: death and personal injury to crew; passengers and others on board; oil pollution and wreck removal, and damage to fixed and floating objects. The 13 principal P&I Clubs form the International Group (IG) of P&I Clubs and together these clubs account for liability cover provided to some 90% of the world's ocean-going ships.[87] Although the IG clubs compete with each other for business, it is beneficial for all shipowners insured by the clubs to pool their larger risks. Pooling is regulated by the Pooling Agreement which defines the risks that can be pooled and how losses are to be shared between the participating clubs - it is a 'mutual of mutuals'.

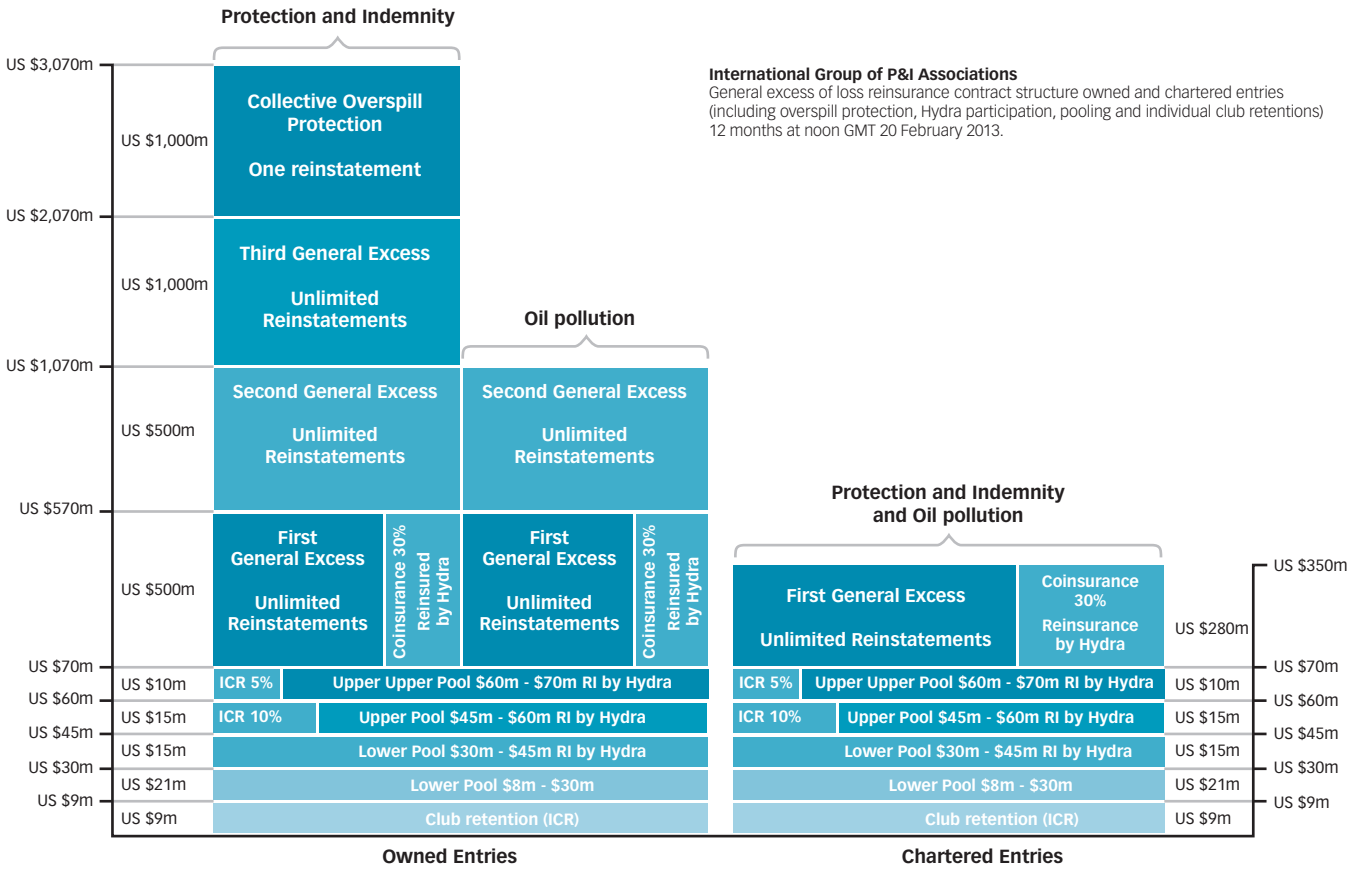
Currently the pool provides a mechanism for sharing all claims in excess of $9m up to approximately $7.5bn ($1bn for oil pollution claims). There is no premium paid between the clubs under the agreement and claims are simply shared in agreed proportions according to formulae under the Pooling Agreement[88] (refer to Figure 10 – see page 30).

