



PROMOTING EFFECTIVE
SPILL RESPONSE

OCEAN ORBIT

October 2019



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Members of the ITOPF team helping the fight against plastic pollution at a Great British Beach Clean event

Managing Director's review

The activities and events that are highlighted in this edition of *Ocean Orbit* serve to reinforce the important role that ITOPF has established in preparedness and response over the last 50 years. At its meeting last November, Directors confirmed that ITOPF's funding model is ideal to provide the services much sought after by industry and governments worldwide. Indeed, the not-for-profit basis upon which ITOPF operates, and the equitable sharing of operating costs across the shipping sector, ensures that ITOPF's services can be provided where they are most needed. The snapshot of our statistics on the right illustrates this point very well.

Over the last two years, the team has spent the best part of three person-years attending incidents in 20 different countries; that averages 1½ months on site for each incident. Far from ITOPF's work receding in line with the decline in major oil spills, the opposite has been true. As the case studies illustrate, many incidents present a wide array of complex issues to address; ranging from incidents in very remote locations, to the unique hazards presented by the substances spilled, and the political and social challenges that can influence a response. The infographic also shows that we have provided advice in connection with a further 46 incidents remotely. When all these cases are plotted on the world map, it shows that there are few regions

"Ensuring that we stay at the 'top of our game' for the next 50 years is our current focus and embracing new technologies needs to be a part of this."

unaffected by one or more incidents. Our funding model also allows us to contribute to enhancing preparedness for incidents in developing countries or those countries located in high-risk areas.

Plastics are ubiquitous in the environment, the vast majority of which come from land-based sources. As such, it makes sense to focus the task of reducing plastic waste at its source and making choices about how we, as consumers, contribute to this problem. The fact that much of this waste ends up in our oceans is of serious concern, as revealed by the recent BBC programme, 'Blue Planet'. Protecting the marine environment, ensuring its resources are used wisely, and cleaning up our mess should be uppermost in our minds. The article in this edition of our newsletter explains the fate and behaviour of certain plastics in the marine environment and cites a number of incidents in which ITOPF has been involved where plastics were lost. Whether we should go a step further and use our expertise to be a part of the solution to remove plastic waste from the oceans, is a thought-provoking area of discussion for the team and our Board and we'd be interested to hear your views.

Ensuring that we stay at the 'top of our game' for the next 50 years is our current focus and embracing new technologies needs to be a part of this.

Drones are changing the way in which we carry out aerial surveillance of oil spills, enabling us to gain access to remote or hazardous environments, as well as providing support to other operations

and validating data. We've included an article to highlight how drones are being used to support spill responders today and how their use may evolve to solve other associated challenges.

The value of ITOPF's technical services to our stakeholders was emphasised in the outcome of our recent stakeholder survey. I'd like to express my sincere appreciation to all those who took part across the broad spectrum of industry and government sectors we approached to assist us. Your honest feedback was overwhelmingly positive. Many of you also said that you'd like to hear more about our work and the wider range of services we offer. Consequently, during 2020 we'll be working on our next five-year strategy and intend to make communications and outreach an integral part of this plan.

We hope you enjoy this edition of *Ocean Orbit*.

