RESPONDING TO SHIP-SOURCE POLLUTION EVENTS WORLDWIDE

Example of an oiled sandy shoreline. © ITOPF.

An introduction to the International Tanker Owners Pollution Federation (ITOPF) by **Joe Lane**.

When a marine pollution event occurs, the consequences for marine life can be severe in the short term. For more than 5 decades, ITOPF (the International Tanker Owners Pollution Federation Limited) has been working to mitigate the impacts of pollution in the marine environment, providing expert technical advice and scientific guidance to those involved in response.

ITOPF was established in the wake of the *Torrey Canyon* oil spill in 1967, originally to facilitate claims and compensation for the clean-up operations and pollution damage arising from tanker spills. Since then, its remit has evolved and ITOPF now offers five key services: spill response, damage assessment and claims analysis, contingency planning and advisory work, training and education, and information services.

The company has responded to more than 850 spills in more than 100 countries, in some of the most highly biodiverse locations on the planet, including The Solomon Islands, Tristan da Cunha, Singapore, Madagascar, The Philippines, Taiwan, Indonesia, Mozambique, Angola, Madeira, Morocco, South Africa, the United States, and the Mediterranean.

Operating on a not-for-profit basis, ITOPF provides these services to its Members, Associates and their Protect and Indemnity (P&I) insurers, and other stakeholders involved in responding to incidents of ship-source pollution including national governments, intergovernmental organizations, and coastal administrations. In this position, ITOPF has worked

Above: ITOPF advising on clean-up techniques. © ITOPF.

closely throughout its history with United Nations subsidiaries such as the International Maritime Organization (IMO), the International Oil Pollution Compensation Funds (IOPC Funds), and many academic institutions, as well as holding a position as visiting professor at the World Maritime University in Malmo, Sweden.

ITOPF's Members are any ocean-going vessel classed as a tanker, including combined carriers, FPSOs (floating production storage and offloading vessels) and barges. Its Associates are non-tanker vessels or bareboat charterers, including container ships, bulk carriers, and some pleasure craft such as large yachts.

With office locations in London and Singapore, its staff total 48. Around 20 of the team respond internationally to marine pollution events, a service available 24-7 all year round. The responders are a multi-skilled, multilingual force of marine biologists, environmental scientists, chemists, geologists, and engineers who are primed to travel at a moment's notice to attend spills of any cargo, or any fuel, whenever they are needed.

When a pollution event occurs, the initial notification to ITOPF is made through its 24-7 emergency phone line. A call can come from several maritime stakeholders, including P&I insurers, shipowners, port authorities, governments, the IOPC Funds, or the IMO, or anyone who has witnessed a pollution incident.

Assessing incidents

After notification, ITOPF begins its preliminary investigation and assessment into the incident. This work covers the likely scale and extent of the pollution, the pollutant's fate and behaviour, potential environmental and economic impacts, and what the local levels of preparedness for a spill response may be. ITOPF's team has many tools at its disposal for its desktop analysis, including remote sensing imagery, using optical and radar satellite imagery and imagery from overflights by drones and piloted aircraft to determine if pollution is present and how it may be behaving.

Dependent on the initial information available on the pollutant spilled, the team will also begin mapping and modelling the substance to predict its fate and movements. It will assess where the pollution may come ashore or remain at sea, potentially dispersing or emulsifying, and what type of response effort is required to begin the clean-up and potential access requirements. When responding to oil spills, the key properties ITOPF's Technical Team look to understand in these early stages are the density, viscosity, pour point, distillation characteristics, wax, and asphaltene content.

ITOPF's extensive experience in responding to spills of many different types of substances enables its rapid understanding of what impacts there may be on the marine environment and on those associated with it.

Information is gathered on environmentally sensitive areas in the spill area such as mangroves or saltmarshes, or if there is commercial activity like fishing zones or fisheries which may be impacted.

Oil spills can cause a wide range of impacts to the marine environment, both as a result of physical smothering and ecotoxicological effects. The severity of impact typically depends on the quantity and type of oil as well as the sensitivity of the affected organisms and their habitats.

