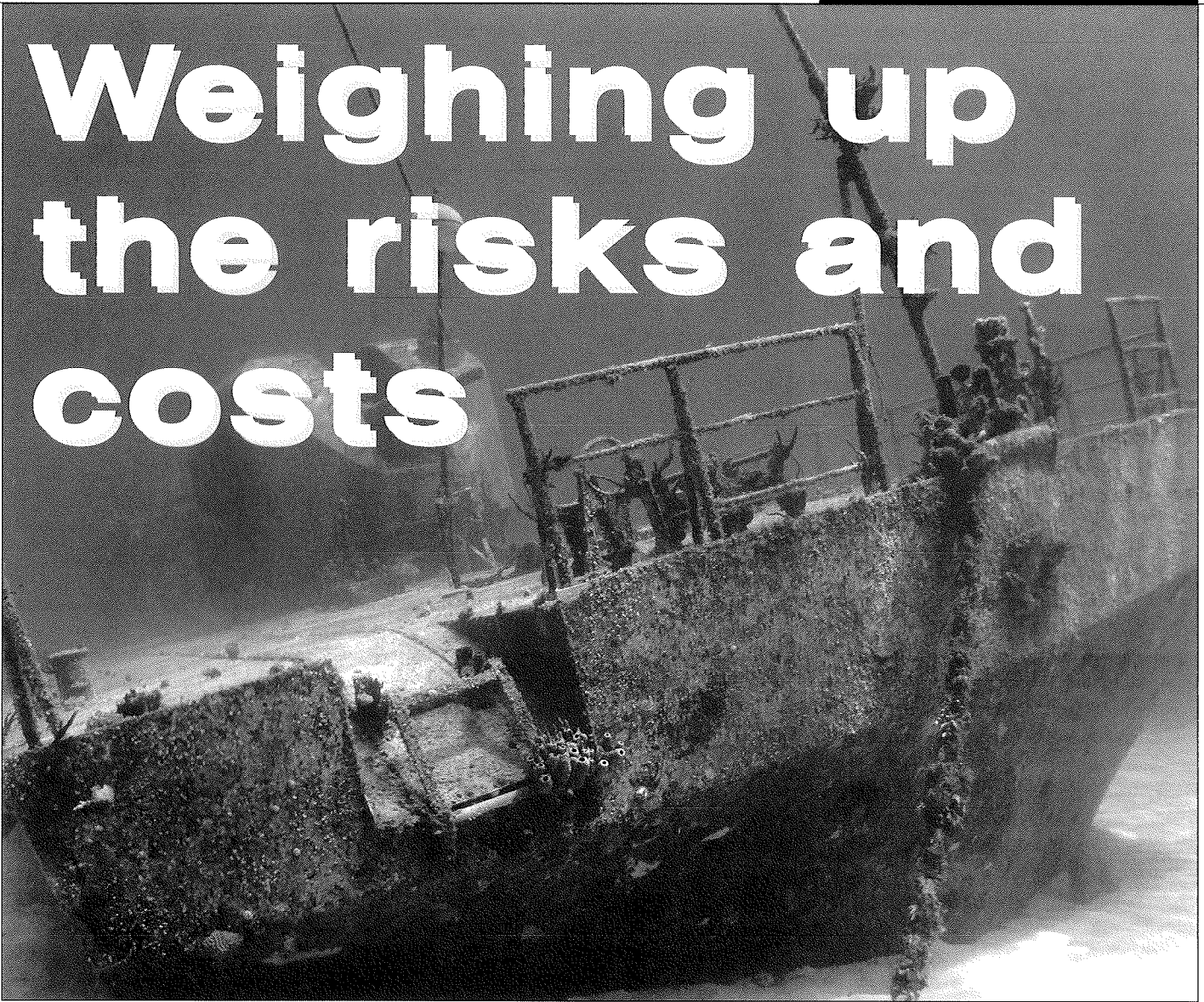


# Weighing up the risks and costs



**Hugh Parker**, of the International Tanker Owners Pollution Federation, considers the removal of oil and chemicals from sunken wrecks

Almost one in every five incidents attended by International Tanker Owners Pollution Federation (ITOPF) in the last five years has involved sunken wrecks and the removal of oil or chemicals from below the sea surface or at least consideration of the feasibility of such operations.