The IG clubs obtain reinsurance in the wider insurance markets - both Lloyd's and the company market - to provide cover for claims which exceed $70m (increased from $60m in February 2013) up to $3.07bn, including the collective overspill, for any one claim ($1bn for oil pollution claims).

It is the largest single marine reinsurance contract. By bringing together the risks of the great majority of the world's shipping tonnage in this way, the IG is able to obtain the reinsurance capacity it requires on the best available terms.

It should be noted that IG clubs also co-insure part of their risk through their captive insurance company, Hydra Insurance Company Limited.[89]

Figure 10: International Group of P&I Clubs reinsurance contract structure



Source: IG 2013

5.2 IMPACT OF MAJOR LOSSES ON MARKET PRICING AND CAPACITY

Pricing

The 2011 P&I Club policy year continues to be impacted by two significant losses. One of these is Rena, where the cost of wreck removal is currently $240m[90] and therefore comfortably in to the first general excess of loss layer of the IG reinsurance contract. The other, and significantly larger loss, is the Costa Concordia. In this case the wreck removal costs are currently in excess of $560m[91] and therefore in to the second general excess of loss layer of the reinsurance contract.

When combined with the Bareli (a containership carrying some 1,900 containers which grounded and broke her back in the East China Sea in 2012), these wrecks have led to P&I claims totalling in excess of $800m[92] and represent the three biggest P&I losses of the last two years.

These recent major losses will impact the financial arrangements of the individual Clubs and their members; the pooled arrangements of the International Group of P&I Clubs; as well as the wider reinsurance markets.

There have been increases in premiums (known as 'calls' in the case of P&I Clubs) for the members of the clubs. In addition, there have been increases in individual club retentions: this has already been seen with the announcement that the individual club retentions within the pool arrangements have risen to $9m in 2013 (up by 12.5% from the previous $8m).[93]

With the general cost of wreck removal rising, the likelihood of exceeding the $70m IG retention (increased from $60m from 20 February 2013) is increasing. Therefore, the Lloyd's and company reinsurance markets, which also take the hull loss, are likely to be more frequently and more substantially exposed to wreck removal losses.

This transfer of risk has now come sharply into focus and reinsurance underwriters have been more demanding in their negotiation of the IG pool reinsurance contracts. The clubs are likely to pass on the increased cost of the IG reinsurance contract to shipowners adding to their financial pressures. For all owners, and dry cargo and passenger operators in particular, the additional cost of reinsurance at the 2013 renewals was significant. There was a reported 8.5% average general increase across the clubs at the 20 February renewal, but with wider variations between clubs than in the previous year. Increases were between 5% and 15%, including the increased cost of the IG reinsurance programme.[94]

It should be highlighted that, despite these commercial pressures, there is an increasing level of transparency and dialogue between the IG and their reinsurers, which is a positive trend and should be encouraged.

Capacity

If the insurance industry is subject to increased frequency or severity of losses due to either a string of major incidents, or a natural catastrophe, such as Superstorm Sandy, insurance and reinsurance capacity could be diminished (please refer to Figure 11 (see page 32) to see how Lloyd's seeks to understand the potential aggregation impact of a major loss across the marine market through its realistic disaster scenarios). While a single large loss like Costa Concordia is unlikely to reduce capacity, the trend of more frequent and severe wreck removal losses will eventually affect capacity levels (through insurers exiting the market or reducing the percentage of the risk they are willing to underwrite) if there is not an opportunity for the insurance industry to adjust premiums levels accordingly. However, the timing and degree to which a change in capacity levels may become an issue for shipowners will depend on a number of factors, including existing capacity levels, the cost of capital and the financial performance of marine (re)insurers more generally.