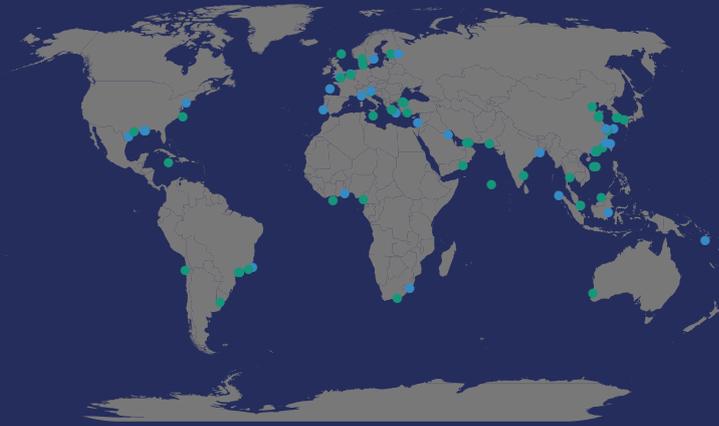


Dr Karen Purnell, ITOPF's Managing Director

Last two years

Here's a snapshot of our activities

ITOPF mobilisations



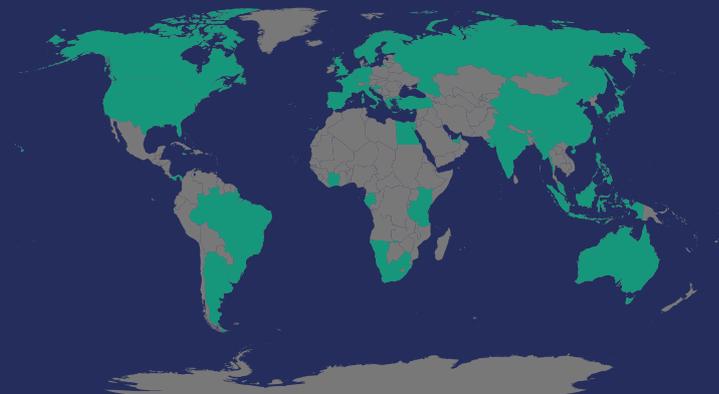
• Attended • Remote advice



1500 staff days on site



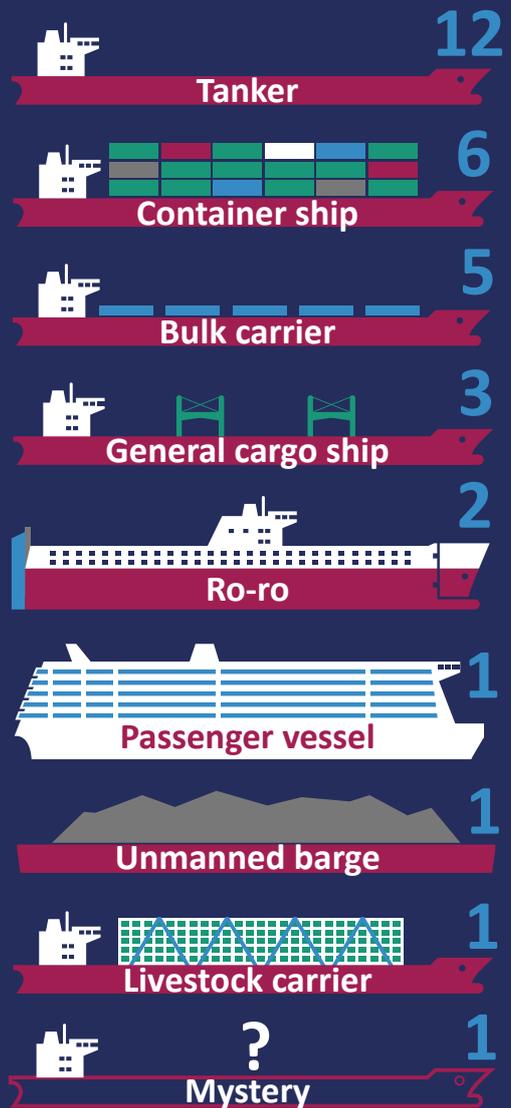
In-country preparedness activities



In partnership with:
IMO, IOPC Funds, IGP&I, IPIECA,
government agencies and industry



Incidents attended by vessel type



Incidents attended by spill type



Data from August 2017-July 2019



ITOPF in discussions with clean-up contractors, Japan

Incidents in the spotlight

ITOPF has attended on-site at 32 incidents in the last two years. Here we turn the spotlight on a cross-section of cases, highlighting some of the issues involved and our role in the response.

