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Integration of Scientific Perspectives into the Application of Maritime Law

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ABSTRACT

This paper reviews a number of recent incidents of pollution form shipping and describes how the application of scientific methods for assessing damage helps to maintain a consistent approach to the implementation of relevant maritime legislation. These cases cover a range of political and cultural settings and serve to identify and assess damage against the background of a complex and highly variable marine environment.

Codes of practise and protocols have been developed to provide guidance for scientists engaged to assist regulators and claimants in gathering relevant evidence in marine pollution cases. Whilst such procedures may be imperfect, the abandonment of a science-based approach would lead to inconsistent results and a rapid loss of confidence in the law. The application of the Civil Liability and Fund Conventions provides examples of both good and bad outcomes, and their consequences.

Particular emphasis is given in the paper to the needs of developing countries in adopting sound strategies for tackling a wide range of environmental threats and in finding ways of resolving conflicting priorities. The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC 90) provides a good framework for co-operation between states, and between government and industry, whilst at the same time fostering collaboration in scientific and technological enquiry, such as research and development.

INTRODUCTION

Much has been achieved through international co-operation in the last forty years to prevent or minimise the effects of pollution from shipping. The trend towards a uniform application of international instruments developed under the auspices of IMO has created benefits for the marine environment and for victims of oil and chemical pollution. Taken together, the MARPOL, CLC, FUND, OPRC, BUNKERS and HNS Conventions provide an integrated system whereby the risk and effect of marine pollution resulting from the transportation of goods by sea can be managed.

The long-term viability, credibility and success of the international regime depend on many factors, including wide adoption and effective implementation. Indeed, the last two of the above instruments are not yet in force. More significantly, experience to date suggests that a fair and consistent interpretation of the science-based elements of the international conventions is of crucial importance. The scientific input required ranges from the identification of operational discharges from ships to environmental damage assessment. Such investigations and assessments are often of a controversial nature and require rational and dispassionate treatment.

THE ROLE OF SCIENCE

Historical background The 1969 Civil Liability Convention (CLC 69) did not come into force until six years later, but tanker owners introduced its provisions from the outset on a voluntary basis through the Tanker Owners Voluntary Agreement concerning Liability for Oil Pollution (TOVALOP), introduced in 1969 and administered by ITOPF. The liability was underwritten by the P&I Clubs, and it was soon apparent that only by applying scientific principles could a consistent interpretation of TOVALOP and CLC provisions be achieved. The alternative of a political or a negotiated solution has always been tempting, not least from the point of view of saving time and transaction costs. However, the expedience of the political or commercial ‘quick fix’ flies in the face of the concept of *reasonable* preventive measures enshrined in the international instruments dealing with pollution liabilities from incidents involving shipping.

ITOPF started work in this area in 1972 with the appointment of its first Technical Manager. It has been a gradual development since then, reflected in the growth of the ITOPF technical team, currently consisting of 14 people. A wider network of technical experts has also been created to serve the needs of the shipping industry and the parties responsible for paying compensation. A pattern was developed whereby the admissibility of claims and their assessment is based on a technical evaluation of available facts and researched data.

Thus, by the time the Fund, Bunkers, and HNS Conventions emerged, the practise of seeking a technical assessment of pollution response actions taken and costs incurred was well established. The International Oil Pollution Compensation Funds (IOPCF), implementing the provisions of the Fund Conventions, have fully embraced the concept and further defined procedures for dealing with more complex issues that have arisen in the course of dealing with numerous pollution incidents. The basic methodology for assessing pollution damage and associated costs is contained in the IOPC Funds’ frequently updated Claims Manual, which has been widely adopted *(www.iopcfund.org)*.

Spill response In most jurisdictions the approach adopted for responding to oil spills from ships is based on civil emergency or military organisations, or a combination of the two. Other government agencies, notably those governing environmental resources, may also play a prominent role. In theory, there should be a simple command & control structure in place, with clear lines of communications, and an efficient management system allowing flexible control of response activity, adapted to changing circumstances. In practice, there are instances when such systems manifestly fail to deliver expected results, either through poor planning and execution, or unrealistic expectations. Political interference may then be the inevitable consequence. In our experience one poor strategic decision can quickly lead to the unravelling of carefully laid plans and loss of confidence amongst those involved in the clean-up operation, as well as the media and the general public.