Shipowners are currently benefiting from record levels of capacity. However, this trend may not continue with the cost of capital increasing, due to more stringent capital requirements as a result of regulatory changes in Europe, and marine (re)insurers currently suffering one of their worst underwriting periods on record with marine losses from Superstorm Sandy in the US (currently estimated at $2.5bn),[95] significant wreck removal losses and more than 100 total losses (ATL and CTL) in the past year.

The bulk cargo ship, Selendang Ayu, broke up after running aground on Unalaska Island.

Source: Wikimedia Commons – United States Coastguard – public domain

Despite these events and the potential future consequences of increasing wreck removal costs, with approximately $2bn of global capacity in the marine (re)insurance market overcapacity remains a concern at present.

5.3 THE OUTLOOK FOR MARINE INSURERS AND SHIPPING

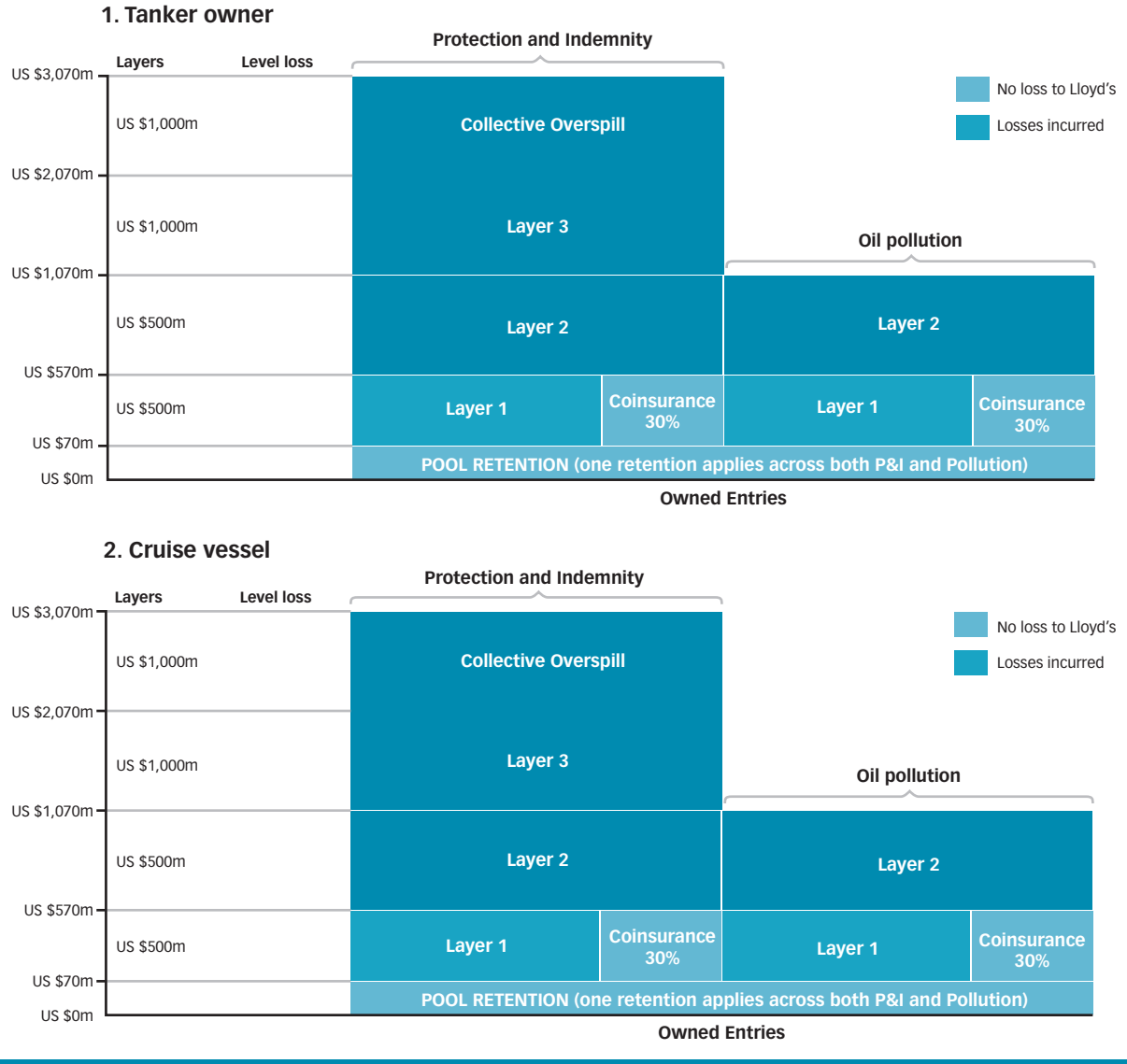
Following the 2008 financial crisis, economic recovery has been slow in many developed countries including the US, UK and Eurozone. The International Monetary Fund (IMF) expects global growth to increase in 2013 and 2014 by 3.5% and 4.1% respectively. However, that is a more gradual upturn than the IMF had suggested in October 2012. The IMF says that while the acute crisis in the Eurozone and the US has been helped by policy action, the risk of a setback remains. There has been a modest improvement in growth in some emerging market economies, but others continue to struggle with weak demand for their exports. The IMF noted uncertainty about how the global economy will operate in a world of high government debt and the sustainability of emerging market growth in the face of weak demand from developed economies.[96] The economic environment has remained challenging for many industries, including insurance and shipping.

