The Financial Cost of Oil Spills - a review of international cost data and the factors affecting the costs of oil spills from ships.

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ABSTRACT

Oil spills pose significant ecological, social, and economic consequences. The response to a spill and the effects of pollution damage can give rise potentially to high costs. The financial risk of an oil spill is consequently of immense interest to policy makers and the organisations involved in funding and providing compensation and in determining risk and liability.

This paper examines the various factors affecting the cost of ship-source oil spills, considering the aspects contributing to the overall cost of an incident. The paper will provide a brief overview of the nature of oil spills from a financial point of view and the importance of understanding their costs. A review of publicly available data on the costs of past oil spills will be analysed, adjusting for a common currency and historical inflation. This will delve into the complexities of calculating the financial consequences of oil spills, drawing on case studies to illustrate the varying costs associated with different incidents.

The diverse factors influencing the cost of oil spills will be considered, including spill size and location, response and containment measures, environmental and ecological damage, socio-economic implications, legal and regulatory consequences, and considering the point of view of the enquirer. Finally, the conclusion will summarise the main findings of the paper, highlighting the need for a comprehensive understanding of the factors contributing to the cost of oil spills in relation to the International Conventions and national law, highlighting the difficulties in predicting figures and anticipating financial risk.

INTRODUCTION

"How much does an oil spill cost?" is a question asked commonly by those with an interest in the risks and liabilities associated with shipping. Unfortunately, no simple answer can be given since the cost of a spill varies considerably from one incident to another, dependent on a wide variety of factors. The type of oil, the location of the spill and the characteristics of the affected area are generally the most important technical factors. However, the quality of the contingency plan and of the management and control of the response, the applicable legislation and political situation within the affected country/countries are also important considerations. The definition of 'cost', and the position and point of view of the person or organisation asking the question can be a further deciding factor.

This paper considers the factors affecting the cost of an oil spill and emphasises the inherent difficulties in anticipating the associated financial risks.

METHODS

Before considering the factors affecting spill costs, a review of historical oil spill incidents is warranted to understand and emphasise the variabilities. Detailed cost information for spills of oil from ships is available publicly only in certain circumstances. Understandably, many aspects of the costs and financial settlements of a clean-up operations and pollution damage claims are confidential agreements or settlements between claimants and the organisations providing compensation. An understanding of the costs of historical incidents is limited as a result.

Cost data is published on the website of the International Oil Pollution Compensation Funds, for spills of persistent oil from tankers in States that are party to the Fund Conventions. The IOPC Funds become involved in paying compensation under specific circumstances:

- When no liability for damage arises under the 1992 Civil Liability Convention ('92 CLC);
- when the total value of claims has exceeded the shipowner's limit of liability under the '92 CLC;
- when the shipowner is not liable under the CLC for specific reasons;

Many incidents under the Fund Convention have come under the second category and, as a consequence, the IOPC Funds' data set tends to focus upon the more expensive spills where the total of compensation payments exceeds the shipowner's limit of liability. The geographic restriction of IOPC Fund cases to States that are party to the 1992 Fund Convention means the data contains a high proportion of the oil spills occurring in Japan, South Korea and Europe. No spills in US or Chinese waters are included in this data set for example, as both countries are not party to the 1992 Fund Convention[1]. Spill cost data for other tanker incidents, outside the International Conventions[2] is sometimes in the public domain and is referenced in this paper where appropriate. However and importantly, for US spills such data is not representative of costs in other countries because of the unique nature of the US response and damage assessment system, examined later in this paper. With the further limitation of this publicly available data to tanker spills, the cost of spills of oil from non-tanker shipping is more difficult still to ascertain since compensation is available primarily from the casualty's P&I insurer and made public rarely. Of note also, the prevalence of large incidents, classified as over 700 tonnes lost to the environment, in the previous millennium means the majority of this dataset is >20 years old (Figure 1).

[1] For China, the 1992 Fund Convention applies to the Hong Kong Special Administrative Region only.
[2] [2] The International Conventions developed through the International Maritime Organisation, an agency of the United Nations, to enable prompt payment of compensation for marine oil spills.