The technical input to the decision to remove potential pollutants from sunken wrecks usually depends on the outcome of a qualitative risk assessment, which can be summarised by two questions:

- Will oil or chemicals be released into the marine environment? and if so;
- What will be the likely consequences of such a release?

The liability for meeting the costs of such operations would be governed by one of a number of conventions including the 1992' Civil Liability and Fund Conventions for

tankers, the Bunker Convention for the removal of bunkers, the '1996 HNS Convention for chemicals and the 2007 Wreck Removal Convention, although it should be understood that the latter two conventions have not yet entered into force.

If costs are to be met under the provisions of one of these conventions, then a third question can be asked, namely; are the removal costs reasonable? In the specific case of the removal of potential pollutants, the answer to this question revolves around whether the costs can be considered proportionate to the costs of the likely consequences of leaving the pollutant in place. In part, the answer lies in assessing the level of difficulty to successfully remove pollutants successfully and, indeed, whether or not removal operations are feasible at all.

In recent years, ITOPF has considered the

risks posed by a number of casualties including three chemical tankers. Our assessment begins with an estimate of how much cargo is likely to remain within the hull and draws upon a number of information sources.

An assessment of the type and degree of damage sustained on sinking, made by marine consultants and salvage experts, provides one such source, usually on the basis of an underwater survey conducted by a remotely operated vehicle (ROV).

Although the results of such surveys can usually provide reliable information on the quantities of cargo or bunkers lost from tanks that are obviously compromised, often little can be deduced in respect of those tanks that appear to be intact.

The assumption has to be made that such tanks still contain cargo. Based on the physical characteristics of the cargo, the probable rate

of its release through areas of damage or as a result of the slow deterioration of the hull through corrosion and cracks is estimated.

The risk of a catastrophic failure of one or more tanks also has to be evaluated, which could perhaps result from storm damage in the case of wrecks in shallow waters, from seismic activity or even perhaps damage caused inadvertently by heavy fishing gear or anchors.

Once the quantity of cargo remaining and the likely rate at which it might be lost over time have been assessed, we then go on to consider the potential environmental and economic consequences again taking into account the cargo characteristics, its persistence and fate once released into the sea.

The remaining factor to be included in the risk assessment is the location and proximity of vulnerable resources. In order to judge whether the pollutant could reach these resources in sufficient quantities or concentration to cause damage, the likely movement of the pollutant under the influence of the wind and water currents has to be addressed.

For oils and many chemicals, the fate of these materials at sea – their rate of dissipation through evaporation, dilution or dispersion, – is reasonably well understood, but other areas of uncertainties in the risk assessment and, in particular, how much of the cargo remains within the wreck, mean that the assessment we derive provides a range of outcomes from the most likely to the remote.

In the case of the *Prestige* incident (Spain, 2002) the initial estimates based on the known damage fell far short of the quantity which was eventually established as having been lost. In that case, a novel approach derived from oilfield technology, a reservoir performance monitoring tool, was used to determine the quantity of oil remaining in the tanks.

The tool emits a cloud of high energy neutrons which interact with materials encountered releasing gamma ray radiation, the energy levels of which are indicative of the materials encountered. Electronic processing of the return signals allows oil–water interfaces to be located and therefore the quantity of oil remaining in the tanks to be established.

In the *Solar 1* incident (Philippines, 2006) this technology could not be applied because the vessel was half-buried in mud and removal of the mud risked destabilising the wreck. However, in the case of *Solar*, a video taken from the air shortly after the vessel sank was reviewed and the rate at which oil was being lost from the wreck was estimated. However, such estimates based on the amount of oil on the surface at a given time are only indicative and so it could not be stated categorically that there was no oil remaining in the vessel even



though the rate of release over a matter of weeks had dwindled to a trickle.