LLOYD'S REALISTIC DISASTER SCENARIO

Lloyd's requests syndicates to model realistic disaster scenarios to understand the potential aggregation impact of a major loss across the market. The current marine scenario involves a fully laden tanker in Prince William Sound (Alaska) which is involved in a collision with a cruise vessel. The incident involves the total loss of both vessels, pollution and loss of lives aboard both vessels. It is assumed that the collision occurs in US waters. Marine underwriters not only have to consider the P&I type liability losses including death and personal injury to crew, passengers and others on board, oil pollution and wreck removal, but in addition they may also be insuring the hull and the cargo.

A major incident, such as that included in the Lloyd's Realistic Disaster Scenario, when considered in the light of the trend of significant deterioration of wreck removal costs and therefore rising financial implications for insurers and reinsurers, could lead to a reduction in direct and reinsurance capacity.

Figure 11. Lloyd's Realistic Disaster Scenario



Source: Lloyd's

The response to the global downturn has led to a period of sustained low interest rates which has reduced returns on government bonds in more creditworthy countries. Equity markets and property have also been depressed and the insurance sector has generally experienced a period of diminished investment returns since 2008; the outlook for investments continues to be a low-yield environment.[97] This means that underwriting performance and premium income are crucial. However, the marine insurance industry is generally perceived as still being in a soft market with excess capacity.

Reinsurance capital reached $500bn in 2012, which is a new record level and has created a substantial gap between reinsurance supply and demand. Reinsurance supply, measured by capital, grew by more than 10% while reinsurance demand, measured by capacity placed, was stable in catastrophe lines and declined in nearly all non-catastrophe lines.[98] [99]