Major condensate spill

Incident date: 6 January 2018
Location: Off Shanghai, PR China
Vessel: Crude oil tanker
Pollutant: Condensate/IFO 380

Nature of incident: A crude oil tanker and bulk carrier were involved in a collision in the East China Sea, 150 nautical miles east of Shanghai. A fire broke out onboard the tanker which was carrying 111,388 tonnes of gas condensate (a low-density volatile liquid hydrocarbon occurring with natural gas). Due to the highly flammable nature of the cargo onboard and the logistical challenges of operations so far offshore, the fire and subsequent explosions could not be easily contained. After eight days ablaze, the vessel sank with the release of a significant quantity of condensate which continued to burn on the sea surface for about 20 hours after the sinking. It is understood that the vast majority of the cargo was consumed by the fire

and explosions. Bunker / slop oil was also released and became the focus for clean-up efforts. By 28th January 2018, oil had arrived onshore in the Ryukyu Islands chain in Japan and subsequently contaminated 26 islands in the region. The majority of these islands only sustained light shoreline contamination, mainly in the form of tar balls. For the most part, clean-up was carried out by contractors engaged by the shipowner and P&I Club, with assistance from local residents and volunteers. By June 2018, it was reported that all clean-up operations in the Ryukyu Islands had concluded to the satisfaction of local authorities.

ITOPF involvement: This is only the second condensate spill ITOPF has attended (the first occurred almost 40 years ago in Algeria) and involved 269 days on-site for five members of the technical team on rotation. We worked closely with the Japanese authorities, providing advice on a range of technical aspects, including the risks and likely behaviour of the condensate cargo and appropriate pollution response

strategies. Whilst on-site in Japan for the bunker spill, we carried out aerial surveillance and extensive shoreline surveys, producing shoreline response plans with recommendations on clean-up techniques and endpoints, as well as advising on safety aspects and general resource requirements for each site. We also advised the P&I Club on the threat of pollution posed by the sunken wreck and provided technical assessments of claims for compensation from clean-up contractors involved in the operations in Japan.

Two Mississippi River spills

Incident date: 12 April 2018 / 22 April 2018
Location: Mississippi River, New Orleans, USA
Vessel: General cargo vessel / Oil/chemical tanker
Pollutant: High sulphur fuel oil / IFO 380

Nature of incidents: Two spills occurred on the Mississippi River within a fortnight of each other in April 2018. The first involved a general cargo vessel which allided with a pier at the Nashville wharf in New Orleans, causing damage to its side shell plating. A fuel tank was punctured, resulting in a spill of approximately 7.5 m³ of high sulphur fuel oil. Oil impacted the banks of the river, with the heaviest oiling covering a two mile stretch of high amenity value man-made shoreline along the downtown New Orleans riverfront. A command centre was set up with Unified Command representatives from the United States Coast Guard, Louisiana Oil Spill Coordinator's Office and the shipowner's spill management team. Clean-up included the removal of significant quantities of oiled debris and the recovery of oil flushed from rip-rap. New Orleans hosted several festivals during the course of the response, and a Natural Resource Damage Assessment was initiated to investigate the loss of recreational use caused by the spill.

Whilst the response to this incident was ongoing, ITOPF was notified of a second spill of heavy fuel oil further upriver,

which occurred during deballasting operations involving an oil/chemical tanker. Approximately 5.3 m³ of oil was lost to the river which contaminated just over a mile of shoreline. In addition to man-made shorelines (concrete levee walls and terminal structures), oil was found within the batture, a vegetated area between the main river channel and the levee, that was submerged by high water at the time of the incident. Within a week, the river had dropped sufficiently to allow access to cut the oiled vegetation in some of the affected batture. Clean-up was signed off as completed by the end of June.

ITOPF involvement: During the first incident, ITOPF worked predominantly with the Environment Unit within the Planning Section of the Incident Command System, providing advice on shoreline surveys, sunken oil risks, and appropriate clean-up techniques and endpoints. For the second case ITOPF's main role was conducting SCAT surveys with Unified Command representatives, as well as providing advice to the Environment Unit regarding appropriate clean-up techniques and endpoints.



Rehabilitation of oiled swans, Netherlands

Bunker spill in port

Incident date: 23 June 2018

Location: Rotterdam, Netherlands

Vessel: Product tanker

Pollutant: RMG 380

Nature of incident: A product tanker in ballast made contact with a jetty and spilled approximately 217 tonnes of bunker fuel whilst berthing at the Port of Rotterdam. The released oil contaminated structures in the port, including the quay, jetty, rock revetment and fenders. In addition, over 100 vessels at the terminal were affected, mostly along the waterline, including ocean-going vessels and inland barges. A small amount of oil and oiled debris escaped from the terminal and caused limited contamination along the riverbanks of Nieuwe Maas. Skimming operations were undertaken by the local contractor within the port during the initial stages of the response. Boat-cleaning stations were set up inside the terminal to carry out high pressure washing of the oiled vessels and ensure minimal disruption to port activities. The waterways are under the jurisdiction of Rijkswaterstaat (Netherlands Ministry of Infrastructure and Water Management), who also instructed its own contractors to assist with the at-sea response and shoreline clean-up. Approximately 500 oiled swans were captured and rehabilitated at a temporary facility. Most of the swans were released within a month of the incident.