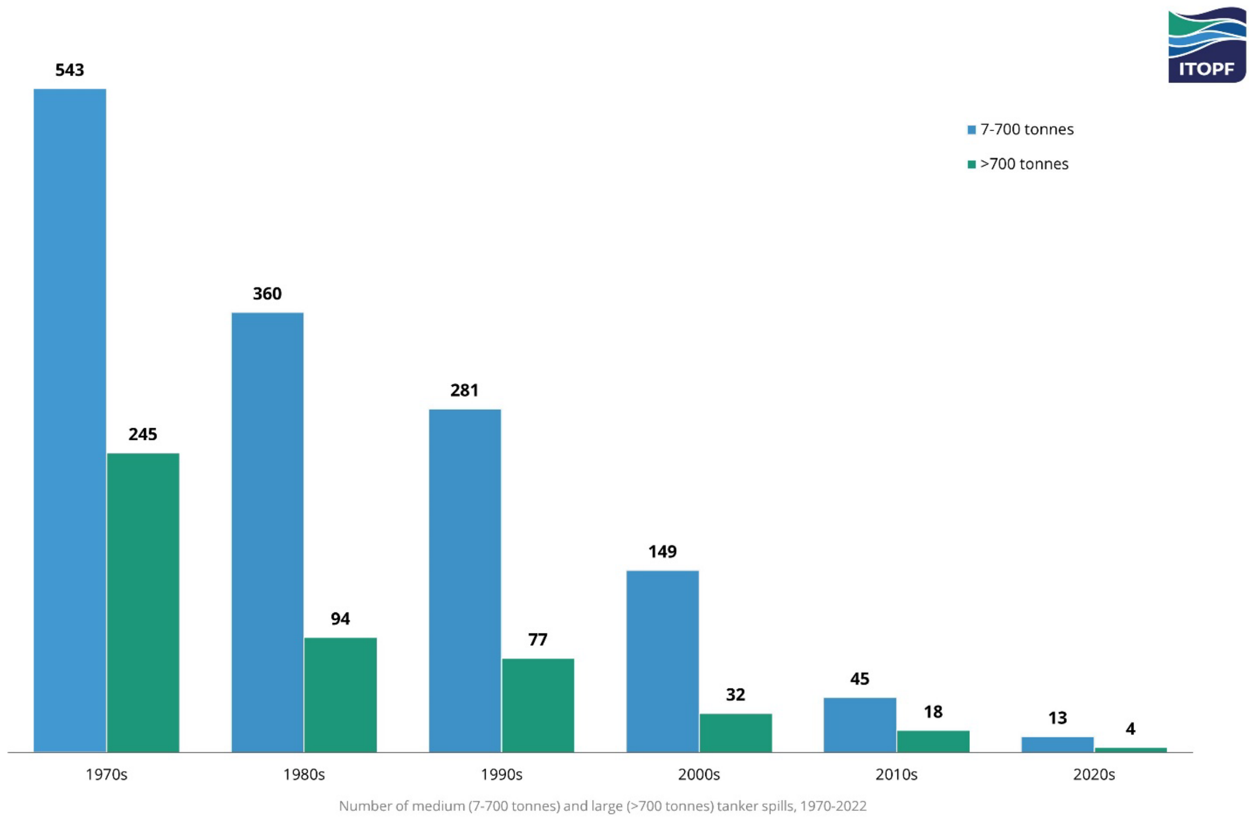

Figure 1. Number of oil spills from tankers recorded per decade. Includes all recorded oil spills, from tankers, not merely spills of persistent oil in Fund Convention States (ITOPF Ltd.)

Nonetheless, using cost data from the IOPC Funds' website, ITOPF has produced a dataset for costs arising from tanker spills in IOPC Fund State parties. For the graphs in figures 2 -5, the horizontal axes show either vessel size, measured in gross tons (GT) or spill size in metric tonnes (MT), while the vertical axes shows the cost in US dollars. In order to improve the comparison of costs generated in various currencies and over a 53 year period, the cost data is unified to this common currency, converted using published exchange rates at the date of the incident and annual inflation percentages to the date of writing. All the US$ figures in this paper are adjusted in this way. Figures 2 and 4 exhibit the data in a linear scale whereas figures 3 and 5 are in logarithmic scale allowing a greater analysis of lower cost incidents in particular.