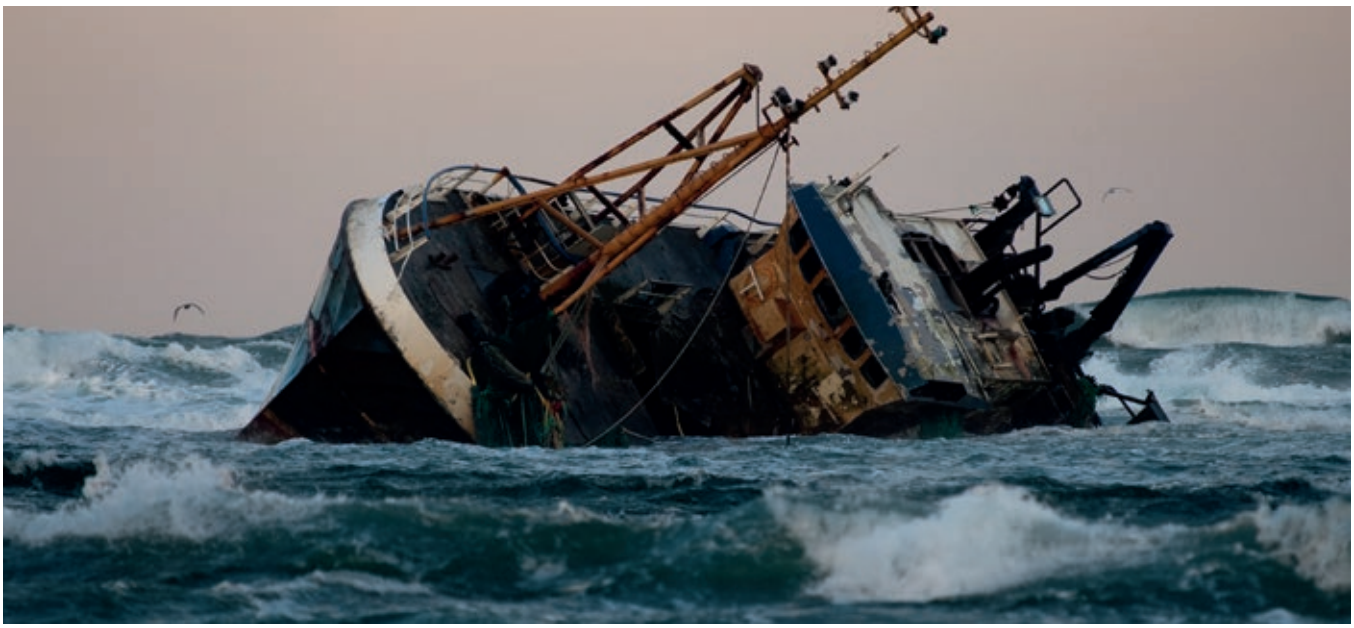
Shipping is a global industry whose performance is closely linked to that of the worldwide economy. The industry faces many challenges – oversupply of vessels, depressed freight rates, rising bunker costs, vessel value impairment, reduced access to funding and increased regulatory pressure.

The main shipping sectors continue to struggle with overcapacity of tonnage ordered and financed in more prosperous times. Freight rates have fallen substantially since the boom time before 2008. The industry has responded in a variety of ways including slow steaming, layups and the recycling of redundant vessels. Substantial additional box capacity is due to come into service this year in the container sector but re-balancing supply and demand will not be rapidly achieved.[100] [101] At the same time, annual operating costs in the shipping industry increased by an average of 2.1% in 2011, with crew costs being the main reason for the overall increase.[102]

There is some optimism that freight rates will rise in 2014 and 2015 with growing trade volume on Asia-Europe routes, but the overcapacity issue is likely to mean that any recovery will be modest, fragile and volatile.[103] [104]

Regulatory pressure continues to be exerted on shipping. In response to environmental concerns, the International Maritime Organisation has adopted new amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL) which came into force on 1 January 2013. These include a new chapter about regulations on energy efficiency for ships, and make mandatory the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships of more than 400 gross tonnes.[105] The EU is also considering its own measures aimed at reducing greenhouse gas emissions from ships.[106]

Increasing wreck removal costs and the associated insurance implications need to be considered in the context of the economic and regulatory challenges facing the shipping and insurance industries.



A fishing vessel run aground near Fraserburgh, Scotland.

6. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Removing a wreck is a major undertaking with considerable physical, financial and environmental risks. It can require complex engineering and the use of substantial inventories of equipment, including heavy lifting gear. There are a relatively small number of organisations which are capable of carrying out such operations. Not all wreck removals require a complicated approach – some methods are relatively straightforward – but all require skilled personnel, often working in difficult, and sometimes dangerous, conditions.

Wreck removal operations are generally expensive, given the need for skilled personnel and specialised equipment, often for long periods and frequently in inaccessible locations. Wreck removal operations have tended to become more costly in the past decade and in certain cases, costs have risen dramatically. It is therefore an issue that is of great interest to shipowners and their liability insurers. It is also an issue of increasing importance to the Lloyd's and company insurance markets, which are more regularly and more substantially exposed to direct and reinsurance risk.