Above: collection of oiled debris using scoops/nets; below: manual cleaning of oiled vegetation, USA



ITOPF involvement: Four members of the technical team spent several weeks on site. Our role included providing recommendations on clean-up activities and appropriate end-points to the P&I Club, authorities and contractor.



Mechanically assisted clean-up of coal in a lagoon, Indonesia

Coal barge grounding

Incident date: 29 July 2018
Location: Banda Aceh, Indonesia
Vessel: Unmotorised barge
Pollutant: Coal

Nature of incident: An unmanned barge, carrying approximately 7,200 MT of coal, ran aground in bad weather whilst under tow near a cement plant at Lhoknga, Banda Aceh, Indonesia. The barge drifted inshore and was pushed along a reef crest by strong wave action, subsequently breaking in two. The majority of the cargo was spilt, washing up on the shores of nearby villages. Some coal also remained at sea. ITOPF assessed the degree and extent of contamination and developed a clean-up plan to avoid further damaging areas of coral reef in the affected area. This was presented to, and approved by, local authorities and then implemented by the barge owners using a local spill contractor. The coal was collected by a combination of mechanical and manual means, largely using a local workforce. Waste storage areas were identified within the cement plant with a view to reusing the coal within the plant's generator. An environmental monitoring programme was undertaken to assess the level of damage caused by the grounding and ship's cargo.

ITOPF involvement: Whilst on site, ITOPF assisted by identifying the affected areas and ecosystems to clarify the job scope for contractors, and then liaised with local government and community to highlight operational considerations for the correspondents and P&I Club. Advice was also provided on environmental monitoring protocols including several discussions in Jakarta regarding the leachate potential of the coal in the marine environment.

Oiling of French Riviera

Incident date: 7 October 2018
Location: Off Corsica, France
Vessel: Container vessel
Pollutant: MFO 380

Nature of incident: Two vessels collided off the northern tip of Corsica, with an



At-sea response efforts, France

estimated loss of 500-600 tonnes of heavy fuel oil from the container vessel. The French authorities coordinated the at-sea response effort with up to 34 vessels and 11 aircraft involved in the response from both France and Italy. The interregional plan RAMOGEPOL was activated between France, Monaco and Italy and an EMSA anti-pollution vessel was also contracted. The at sea-response lasted for 24 days but was impeded by continuous bad weather, as well as the weathering of the oil. The first sightings of shoreline contamination were reported on the French Riviera nine days after the collision. By November, around 372 km of coastline had been contaminated to varying degrees. Clean-up ranged from manual bulk removal to mechanical high-pressure cleaning of a variety of substrates and was completed successfully by the end of April 2019. The main challenges to the operation were accessibility (helicopters were needed to drop off equipment or remove waste in places), and the natural abundance of driftwood and seagrass in these areas, which became oiled and involved major sorting and recycling operations.

ITOPF involvement: ITOPF was integrated into the command centre and for 26 weeks provided advice to all parties on

both the at-sea and shoreline response operation. This included providing drift forecast models using in-house satellite imaging analysis and daily aerial observations. The team undertook surveys of the impacted shorelines and mapped the extent of contamination; gave recommendations on the clean-up strategy and prioritisation and segregation of waste; and oversaw the response undertaken by the contractor appointed by the P&I Club. We also liaised with the authorities to ensure agreement on endpoints and provided technical support and guidance to the Claims Submission Office.