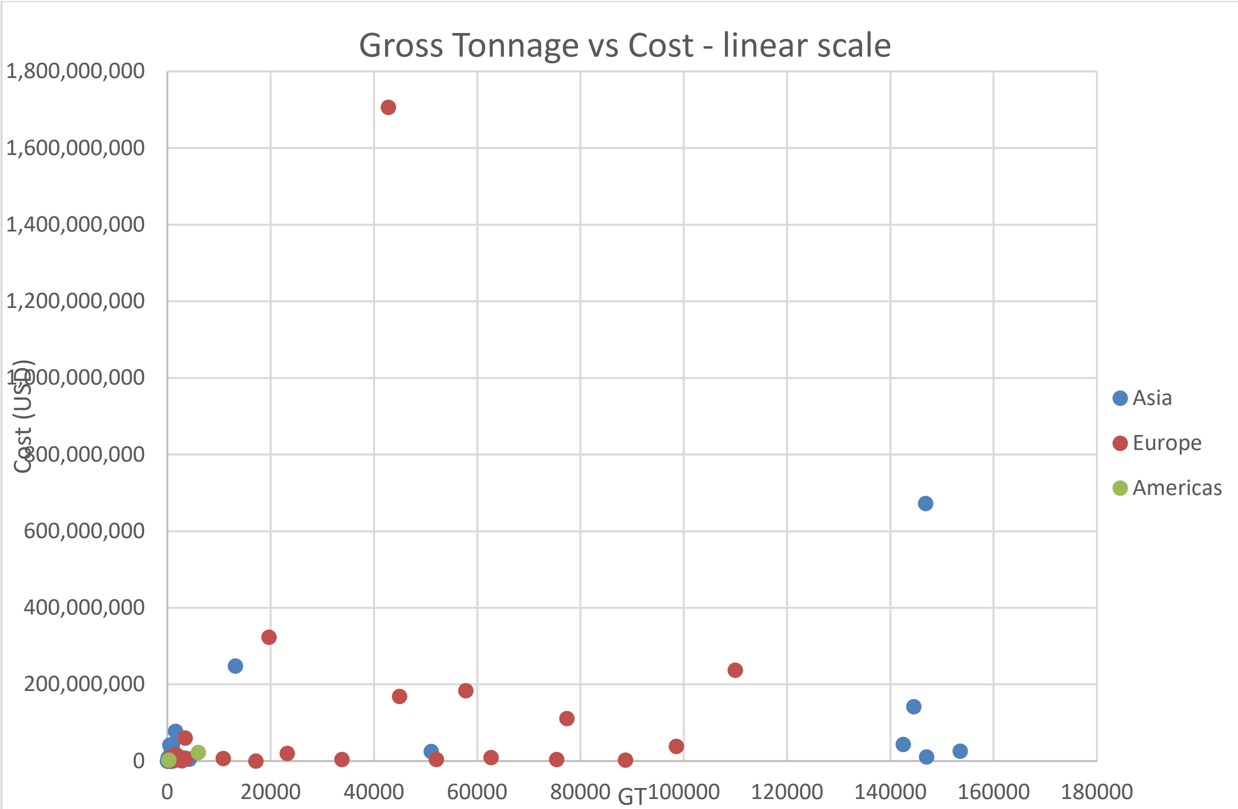

Figure 2: Costs of oil spills in US$ against the GT of the ship casualty from which the spill ocurred – using linear scales. IOPC Fund incidents only.

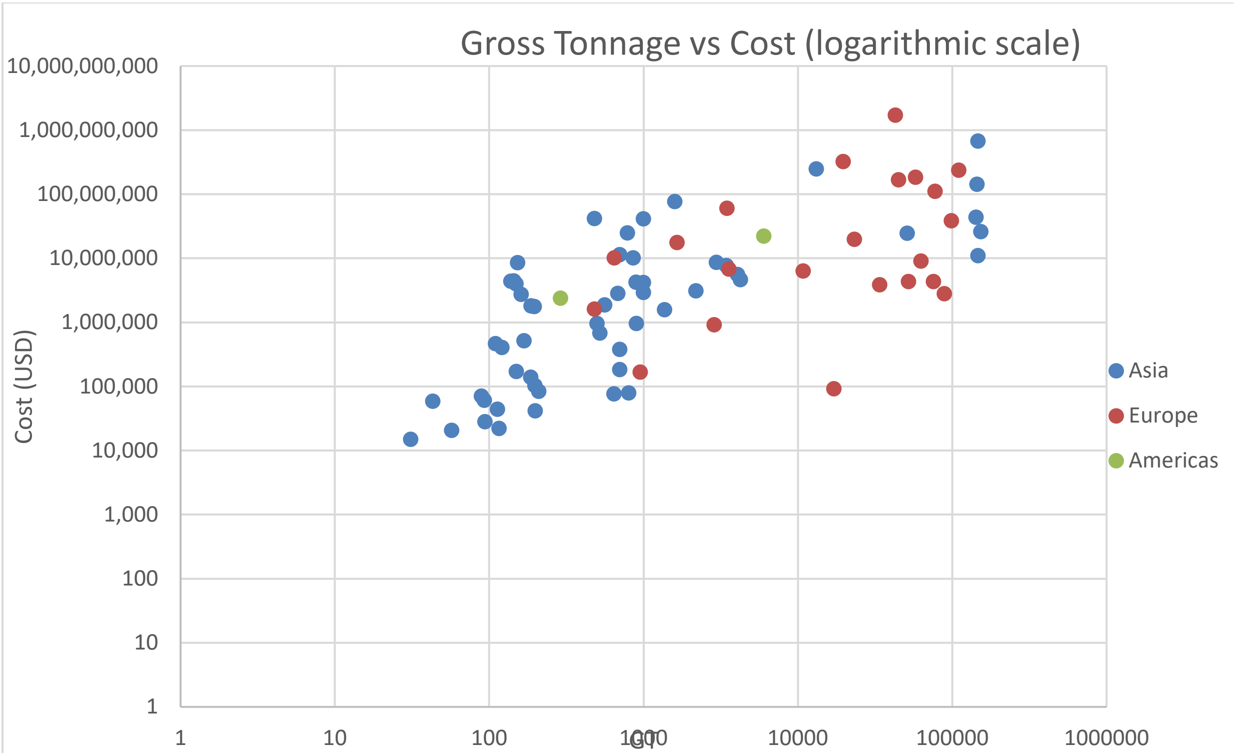

Figure 3: Costs of oil spills in US$ against the GT of the ship casualty from which the spill ocurred – using logarithmic scales. IOPC Fund incidents only.