The criteria intended to provide guidance are included within the body of the Wreck Removal Convention for all types of ships, whereas the '1992 International Oil Pollution Compensation (IOPC) Fund's *Claims Manual* (December 2008 Edition, 1992 IOPC Fund, [www.iopcfund.org](http://www.iopcfund.org)) sets out the criteria to be taken into account in the specific case of oil removal from sunken tankers, which can be summarised as follows:

- The quantity and characteristics of the oil remaining in the wreck and the likelihood that any of that oil would be released;
- The vulnerability of areas likely to be affected by any such release either in terms of either economic or environmental impacts;
- The feasibility of the removal operation, and the likelihood of success taking into account the risks of the removal operation itself; and
- The cost of the operations, especially in relation to the likely pollution damage [and costs thereof] which would have resulted from the release of the remaining oil from the ship.

These criteria were developed following the IOPC Fund's experience of the *Prestige* and *Solar 1* incidents, the circumstances of which were quite similar but the decisions reached by the IOPC Fund's executive committee were different in determining the admissibility of the two claims for the costs of oil removal.

In the case of the *Prestige* the executive committee decided that the costs of undertaking measures to assess the risk posed by oil remaining in the wreck were admissible

but that the costs for the actual removal of oil were not (Records of Decisions of the 32nd & 33rd Sessions of the Executive Committee, [www.iopcfund.org](http://www.iopcfund.org)).

Although the *Prestige* oil was more persistent, reaching as far as the UK and perhaps even the Netherlands, the cargos of both *Prestige* and *Solar 1* were fuel oils with the potential to persist for long periods on the sea surface. However, the key considerations were the proximity and risk of damage to sensitive resources.

In the case of the *Prestige* the seafood production industry along the Galician coast was by far the most valuable economic resource potentially at risk from oil pollution. The wreck was 170 nautical miles offshore at a depth of more than 3,500 metres and it was judged that any oil released would be limited to the formation of tar balls.

In order for damage on a significant scale to be suffered by the tourism industries of the Atlantic Islands to the south or the Galician seafood industry to the east, a sudden loss of a substantial quantity of oil would have had to occur and the risk of such a release was assessed to be remote.

In the case of *Solar 1* the resources of Guimaras Island were also particularly sensitive to oil pollution. The location where the vessel sank was 630 metres deep but only some 10 nautical miles from the shore and, as in *Prestige*, the experience of the initial incident demonstrated that oil could reach the shoreline.

The presence of oil and oily sheens on the water would have disrupted coastal fisheries as well as fish and shellfish gathering from the fringing reef along the southern coast of the island. There was also the risk of contamination of

the reefs themselves to consider as they dry out at certain states of the tide. From our investigations, the impact of the oil on mangroves does not appear to have been severe.

However, the experience of other incidents where similar habitats have been repeatedly oiled indicates that greater damage can be inflicted by chronic multiple oiling than by a single acute episode. The other factor in the case of *Solar 1*, which strongly influenced the outcome of the risk assessment, was that the vessel sank in an area of frequent seismic activity whereas *Prestige* sank in an area of the seabed judged to be relatively stable.

In reaching their decision to accept the costs of extracting oil from *Solar 1* as admissible, the 1992 IOPC Fund's executive committee weighed the proximity of vulnerable economic and environmental resources, the uncertainty over the quantity of oil remaining and the unknown consequences of frequent seismic activity against the moderate projected costs of oil removal from a lesser depth than *Prestige*. In the event, however, only nine tonnes (Incidents Involving the 92 Fund – *Solar 1*, [www.iopcfund.org](http://www.iopcfund.org)) of oil were recovered at a cost of about US\$6m.

Similar issues to those that were debated by the IOPC Fund's executive committee in the *Solar 1* and *Prestige* incidents have been raised by a number of other incidents recently. In each of these, the two most common difficulties have been determining the quantity of potential pollutants remaining on board and establishing the feasibility of their removal.

As noted above, the former is one of the key parameters in the initial risk assessment and without this information conservative assumptions have to be made which, as was shown in the *Solar 1* incident and a number of previous incidents, turned out to be unfounded, but only after commitment to removal of the remaining pollutants had been made.