It is frequently assumed that the remedy for such failures lies in more and better equipment and materials. Of greater importance, in our view, is to ensure that appropriate response management systems are emplaced and validated through training and exercises. The key word here is *appropriate*, which embodies different components related to risk assessment, and the fate and effects of marine pollutants. This is where an appreciation of the role of science is again relevant.

Big incidents such as the *PRESTIGE* foundering off Spain in November 2002 demonstrate the point in several ways. A number of failings were identified in conducting oil recovery operations at sea, largely due to ineffective command and control functions. Delays and bottlenecks occurred as a result of problems with discharging recovered viscous oil. With the experience of recent incidents in European waters, great emphasis has now been placed on the capability to respond to spills of Heavy Fuel Oil. However, much greater quantities of crude oil are carried through these waters than fuel oil. Dispersants have been used successfully in past incidents to mitigate the effect of large crude oil spills, but many European States are reluctant to follow this approach despite their proven effectiveness. Aerial surveillance is an important tool for both the strategic management of an incident and the tactical direction of recovery vessels at sea. Techniques need to be devised allowing the integration of visual and remote sensing imagery into an electronic format for rapid transmission of information to both the command centre ashore and to ships at sea.

Drawing on these experiences, ITOPF last year completed a post-PRESTIGE review of the arrangements for spill response at sea in fourteen European countries and proposed ways is which the newly established European Maritime Safety Agency (EMSA) might enhance existing response arrangements within Member States of the European Union and to evaluate the costs and benefits of these proposals.

The imminent threat of oil contamination from PRESTIGE to the US$1 billion mussel cultivation industry of Galicia prompted the regional government to commission an urgent study in November 2002 to formulate an emergency plan to protect the hundreds of cultivation rafts that populate the wide Galician estuaries facing the Atlantic. The consultancy firm given the task came up with an unrealistic plan to deploy some 50 kilometres of boom across the entrance to the main estuary. This plan completely ignored the well-known limitations of oil containment booms in the open sea. Fortunately the regional government heeded warnings not to embark on what would have been a futile venture and thereby avoided wasting over €10 million. Instead, a wide-ranging review of the regional contingency plan was implemented, with far greater prospects for a reasonable return on more modest investment. The review has helped to improve the underlying organisation and the wider dissemination of the basic facts governing the behaviour of spilled oil and the performance of spill response equipment.

In the summer of 2004 a Spanish-led consortium including the state oil company REPSOL succeeded in recovering most of the Heavy Fuel Oil cargo remaining in the wreck of PRESTIGE, as it lay in two pieces at a depth of over 3,500 metres off the northwest coast of Spain. Following this impressive feat – at a cost of €110 million – there have been calls for more sunken wrecks to be emptied of oil as they are demonstrably now within reach. In common with many risk assessments, the sensible approach to the issue of oil trapped in sunken wrecks is one of balancing conflicting factors. To tackle every wreck is obviously impractical and, conversely, to ignore all those which begin to leak would be unwise. A reasonable strategy is to focus on the wrecks which pose a substantial threat to sensitive economic and environmental resources, and which can be emptied effectively against an acceptable financial outlay.

An understanding of these technical issues is essential for a balanced assessment of the event and the response to it. Too often, the conclusions drawn from an incident are hasty, biased and simply wrong. In part, this situation arises out of a common desire to apportion blame rather than find solutions. There is also a tendency to confuse the risk management and risk avoidance. Failure to analyse threats and deficiencies in a rational manner and to improve performance within realistic bounds will invite unhelpful interference.

Assessment of damage Whilst the purpose of the Compensation Conventions is straightforward, the route to the fair settlement of claims can be long and arduous. Presentation of the facts and findings of a damage survey is often the first step in establishing the effects of an incident. In a large or complex case specifically targeted scientific studies are necessary to quantify environmental impact. In countries such as China the will to conduct good science in the wake of pollution incidents is not matched by available resources or effective procedures, whilst in Europe and North America there is no such shortage. However, and particularly in the United States, the trend towards using science to support adversarial positions has been damaging and has hindered the development of amicable government-industry partnerships. The issue arising from this conflict is encapsulated by the following statement: *"Science seeks to establish the scientific truth whereas the legal process is founded on the advocacy of conflicting interests to resolve a truth"* (Mauseth & Kane, 1994).