For saltmarshes, the impact of an oil spill depends on the time of year it occurs relative to periods of plant growth. Temperate or cold-region marshes are dormant during winter months, while in the Mediterranean, growth is slow during high summer temperatures. A single pollution event is unlikely to cause more than temporary effects, but longer-term damage, possibly over several years, can be inflicted by aggressive clean-up activity, such as trampling, the use of heavy equipment, or removal of contaminated substrate.

In the case of mangroves, their location leaves them highly vulnerable to ship-source pollution events and they are extremely sensitive to contamination by oil, dependent largely on the substrate in which the mangroves are growing. Typically, mangroves grow in muddy, anaerobic sediments and rely on oxygen supplied through small pores on aerial roots. Heavy oil inundation of the root systems

Manual clean-up efforts at the site of oiled mangroves. © ITOPF.

may block this oxygen supply, causing mangroves to die. However,, in open, aerated sediments the root systems draw oxygen from seawater and have a higher tolerance to smothering by oil.

While oil has historically been the primary pollutant to which ITOPF has responded, in recent years, the types of substances have diversified to include chemicals, plastics, coal, iron ore, and other cargoes.

For instances where Hazardous Noxious Substances (HNS) or plastic pellets are released, a key information requirement is what state the chemical may be in, including its method of transportation and whether its release occurred above or

Left: ITOPF on-site in the Arctic. © ITOPF.

Below: Taking oil samples on-site at an oiled shoreline. © ITOPF.

below the waterline. In the case of plastic pellets, they are extremely mobile and when released at sea can disperse across vast distances with little encouragement from meteorological and oceanographic conditions.

However, as the shipping industry sails towards decarbonization, ITOPF has kept abreast of the new developments in alternative fuels such as ammonia, methanol, and hydrogen and the potential risks and hazards associated with spills of these substances.

Sharing knowledge and improving responses

Understanding the breadth of response options available to clean up spills of pollutants enables ITOPF's team to provide the most technically sound advice to the response operations teams.

An effective clean-up operation usually includes removal of any bulk pollutants, reducing the geographical extent and duration of pollution damage, and allowing natural recovery to commence. At times, natural cleaning processes may be preferable to aggressive clean-up methods using heavy machinery and equipment.

Over the course of ITOPF's history, it has amassed over half a century of experience and knowledge which is distilled into a series of films, Technical Information Papers (TIPs), and a multitude of other papers and presentations.

The majority of its documents are available to download from its website free of charge. ITOPF also possesses one of the largest technical libraries on marine pollution in the world, primarily a source of reference for its team, but open to visitors by appointment.

It has fostered an environment for steady learning through its Research and Development Award. Continuous improvement in the understanding of the fate and effects of pollutants will lead to improvements in accepted 'best practice' for spill response and environmental monitoring.

Since the Award was established, more than £600,000 has been distributed to 13 separate research and development projects worldwide on behalf of ITOPF's shipowners and their P&I insurers.

From 2021, ITOPF made £60,000 available for short-term projects (1–2 years) and up to £40,000 for PhD projects plus a student stipend and university fees. This supports PhD or short-term projects which have the potential to lead to improvements in spill preparation and response, as well as new techniques for monitoring and restoring marine habitats. ITOPF has awarded the funding to projects covering research into plastic pellets, the behaviours of low and ultra-low sulphur fuel oils (LSFO and VLSFO), tracking of rehabilitated oiled birds, emerging risks in marine transportation, developing resources for training spill responders, and many more.

As ITOPF moves with the times and shipping's race to decarbonization, its mission statement '*To promote effective response to marine spills of oil, chemicals and other substances as a means of reducing impacts on the environment and affected communities*' could not be more relevant. As new blends and types of fuel emerge, ITOPF expertise is required by the maritime industry to understand their fate, behaviours and potential risks and hazards to the marine environment and those dependent upon it. ●

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