Remote location

Incident date: 5 February 2019

Location: Rennell Island, Solomon Islands

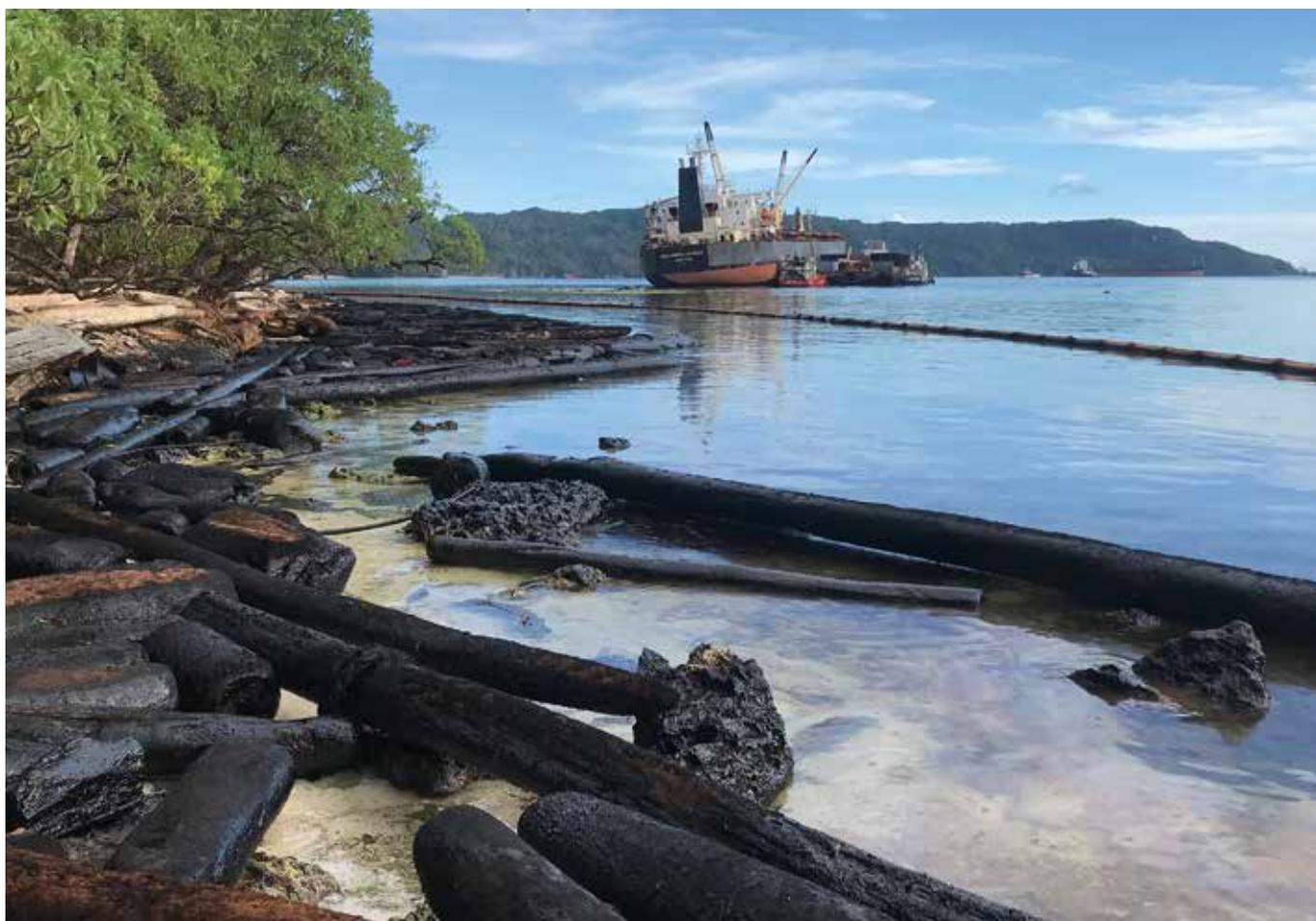
Vessel: Bulk carrier

Pollutant: IFO 380

Nature of incident: A general cargo vessel carrying bauxite ore ran aground during poor weather off Rennell Island, Solomon Islands. Rennell Island, measuring approximately 85 km x 15 km, is the largest raised coral atoll in the world and encompasses a UNESCO World Heritage Site. The incident resulted in a spill of