The EXXON VALDEZ spill provided opportunities for investigating oil pollution effects, and numerous studies were carried out. However, efforts to establish the extent of the damage and the rate of recovery after the spill were controversial and opposing positions were fiercely debated. As a consequence of the ensuing inconsistency in methods used for the collection and analysis of data, some fundamental differences arose between the interpretations of the studies and the data gathered. In the litigious environment which followed the EXXON VALDEZ spill, the formation of a consensus was not the main priority. The aim was instead to build strong legal argument to support the specific standpoints taken.

The implementation of the regulations governing Natural Resource Damage Assessment under the US Oil Pollution Act of 1990 provides many examples of the erosion of science-based enquiry. In essence the NRDA process entails fact-finding by biologists and chemists employing statistically validated sampling and analytical techniques. The results are interpreted by economists in accordance with theoretical valuation models. The final phase is negotiation by lawyers in court resulting in a commercial deal that often bears little relation to the original pollution damage. This is particularly likely given the practice of employing so-called Habitat Equivalence Analysis (HEA) to quantify damage in non-economic terms. Whilst HEA avoids some of the controversy of attempting to put a $-value on the environment, the end result can be seen as somewhat arbitrary and inconsistent from case to case.

In contrast, the international conventions focus on the components of environmental damage which cause economic loss. Perhaps the most significant development with respect to the Civil Liability and Fund Conventions in recent years is the clarification of the procedures for determining and facilitating measures to reinstate natural habitats affected by oil pollution.

The IOPC Funds' Claims Manual contains guidance relating to the conduct of studies to establish the nature and cost of environmental impairment, and the restoration measures available for accelerating recovery.

Spills of sufficient magnitude to result in environmental damage are usually accidental and therefore unpredictable in nature and location. Frequently, the areas affected by the oil spill have not been surveyed and documented in depth prior to the incident. Consequently, changes in what might be considered the norm may be difficult to attribute to the oil spill as opposed to other factors, such as chronic pollution, over-fishing, and climatic change. For example, many oil spills happen close to ports, industrial or urbanised areas, where it becomes important to be able to separate spill effects from those of other pollutants. Taking this into account will require careful design of the sampling protocols and the layout of the sampling locations, as well as additional analytical methodologies to measure other contaminants.

The next step in evaluating the risk, nature and degree of environmental damage is to determine both the geographical extent of the spill and identify the resources which are likely to fall within the area of the spill. The extent of the spill is probably the single most important aspect of damage assessment as it establishes the affected area. The location of resources sensitive to oil pollution in the path of drifting oil can usually be identified either from direct observations or on the basis of environmental sensitivity maps prepared as part of the development of contingency plans.

When environmental damage from a spill and from clean-up activity is likely to be more prolonged, it may be feasible to speed up the natural recovery process. Restoration measures should enhance natural recovery leading to the re-establishment of a healthy biological community in which similar faunal and floral components coexist and interact normally. More complex communities such as salt marsh, mangroves, sea grass beds and coral reefs are generally the slowest to recover and their resilience is low. On the other hand, communities characterised by opportunistic species with high reproductive rates, a broad physiological tolerance and wide-ranging dispersal abilities, have a higher degree of resilience.

Salt marshes and mangrove forests provide two clear examples of habitats with potential for reinstatement after spill damage. Both are ecologically valuable coastal habitats, providing coastal defences, important nursery areas for commercial fish species and a considerable supply of organic material which provides nutrition for near-shore marine communities. Both are also sensitive to oil spills and the natural recovery process is likely to be slow after serious spill damage.