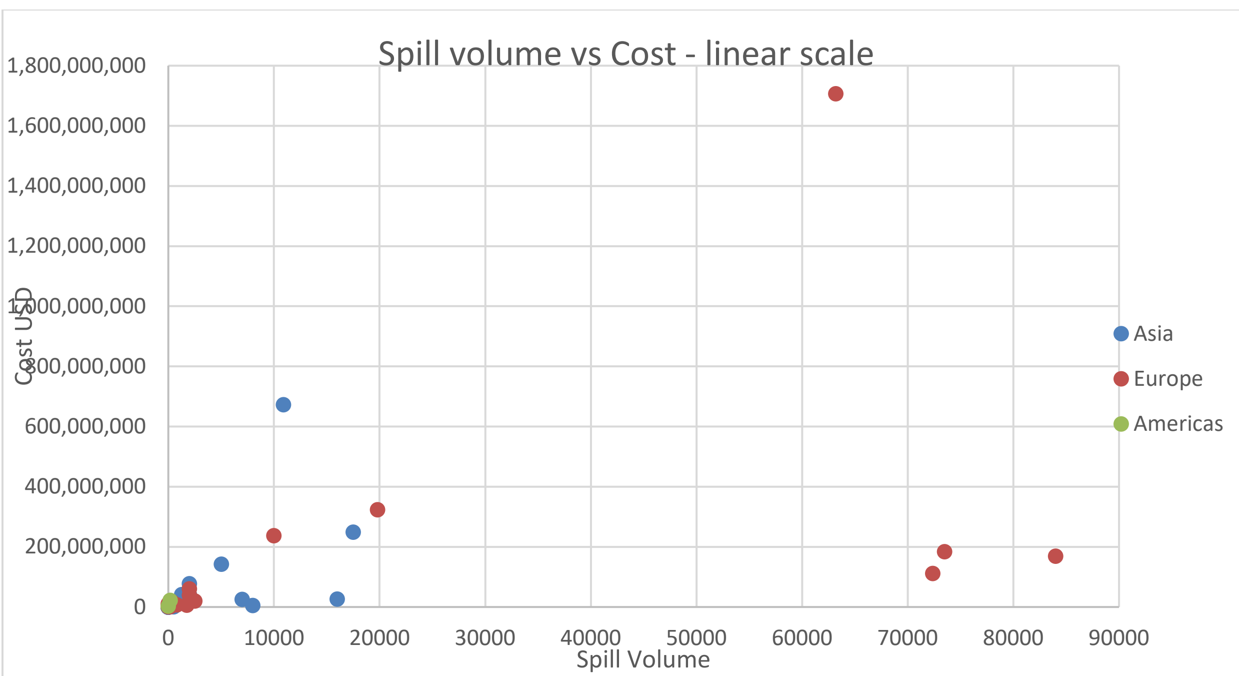

Figure 4: Costs of oil spills in US$ against the volume of oil spilled – using linear scales. IOPC

Fund incidents only.

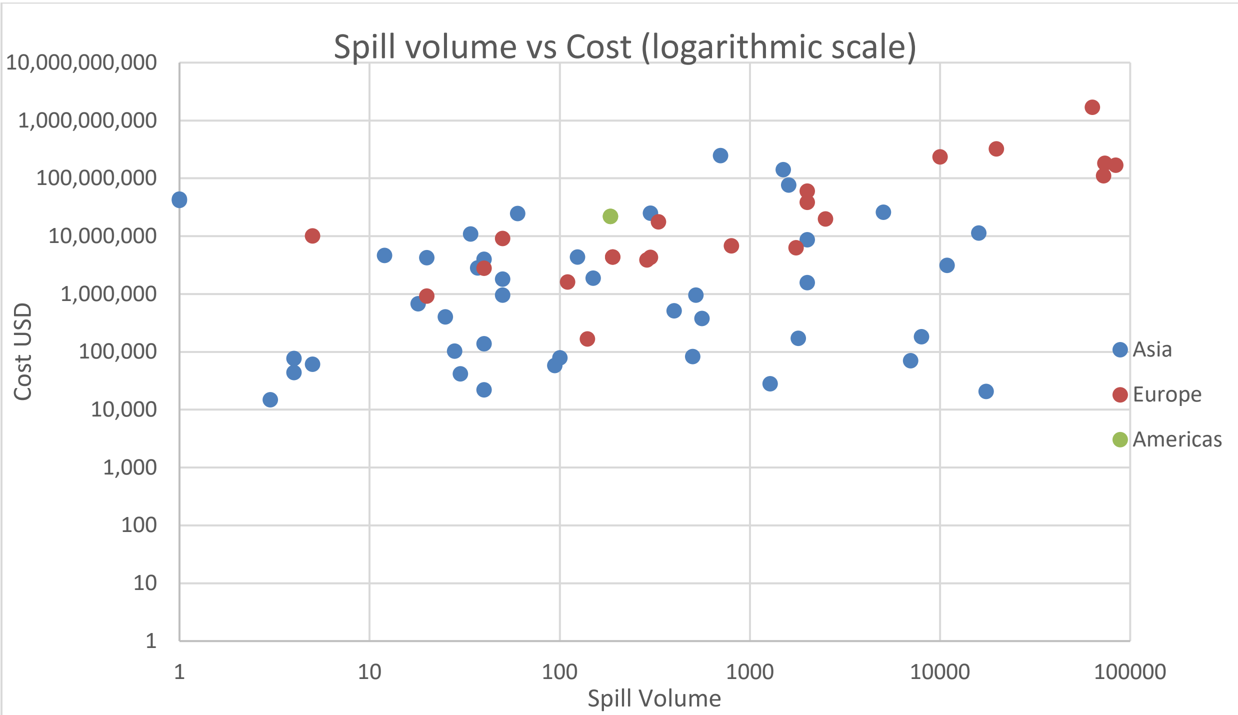

Figure 5: Costs of oil spills in US$ against the volume of oil spilled – using logarithmic scales. IOPC Fund incidents only.