Analysis of the most expensive cases by the IG of P&I Clubs has found that the role of relevant authorities is a key driver of increasing costs. Media coverage and pressure from political and environmental groups can increase pressure on the authorities, which may in turn exert more influence on operational matters. Specific requirements, often with understandable regard to environmental concerns, such as the approach to removing a wreck's bunker fuel, can further add to the cost. At the same time, technology has pushed the boundaries of what is feasible. Fuel and cargo may, for example, be recovered from a wreck lying in deep water and, if it is achievable, the authorities will increasingly ask for this to be done.

The location of a wreck is very important. Remote sites, distant from supply bases and sources of heavy equipment, will tend to drive up costs, as the duration of operations extends and the period of hire for equipment lengthens. Globally, the amount of heavy lifting gear is limited and concentrated in comparatively few locations. Large parts of the world are very distant from the equipment that might be needed to undertake a substantial wreck removal.

At a local level the ground conditions at the wreck site are central to costs. A rocky site offshore, for example, will be more challenging than a sandy beach.

The type of vessel that is wrecked is also a major factor. All classes of vessel offer their own challenges, but container ships present the particular difficulty of removing large numbers of containers individually, which can be a protracted process, even before dealing with the wrecked hull itself.

Many classes of ship have grown in size in the past 20 years, making salvage harder and more likely to increase the duration of a wreck removal. Insurers and contractors have expressed concern about the gap that has opened up between the size of many modern vessels and the capability of existing equipment and approaches to render services to them or to deal with them as wrecks.

The insurance industry is already affected by rising costs in wreck removal, and reinsurance costs are likely to rise and be passed on to the shipowners, pushing up their operating costs in turn.

RECOMMENDATIONS

National government and relevant authorities
In many cases the national authorities are the key driver of the cost of wreck removal – sometimes under political pressures. There is a presumption by state authorities that a wreck should be removed and political factors can influence operational decisions. Consistency and fairness in the approach to wreck removal across different territories is required.

There should be increased dialogue and openness between all parties to build trust, and shipowners and insurers should consider a formal, international campaign of engagement with relevant stakeholders such as influential coastal states, IMO, EU and International Harbour Masters. The campaign should link the global importance of the shipping industry to concern about rising costs from wreck removal, and demonstrate that the industry is competent to conduct and pay for wreck removal. Authorities should be encouraged to resist political pressure and maintain focus on the need to remove wrecks safely, and with regard to the environment, to fully engage with the shipowner, insurer and contractor during operations.

The value of the UK SOSREP role has been proven through experience, and other coastal states should consider adopting this approach. It will help promote rapid, measured responses to a casualty or wreck situation free from political pressure and improve cooperation between coastal states.

Media and stakeholder management

Media and stakeholder scrutiny can be intense during casualty and wreck incidents and can influence the authorities. At the same time, poor communication by responders may cause reputational damage not only to the organisations involved but also to the wider shipping industry. Poor communication also weakens authorities' confidence in those responsible for responding to casualties or wrecks. Shipping operators should be encouraged to have robust crisis communications plans and to test them to ensure they communicate effectively during incidents.

Mega-ships – the capability gap

One of the key challenges facing the shipping industry is the gap that has developed between the increasing size of vessels – notably container ships, passenger vessels, bulk carriers and LNG vessels – and the capability and equipment available to handle them, either as casualties or wrecks. Closing this gap is an important consideration, and contractors on the whole recognise the threat it poses. It is recommended that shipowners, the ship design industry, the salvage industry and liability and property insurers consider exploring together options aimed at addressing this gap.

Cost of bidding for wreck removal contracts

Ensuring that there is a vigorous, competitive market among capable contractors is important to the shipping industry in order that wrecks may be safely dealt with. There are a small number of contractors with the experience, competence and financial wherewithal to undertake major wreck removal. Contractors may be discouraged from bidding for some jobs due to the high cost of preparing the bid. P&I Clubs and contractors should consider joint working on ideas for reducing the cost of preparing tenders. For example, interested contractors might share common survey information provided by a neutral third party.