In July 2003, the tanker TASMAN SPIRIT grounded in Karachi, Pakistan and spilled about 30,000 tonnes of Iranian crude oil, which constituted the largest spill of that year. Mangroves and subsistence fisheries were affected, and as a direct consequence of this incident, the United Nations Environment Program (UNEP) initiated the preparation of a manual with guidance aimed specifically at developing countries. The IMO is also taking part in the initiative by establishing a correspondence group to review the draft manual with the aim of ensuring that the finished document is consistent with the precepts of the international conventions.

WIDER PERSPECTIVES

OPRC Convention A sound framework for improving response capabilities and organisation is provided by the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), whereby available resources are integrated in a systematic way. Our experience at the scene of many oil spill clean-up operations clearly indicates that good organisation is the key factor in effective spill response.

The Parties to the Convention require ships of over 400 GT registered under its flag to carry oil pollution emergency plans on board, and that operators of oil handling facilities and offshore oil installations have such plans. Each Party designates competent national authorities with responsibility for oil pollution preparedness and response. There is a commitment to establish a national contingency plan for preparedness and response which includes the organisational relationship of the public and private bodies involved. In cooperation with the oil and shipping industries and other entities, a minimum resource of oil spill combating equipment should be established; a training and exercise programme; a continuously available communication system and response plan; and a procedure for coordinated mobilisation and deployment of oil spill combating resources.

Parties agree to cooperate in providing advisory services, technical support and oil spill response equipment on request, and to facilitate the movement of spill response personnel and resources, and associated transport means into, through, and out of its territory. Contracting States agree to cooperate in promoting and exchanging results of research & development activity relating to oil pollution preparedness and response, and to provide mutual support in personnel training, technology transfer. Parties endeavour to conclude bilateral and multilateral agreements for oil pollution preparedness and response. IMO is called upon to provide information services; to promote education and training; to perform technical services; to facilitate the provision of technical assistance, paying particular attention to the needs of developing countries.

Collaboration between government agencies and industry groups is another area of co-operation envisaged in the OPRC Convention. To this end, IMO and the international oil and shipping industries have joined in a partnership, the Global Initiative, to promote progress in oil spill preparedness. The Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is an excellent model for the productive partnerships on a regional scale.

Oil spills in context Whilst it is true that in many developing countries there are more pressing requirements than oil spill contingency planning, there are persuasive arguments for devoting attention to developing a well-focused programme on marine pollution preparedness, particularly in high risk areas. An effective response capability will confer a quicker recovery from pollution incidents in high risk areas and where environmental degradation is significant there is a long-term economic dividend to be gained from adopting improved environmental standards and promoting sustainable development.

In a wide-ranging review of land-based activities and pollution sources affecting the quality and uses of the marine environment conducted by the United Nations Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, GESAMP identified two avenues for improving the control of accidental oil spills: risk reduction and developing spill response capabilities. In particular, it was concluded that significant gains can be made by implementing existing technologies and procedures more widely, especially in developing countries (GESAMP, 2001a).

Given the wide variety of potential impact on the marine environment, it is clear that the implications of oil spills for both risk perception and formulating policy for preparedness can be difficult to balance amongst other conflicting requirements. As a generalisation, pollutants such as oil, heavy metals, persistent organic substances and radionuclides are perceived as less significant compared with other agents of environmental deterioration, and create few long-term problems. Instead, the focus of concern is centred more on the threat of climate change and the greater effects of sewage, eutrophication, declining fish stocks, and habitat destruction. These were the conclusions reached by GESAMP (2001b).

An effective response capability will greatly help to defuse public criticism in the event of an oil spill. Conversely, as long as there is a mismatch between public perception and scientific reality regarding pollution there is a risk of political interference in decision-making. Spill response decisions should be based on a technical appreciation of the issues. Common sense suggests that activities posing the greatest risk to the environment should attract the most attention. The media, governments, special interest groups and scientific organisations have a responsibility, as well as an opportunity, to provide reliable public information and education about marine and other environmental issues, thereby enabling the public to assess the relative significance of problems and threats.

The same principles can be applied to the many interdependent issues related to the exploitation of the marine environment. Ship-source pollution is but one class of threat to the marine environment and at the site of any incident other influences from man-made activity will inevitably be present. Scientific investigation must play a central role in identifying the various different contributions to the observed environmental condition.

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