These graphs evidence the absence of a linear relationship between the spill cost and either the size of the tanker or the amount of oil spilled. Part of the reason for the former is that a tanker will spill all the oil carried on board only in the most catastrophic incidents. A more usual scenario involves part of the contents of one or more tanks lost as a result of physical damage, for example as a result of an allision or a collision. **HEBEI SPIRIT** (Korea, 2007, 146,898 GT) is a clear example whereby 10,900 MT of crude oil was lost from a cargo of 209,000 MT on-board, with even this limited amount resulting in one of the most expensive spill recorded by the IOPC Funds. As a consequence, of such situations, a clear association between vessel size and volume spilled in an incident is unreliable. As an added factor, some of the most complex spills have been caused by relatively small tankers. In the three cases listed below a primary factor has been the type of oil spilled, in these instances highly persistent heavy fuel oil, which came ashore along extensive lengths of coastline resulting in significant costs:

- **NAKHODKA** (Japan, 1997, 13,159 GT, US$248 million, 17,500MT lost, US$14,190/MT;
- **ERIKA** (France, 1999, 19,666 GT, US$323 million, 19,800MT lost, US$16,337/MT); and
- **SOLAR 1** (Philippines, 2006, 998 GT, US$41.5 million, 2,000MT lost, US$20,724/MT).

This situation was repeated with **PRINCESS EMPRESS** (Philippines, 2023, 508 GT) whereby the loss of up to 800m^3 of fuel oil carried as cargo has resulted in costs exceeding the shipowners limit under the 1992 Civil Liability Convention. The claims process for this incident has yet to conclude, with the final costs as yet unknown, and the incident is not included in the IOPC Funds' dataset.

Similarly, the cost of a spill cannot be determined directly by citing the quantity of oil spilled. As described below, the number of variables involved means an "average" clean-up cost per tonne of oil spilled has little practicable meaning. For the IOPC Fund incidents displayed, the cost per tonne of oil spilled ranges from US$583/MT for **PONTOON 300** (UAE, 1998, 4,233GT, 8,000MT lost) to ~US$2 million/MT for **SPABUNKER V** (Spain, 2003, 647GT, 5MT lost), the later due in part to significant precautionary mobilization of resources. Even within a limited geographic area, an average cost per tonne spilled is unreliable because every oil spill differs markedly with its own unique set of conditions, effects and consequences, some of which may become apparent long after the incident has occurred.

Where published data is available, caution is advised, as certain notoriously expensive cases can skew the analysis. Within the dataset of IOPC Fund incidents, **HEBEI SPIRIT** and **PRESTIGE**, the latter explained below, are by far and away the most expensive incidents under that 1992 Fund Convention. However, the most expensive oil spill from a ship, by a significant margin, remains **EXXON VALDEZ** (USA, 1989, 95,169 GT). With ~37,000 tonnes of crude oil spilled in a remote location, the clean-up alone cost in the region of ~US$10 billion with inflation. With additional fines and damages, ~US$14 billion or US$378,000/MT, was paid as a result of the spill. This incident fell outside the International Conventions so is excluded from the above graphs.

By way of comparison, the costs of selected oil spill incidents are:

- Costs of the significantly larger spill of 233,000 tonnes of crude oil from **AMOCO CADIZ** (France, 1978, 109,700 GT), were decided in a US court in 1992, some 14 years after the spill, awarding US$520 million (with inflation) of which approximately half was for legal fees and accrued interest (equivalent to US$2,230/tonne lost). This incident occurred prior to the Fund Convention coming into force in France, hence this data is obtained from reports of court proceedings. and is not included in the graph data set.
- Conversely, the spill of 84,400 tonnes of crude oil cargo and 1,700 tonnes of fuel oil bunkers from **BRAER** (UK, 1993, 44,989 GT) cost in the region of ~US$168 million with inflation. Clean up costs in this incident were relatively low since most of the oil dispersed naturally. However, some ~US$127 million, or US$2,006/MT lost, was paid out in compensation for the closure of fisheries as a result of the oil.
- The cost of the clean up after the release of 72,360 tonnes of crude and fuel oil from **SEA EMPRESS** (UK, 1996, 77,356 GT) was relatively low also, at ~US$68.8 million), with total

costs for the incident around US$111.3 million, or US$1,530/tonne lost, once all pollution damage settlements were made.

- For the spill of 64,000 tonnes of heavy fuel oil from **PRESTIGE** (Spain, 2002, 42,820 GT), compensation of US$1.7 billion, or US$26,000/MT lost, including inflation, was awarded by the Spanish courts in 2018. In addition to costs for clean-up and pollution damage (primarily fisheries and tourism), this amount includes costs for moral and pure environmental damage and other items considered inadmissible under the International Conventions.
- As a further comparison, for the release of 10,900 tonnes of crude oil from **HEBEI SPIRIT** compensation of ~US$670 million, with inflation, was awarded by the Korean court, or ~US$61,600/MT lost, of which a part was paid by the Korean government since the limits of the International Conventions effective in South Korea at the time were exceeded.