With the success of the *Prestige* cargo removal, it might be thought that the technical obstacles to cargo removal even at great depths have been overcome. However, despite this success, a number of technical difficulties do still remain, for example, working in high current regimes and affixing pumping equipment to wrecks deformed on sinking.

In the *Ece* incident (France, 2006; [http://www.premar-manche.gouv.fr/services/actualites/communiqués/e-docs/00/00/24/07/document\\_communique.php](http://www.premar-manche.gouv.fr/services/actualites/communiqués/e-docs/00/00/24/07/document_communique.php) & <http://www.cedre.fr/uk/spill/ece/ece.htm>), oil within internal bunker tanks was not accessible using the hot-tapping techniques used successfully in many other incidents.

Similarly, in both the *Sea Diamond* (Greece, 2007;) (Louis says Greek fine on *Sea Diamond* was "unfounded and unfair", 21-06- June

2007, [http://www.financialmirror.com/more\\_news.php?id=7375&type=news](http://www.financialmirror.com/more_news.php?id=7375&type=news)) and the *Queen of the North* (Canada, 2006;) ("Queen of the North Stays Sunk," <http://www.theglobeandmail.com/servlet/story/RTGAM.20070608.wferry0608/BNStory/National/>) incidents, any remaining oil was thought to be inaccessible and distributed in pockets throughout the wrecks.

**The positions currently taken by many government authorities suggest that the tolerance of earlier times towards maritime casualties has given way to a determination to mitigate any risk of pollution**

However it is interesting to note that despite this initial assessment, further oil has now been successfully removed from the *Sea Diamond* wreck at a reported cost of some \$8m ("Diamond polished off. Final fuel removed", Lloyd's List, 18 June 18, 2009).

The positions currently taken by many government authorities suggest that the tolerance of earlier times towards maritime casualties has given way to a determination to mitigate any risk of pollution. The *Ece* incident off northern France in 2006 provides a clear example of how public attitude is driving the debate. In this case, a chemical tanker with a cargo of 10,000 tonnes of phosphoric acid was perceived as an environmental hazard by influential environmental lobbies in France.

Public perception was said to have been

coloured by the quantity of cargo involved and emotive connotations of 'phosphorous' and 'acid'. In fact, phosphoric acid is used either as a component of, or directly as, a fertiliser.

Risk assessments to evaluate the consequences of leaving the cargo within the wreck found that the risk to the environment was limited to increased acidity within the immediate vicinity of the wreck and that even a catastrophic loss of cargo would result in rapid dilution in the strong current regime that existed at the wreck site.

Nevertheless, the French authorities judged that a controlled release of the cargo was required to satisfy public opinion. So, although it was possible to demonstrate that cargo was being lost from the vessel, it was not possible to determine how much was left within the tanks and so, neither the authorities nor the media could be convinced that the risk assessment was sufficiently reliable to leave the cargo to dissipate under the forces of nature.

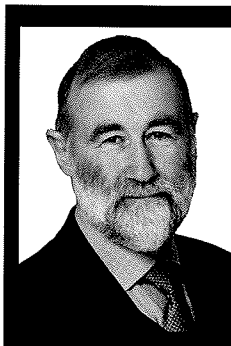
Under the Wreck Removal Convention ('the Nairobi International Convention on the Removal of Wrecks, 2007', [www.imo.org](http://www.imo.org) "the Nairobi International Convention on the Removal of Wrecks, 2007"), which as noted previously is not yet in force, the criteria for establishing whether a wreck constitutes a hazard includes the nature of the cargo where a hazard is defined as:

"any condition or threat that:

- (a) poses a danger or impediment to navigation; or
- (b) may reasonably be expected to result in major harmful consequences to the marine environment, or damage to the coastline or related interests of one or more states."

However, removal measures ".....shall be proportionate to the hazard."

It is interesting to note that it was the lack of proportionality that defeated the Spanish claim against the IOPC Fund for removal costs in *Prestige*, whereas despite the final outcome (and without the benefit of hindsight) the projected costs were accepted as proportional to the threat posed by *Solar 1* at the time the decision was made to commit resources to removing the cargo.



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