Recruitment

Salvage and wreck removal contractors have expressed some concern about recruitment and retention into this vital part of the shipping industry. A pool of experienced and capable wreck removal operators is vital to maintain the health of the industry. The salvage industry needs to address this issue and promote the career opportunities available.

Human factors in marine casualties

Human factors continue to be the single most significant cause of marine casualties and are therefore the root cause of most wrecks. Shipowners and operators should be encouraged to maintain vigilance in ensuring that seafarers are well trained and that shipping operations are conducted safely, supported by appropriate technology.

Collaboration

It is arguably in the interests of all parties involved in the shipping industry to understand better the issues relating to wreck removal and to work together to reduce costs. This could be achieved through increased communication and cooperation between the different stakeholders including shipowners, insurers, relevant authorities and contractors.

APPENDIX 1

Key features of the Nairobi International Convention on Removal of Wrecks[107]

- A coastal state has the right to remove a wreck from its Exclusive Economic Zone – which extends to 200 nautical miles – if it is a navigational hazard or poses an environmental threat.

- Clear definition of what constitutes a wreck: It is a ship or part of a ship, or an object lost overboard (such as cargo), that has sunk or stranded or is adrift that may be reasonably expected to become a wreck, provided effective measures are not already being taken. There is clear and wide definition of a ship – any seagoing vessel or platform (excluding those actually engaged in exploration work).

- Clear definition of what constitutes a hazard: A hazard is defined as a danger to navigation, or a condition giving rise to harmful consequences to coastlines or other wider coastal interests such as ports or fisheries, tourism, offshore and underwater infrastructure. The health of coastal populations and protection of marine and non-marine wildlife are also taken into account in determining a hazard.

- Increased financial certainty – there is strict liability on the shipowner for the costs of reporting, marking and removing the wreck if required by the coastal state.

- Liability is excluded in the event of an act of war or due to exceptional natural phenomena and if a state can be proven to have failed properly to have maintained navigational aids.

- There must be compulsory insurance (or other financial security) in place for any vessel over 300 gross tonnes, with prescribed limits, and states will have the right to direct actions against insurers. The amount of insurance or financial security must be at least equal to the applicable limit of liability based on the tonnage of the ship concerned.

- The responsible parties will have freedom to contract with their choice of wreck removal contractors – a coastal state may not impose a contractor on the wreck's owner.

- The Convention makes strong reference to consideration of safety and the protection of the marine environment.

- The Convention restricts measures taken by the coastal state to being reasonable and proportional to the hazard faced.

APPENDIX 2

Text of letter from the International Chamber of Shipping and IG of P&I Clubs regarding Nairobi International Convention on the Removal of Wrecks, June 2010

Nairobi International Convention on the removal of wrecks, 2007 (Wreck Removal Convention)

Summary

States that are considering ratification of the Wreck Removal Convention are urged to extend the application of the Convention to wrecks located within their territory, including the territorial sea, in the interests of global uniform implementation of the Convention.

Background

Some states are currently considering whether they should become parties to the Wreck Removal Convention, which was adopted by a diplomatic conference held under the auspices of the International Maritime Organization (IMO) in Nairobi on 18 May 2007.

Upon entry into force, the Wreck Removal Convention would establish an international regime of strict liability for shipowners for the costs of locating, marking and removing hazardous wrecks. Shipowners would be required to maintain insurance to cover liability under the Convention, and claims for costs could be brought directly against insurers.

Wreck is broadly defined as, following a maritime casualty, a sunken or stranded ship or any part or any object from a sunken or stranded ship. The definition includes any object that is lost at sea from a ship that is stranded, sunken, or adrift, such as lost containers. It also includes ships that may be reasonably expected to sink or strand.

Hazard means any condition or threat that poses a danger or impediment to navigation, or is likely to result in major harmful consequences to the marine environment, or damage to the coastline or related interests of one or more states.

The Convention applies only within the exclusive economic zone of a State Party. However, states can elect to extend the application of certain provisions of the Convention to wrecks located within their territory, including the territorial sea.