These examples support the messages from the above graphs, showing the lack of a clear relationship between ship size, spill size and cost. The reasons for this are explored in further detail in the following paragraphs.

RESULTS/DISCUSSION

Factors Affecting the Costs of Spills

For this analysis of the factors affecting the cost of an oil spill, the technical factors affecting the response and pollution damage are considered first, and then other, non-technical factors that can affect the amount of money paid by particular parties.

Type of Oil

Oil type is shown by experience to be one of the most important factors governing the costs of an incident, including the clean-up costs and losses arising from pollution damage. In generic terms, the more persistent the oil, the more difficult and costly the clean-up is likely to be, all other factors being equal. Spills of light oils, for example very light crude oils, condensate, or light refined products, such as kerosene and gasoline, often do not require an extensive clean-up response. Such spills may be toxic in the short term and require careful monitoring, but because of their high volatility usually do not persist on the sea surface. Of note, spills of lighter, non-persistent oils are not covered by the 1992 Civil Liability and Fund Conventions, so are excluded in the above graphs.

At the other end of the spectrum are the persistent heavy crude oils and heavy fuel oils (HFO) which are normally viscous with a smaller proportion of volatile components. These persistent oils may not break-up easily and often emulsify to take on entrained water increasing in volume, sometimes up to five or six times or more, with consequent further increases in viscosity. Such spills can be difficult to clean up at sea, in coastal waters and on shorelines. Clean-up can be protracted, with intensive resource and manpower requirements with associated high costs. Spills of these heavier crude and fuel oils comprise the dataset used for the above graphs.

Heavy fuel oils and crude oils are generally of lower toxicity and their main impact is usually through physical contamination, e.g, smothering or adhering to surfaces. Birds and other wildlife may become coated, and tourist beaches, fishing gear, mariculture facilities, port and other structures can also be contaminated and require cleaning or other solutions. All these problems can result in significant clean up costs and economic losses. Both the spill of 19,800MT of HFO from **ERIKA** and the 64,000 tonnes HFO spilled from **PRESTIGE** resulted in high costs.

In some circumstances heavier oils can sink, particularly if they interact with sediment particles, which can result in the prolonged contamination of the sea bed and bottom fishing gear and may cause repeated re-oiling of cleaned beaches if the sunken oil is remobilised after storms. The part of the ~1,000 tonnes of heavy crude oil spilled from **ATHOS 1** (USA, 2004, 37,895GT) that sunk to the bed of the Delaware River proved particularly difficult to detect and recover , contributing to the overall clean-up costs of ~US$227 million with inflation). With additional natural resource damages and third-party claims combined costs exceeded ~US$500 million or ~US$500.000/MT.

Between the two extremes of gasoline and heavy fuel oil there are many intermediate crude oils and refined products that are transported by tankers as cargo, as well used as bunker fuel in a variety of marine engines. The fate and effects of all these oils, as well as the requirements for clean-up, will vary greatly, which in turn realise unpredictable spill costs.

Amount Spilled, Spill Location and Rate of Spillage

If all other factors are similar, a 10,000 tonne spill is likely to result in far wider zone of higher contamination and impact than a 100 tonne spill. However, the location of the spill is an important consideration. For example, the three largest tanker spills recorded, in terms of spill volume, resulted in minimal or no clean-up and pollution damage:

- **ATLANTIC EMPRESS** - 287,000 tonnes crude oil lost off Tobago, West Indies, 1979;
- **ABT SUMMER** - 260,000 tonnes of crude oil lost off Angola, 1991; and
- **CASTILLO DE BELLVER** - 252,000 tonnes of crude oil lost off South Africa, 1983.

Each of these incidents occurred offshore with comparatively little or none of the spilled oil affecting coastlines, with negligible associated response and pollution damage costs. In such circumstances the cost of the response would normally be limited to surveillance of slick movement and eventual dissipation. These three incidents occurred outside the scope of the International Conventions. As noted previously, the fourth largest recorded tanker oil spill, from **AMOCO CADIZ** (233,000 MT lost), was the result of a grounding close to shore with resultant high response and pollution damage costs, albeit low relatively at US$2,230/MT. The largest oil spill covered by the International Conventions, the 86,100MT lost from **BRAER**, occurred close to shore but resulted also in comparatively lower costs at US$2,006/MT. Of note, **HAVEN** (Italy, 1991, 109,977GT) with 144,000 tonnes of crude oil on-board, may be recorded as a larger IOPC Fund incident although the majority of this oil board is considered to have been consumed in the ensuing fire with a comparatively minor volume spilled to the sea. This lower volume spilled, estimated at 10,000MT is applied for this paper, costing ~US$236 million or ~US$23,700/MT with inflation.

Proximity to the coast and the direction of slick movement are therefore factors in the scale of the resultant cost. This assists to emphasise the inappropriate application of simplistic comparisons between the cost of individual spills based on the single parameter of volume of oil spilled.

The rate of spillage can also be an important factor. For example, the clean-up operation required in response to a single release of oil may be considerable. However, the same quantity of oil lost over several months from a damaged or sunken vessel close to the coast may require a more prolonged clean-up effort, with repeated cleaning of amenity areas and potentially more prolonged effects on fishery resources and tourism. Costs of recovery of oil remaining within sunken wrecks can be a significant additional cost, the work for which contributed to the overall costs for **ERIKA, PRESTIGE, SPABUNKER IV** and **SOLAR 1.**

The characteristics of the spill site (e.g. prevailing winds and weather, tidal range, currents, water depth, coastal topography) also have a bearing on cost as they affect the feasibility and difficulty of mounting response operations at sea and ashore. The sensitivity of different shoreline types, the extent to which they self-clean, for example during storms, and the availability and cost of local labour and other response resources will influence the overall cost.

Socio-economic factors and resources at risk vary both within and between countries. Some areas will be of high national or even international importance for fishing, mariculture, tourism, other industries or conservation, whereas others will only rank as locally important. Seasonal differences will also occur in the sensitivity of these resources to oil pollution and therefore the economic impact of a spill. This in turn will help determine the requirement for and extent of the clean-up and thus its cost.

Response strategies

As noted, oil spills will sometimes dissipate naturally and so pose little or no threat to sensitive coastal resources with sufficient distance and time. On other occasions, poor weather, relative spill location, or other particular circumstances may affect the ability to respond. Nonetheless, under such circumstances, a decision to limit a response may be a difficult one, especially when viewed less acceptably by the public, politicians and media. An active response may therefore be adopted even when the technical benefits are negligible. Added to this are the limitations on containment and recovery systems imposed by winds, waves and currents, and the problems posed for the effective use of chemical dispersants or in-situ burning by high viscosity oils and the rapid formation of water-in-oil emulsions. At times, these technical realities fail to deter decisions to deploy resources in order to be "seen to be doing something", particularly when a driver is to uphold commercial or political reputation. To this end, “prudent over-response” is encouraged by some to address reputational damage.

In extreme cases an ineffective at-sea response may continue for an extended period, leading to high clean-up costs for little or no benefit. The actual cost-effectiveness of an at-sea response will depend upon many factors including the nature of the incident; the availability of trained personnel and required equipment and materials; the equipment employed; as well as the effectiveness of the pre-spill planning and the command and control of the actual operations.

Shoreline clean-up relies frequently on manual recovery methods supplemented by equipment available locally or brought-in from further afield. In terms of the amount of oil collected relative to financial outlay, oil recovery on shore can be more cost effective than collection at-sea, which typically requires expensive equipment, vessels, aircraft and trained operators. Nonetheless, recovery at sea when practicable is a recognised and important component of a response.

An important factor in the cost of shoreline clean-up is the extent to which cleaning is required to bring the contaminated area to a condition agreed by the parties. As the clean-up operation progresses beyond recovery of bulk oil and the degree of contamination reduces, ever more effort is required to effect further improvement. The operation becomes one of diminishing returns, with costs escalating rapidly in proportion to the amount of oil remaining. This factor can be a key reason shoreline clean-up costs cannot be related directly to the degree of initial contamination: the level of effort to deal with the lighter contamination remaining during the "secondary" and final cleaning phases may be comparable to that expended in the initial bulk oil recovery stage.

Other factors to consider include the extent to which oil becomes buried in shoreline substrate, for example seeping into pebble beaches or becoming covered by sand on subsequent tides. Detecting and removing such buried oil, can be time consuming and costly, if required.

The shoreline type affected, its amenity value, and temporal season can be additional important factors. A high amenity shoreline, for example a high-value tourist area, contaminated just before or during peak season may require extensive cleaning to minimise economic losses. The same area contaminated after the tourist season, may instead be left to self-clean during seasonal storms once bulk oil is removed. Similarly, contaminated areas inaccessible to clean-up crews may be left to self-clean on safety and practical grounds.

An objective of recovery, both at sea and on shore, should be minimisation of collected waste. Employment of techniques to reduce the proportion of water or otherwise unaffected substrate collected for further, onward treatment and potential disposal has the dual purpose, for on-shore activities, of limiting the ecological impact of the oil and clean-up as well as the overall cost. To this end, techniques that treat contaminated substrate in situ, such as flushing or surf washing, can result in major cost reductions against less selective techniques, for example using construction equipment. The method of disposal: co-disposal, incineration, use as fuel etc., and the unit rate applicable for the method can be major influences on the overall incident cost.

Planning and Command and Control of Response Operations

The extent by which affected organisations have prepared for an oil spill and the quality of that preparation can be a major influence on costs. Inadequate planning and poor command & control can result in the mistakes of previous spills being repeated time and time again. This result can be increased damage to the environment and local economies that could have been avoided resulting in elevated costs for reinstatement and losses. The tendency to react to political, media and public perceptions and pressures, rather than basing decisions on technical realities, can escalate the cost of any incident beyond the level considered "reasonable" under the International Conventions.