The International Chamber of Shipping and the International Group of P&I Clubs support international regulation of the shipping industry by the IMO, and the Wreck Removal Convention completes the framework of liability and compensation conventions adopted under the auspices of IMO. An important reason for concluding international conventions is to promote uniformity and certainty of law on an international basis. In order to achieve this, legislation and regulation should be applied and be capable of being applied, to the widest extent possible by states. It is crucial for the efficiency of world trade that the same legislation and regulations governing matters such as navigational safety, environmental protection and liability/compensation apply to all ships engaged in international trade and that in so far as possible the same legislation applies in all jurisdictions to which a ship may trade.

When ratifying the Wreck Removal Convention, states are presented with a choice as to its geographic scope of application. The Convention will only apply to wrecks located in their exclusive economic zone (EEZ) unless States choose to apply certain provisions of the Convention to wrecks located in their territory and territorial sea. The vast majority of wrecks occur in territorial seas, and the fact that some states may elect to apply the Convention only to their EEZ while others may extend the application of the relevant provisions to their territory and territorial sea defeats the goal of international uniformity and certainty in relation to wrecks, as provided for under the Convention.

Conclusion

The International Chamber of Shipping and the International Group of P&I Clubs would urge States to make use of Article 3 paragraph 2 of the Convention and extend the application of the Convention to wrecks located within their territory including the territorial sea, ie to opt-in.

Opting in, in our view, would have the following benefits: Wider geographic scope of application of the internationally agreed provisions on wreck removal as contained in the Convention and therefore greater uniformity and certainty of law; compulsory insurance cover for shipowners; and direct action against insurers, in respect of measures taken under Articles 7, 8 and 9 of the Convention (locating, marking and removal of wrecks) in a state's EEZ, territory and in territorial sea.

APPENDIX 2 CONTINUED.

The International Group of Protection and Indemnity Clubs compromises 13 mutual non-profit insurance associations that provide third-party liability cover for more than 90% of the world's ocean-going tonnage.

The International Chamber of Shipping is the principal international trade association for shipowners, with a membership comprising national shipowners' associations from 31 countries. ICS represents 75% of world tonnage and all sectors and trades.

APPENDIX 3

Introduction to Salvage Law

The law of salvage has evolved over centuries and is based on the principle of 'no cure, no pay.' The salvor voluntarily enters into an agreement to try to save the ship and its cargo at their own financial risk. A successful salvor expects a reward based on the value of the ship and its cargo (the salved fund) and taking account of the peril and complexity of the operation.

Salvage is underpinned by the International Maritime Organisation's 1989 Salvage Convention which endorses the 'no cure, no pay' principle. The most commonly used salvage contract is the Lloyd's Open Form (LOF) which has been in existence for over one hundred years and has been regularly revised. The current edition is LOF 2011.[108]

Users of LOF cite the simplicity of the contract as its great attraction. It does not require the negotiation of remuneration before it is signed, which allows rapid intervention when time may be of the essence. The parties proceed on the basis of 'no cure, no pay' and agree the award after services are finished. If there is no agreement on the award a process of binding arbitration is entered. The salvage award is paid by the property underwriters representing the hull, machinery and cargo interests. However, the use of LOF has declined over the past 20 years. In 1990, for example, there were 178 cases; in 2012 there were 71 cases (excluding yacht cases).[109] Although it is a requirement, not all LOF cases are reported to Lloyd's. The decline in usage of LOF may be due to shipowners' concerns with the size of awards; improvements in ship and operational safety; improved communications between ship and shore (allowing the negotiation of different types of contract). Other similar contracts, such as the Japanese form and the Turkish form, are also in use.

During the 1980s, concerns grew that LOF did not encourage salvors to go to the aid of casualties which may be of relatively low value where the likelihood of success was low but the threat to the environment was great. It lead to the introduction of the so called 'Special Compensation P&I Clause' (commonly known as SCOPIC) which parties may incorporate into LOF contracts and invoke according to the circumstances. Once invoked it enables salvors to be paid a daily tariff rate for their work and equipment used in attempting to save a vessel, with a 25% 'uplift' (which may be reduced to 10% in some circumstances). Importantly, these payments are made by the liability insurers of the casualty – the mutual Protection and Indemnity Clubs (P&I Clubs). It encourages action when 'no cure, no pay' alone would be unlikely to produce a reward.

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