Conversely, an ability to respond promptly to an accidental spill of oil may serve to reduce environmental damage and economic loss. Rapid mobilisation of appropriate resources with clear direction and informed decision making may contribute to a more effective response. Nonetheless, the scale of the incident, for example large volumes of oil spilled in poor weather to spread over a wide area, may undermine such a prompt response and high-quality leadership by overwhelming available resources and necessitating an extended and more complicated response.

Applicable legislation

While the technical aspects of a response have been shown to have an important bearing on costs, the legislation prevalent within the affected country, and the applicable national legal system, can be an equally important, if not greater, factor in overall costs. The International Conventions aim to establish a globally uniform scheme for rapid compensation for reasonable expenditure and loses, and therefore place parameters on the costs of a spill. The knowledge that compensation under these conventions will be limited to reasonable expenditure and losses can guide the response and the quantum of claims submitted for clean-up and pollution damage. Expenditure and losses considered to be unreasonable may not be compensated under this regime. The majority of cost figures illustrated in the graphs in figures 2 – 5 comprise such reasonable costs. However, in both **ERIKA** and **PRESTIGE**, national courts decided to include costs otherwise considered to be outside the International Conventions, including pure environmental damage. For the former case, these additional costs were borne by several parties, including the casualty's classification society and charterer. Instead, compensation for pollution damage under the International Conventions is limited to consequential and pure economic losses supported usually by suitable evidence of loss of income (other evidence means for subsistence losses). For example, any expense, loss or damage must actually have been incurred. Admissible claims for environmental damage are limited to loss of profit as a result of the damage and the costs of reasonable measures of reinstatement undertaken.

Oil spills outside the International Conventions can be subject to different admissibility criteria. This may be most notable in the USA, where compensatory restoration for natural resource damage under the Oil Pollution Act of 1990 (OPA'90), and other federal and state legislation, can introduce significant additional costs, for example in **NORTH CAPE** (USA, 1996), from which ~3,100m^3 of home heating oil spilled to affect large numbers of commercial lobsters and other species. The response was limited in part by the nature of the oil, but pollution damage was severe comparatively, with the owner required to pay for rebuilding the lobster fishery and ~US$15.9 million (with inflation) for ecosystem restoration. The costs of oil spills under the OPA '90 are consequently usually not representative of spills elsewhere globally. The Russian Federation, by use of the Metodika, and Saudi Arabia through the Jeddah Method, are examples of other countries that may apply additional costs based on abstract calculations of environmental damage.

Cost to whom?

A final aspect when considering the question of oil spill costs may be to determine the point of view of the questioner. While the above factors contribute to overall spill costs in greater of lesser proportions depending upon the spill scenario, the costs borne by a person, agency, organisation etc. can also vary widely. For example for a government agency involved in a response, the final cost may be low since, in many instances, a spill from a commercially trading ship may be eligible for compensation from the associated Protection & Indemnity insurer or the International Fund or a domestic Fund as relevant. However, even if a source of compensation is available, if an element of costs incurred are considered unreasonable under the relevant admissibility criteria, are beyond the limits of liability, or where no compensation is available, the government may shoulder some or all of the cost.

In many circumstances, the casualty owner of a commercially trading ship may expect submitted claims to be covered by their P&I insurer. For the casualty insurer, liability for the incident may be established by an applicable International Convention, by national legislation or by court judgments. Where the appropriate International Conventions are in force, the costs of the incident may be shared by the insurer and IOPC Fund, itself funded by importers of contributing oil in signatory countries. Domestic funds may also share the financial burden when relevant, for example in Canada, the USA or in China. Nonetheless, if liability limits are broken, for example by proven recklessness, limitation of liability may not be possible.

As a further point of consideration, the figures used as the basis for the graphs in figures 2 – 5 comprise primarily payments for assessed claims for clean-up and pollution damage. However, the parties paying compensation may incur additional costs for administration of the claims process by employees and third party lawyers, experts etc. Such administrative costs can be substantial in significant and protracted cases, particularly if cases end up in court. While an aim of the International Conventions is to preclude to involvement of the courts, this may be unavoidable in some scenarios and jurisdictions.

CONCLUSIONS

This analysis of the comparative costs of oil spills from tankers has shown clearly such figures cannot be predicted with sufficient certainty by considering merely the size of the tanker or the volume of oil spilled. The extent to which all or a part of the cargo and bunkers are lost in an incident is a primary cause of the former. The variables encountered during the response to the spilled oil, together with the variety in the potential type and extent of pollution damage, reinforce the long held notion that every spill is different, particularly when costs are considered. The concept of ‘cost per unit of oil spilled’ encompasses a range so large that an average figure has little meaning practically.

The decisions made on clean-up strategies, the extent to which the resultant techniques can be considered reasonable, and the willingness to respond to commercial, public or political pressures by applying other techniques, can affect costs markedly and will determine to a certain extent the burden of paying such costs: whether the vessel's insurer, the International Oil Spill Compensation Fund, and/or a domestic Fund, where relevant, are liable or whether costs are borne elsewhere – by the claimant for example.

In instances where domestic legislation, or national courts, allow costs outside the scope of the International Conventions the costs of the incident are logically higher, a key factor being the extent to which compensation for environmental damage is applicable.

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