IFO 380 which impacted approximately 5 km of shoreline to varying degrees. This included an estimated 600 oiled cut logs (up to 20 m long) that were pushed ashore and subsequently hampered the clean-up operation. The Australian Maritime Safety Authority (AMSA) was mobilised under the PACPLAN (Pacific Islands Regional Marine Spill Contingency Plan) to provide direct advice and assistance to the Solomon Islands government. The incident's remote location created significant challenges for the response effort, creating delays with the mobilisation of personnel and equipment. Issues included: limited communications on-site; no running water, limited electricity; and limited housing for external contractors. Lack of an in-situ workforce, tribal divisions and political tensions added a further layer of complexity. Clean-up operations were completed in July 2019, following a joint survey with the authorities.

ITOPF involvement: ITOPF spent 120 days embedded within the response operations working to provide technical recommendations for clean-up, waste disposal and environmental damage investigations and acting as a liaison between the P&I insurer and government interests.



Oiled logs on the shoreline near the grounding site, Solomon Islands



How to report a spill

To report a spill of oil, chemicals or other substance, please call us on the numbers below for advice and/or to mobilise us to site. Please do **not** rely on notifications of emergencies to ITOPF by email.

**9 AM – 5 PM
(UK BUSINESS HOURS)
+44 (0) 20 7566 6999**

This is our office number.
Please ask to speak to a member
of the technical team.

**OUTSIDE UK BUSINESS HOURS
(spill emergencies only)
+44 (0) 20 7566 6998**

Your call will be forwarded
to the member of the
technical team on duty.

It will be helpful to have as much of the following information as possible:

IMPORTANT INFORMATION

- Contact details of the person reporting the incident
- Name of vessel and owner
- Date and time of the incident (specifying local time or GMT/UTC)
- Position (e.g. latitude and longitude or distance and direction from the nearest port or landmark)
- Cause of the incident (e.g. collision, grounding, explosion, fire, etc) and nature of damage
- Description and quantity of cargo and bunker fuel on board
- Estimate of the quantity spilled or likelihood of spillage
- Name of the cargo owner
- Action, both taken and intended (and by whom), to combat pollution
- Status of the vessel and any planned salvage activities

ADDITIONAL USEFUL INFORMATION

- Weather and sea conditions, wind speed and direction
- Length, breadth and appearance of any slicks or plumes, including direction of movement
- Type of resources that may be at risk (e.g. fisheries or residential areas)
- Distribution of cargo and bunkers and location relative to damage

HNS Chemicals

- State – solid, liquid, gas, bulk, packaged
- UN or CAS number, MSDS, cargo manifest

Oil

- Density, viscosity, pour point, distillation characteristics, wax & asphaltene content (or bunkering certificate)

Strengthening spill preparedness

Against a background of reducing oil spills from tankers, maintaining adequate preparedness and response levels can be a challenge. ITOPF is ready and available to assist governments and industry with their spill arrangements through our core service of contingency planning and advisory work.

Western Mediterranean

In 2018, we were part of a successful bid made by REMPEC (the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea) for European Union money to assist in strengthening collaboration in combating oil and chemical pollution in the western Mediterranean.



This two-year project, known as WestMOPoCo, (Western Mediterranean Region Marine Oil & HNS Pollution Cooperation Project) was launched in January 2019. Coordinated by the French General Secretariat for the Sea, it involves seven countries: Algeria, France, Italy, Malta, Morocco, Spain and Tunisia, and is supported by three Secretariats (REMPEC, the OSPAR/Bonn Agreement and HELCOM) and three other organisations (CEDRE, ISPRA and ITOPF).

ITOPF's involvement includes assisting with updating decision support

tools, including a new HNS response manual, reviewing national contingency plans, and providing training to enhance cooperation and preparedness within the region. The project will be completed by December 2020.

Africa

ITOPF has supported a number of contingency planning projects in Africa recently. In February 2019, we reviewed the National Oil Spill Contingency Plan of Uganda, at the request of the Global Initiative for West, Central and Southern Africa (GI-WACAF), one of a series of programmes led by IMO and IPIECA to help build national structures and capability for oil spill preparedness and response worldwide. In June 2019, we attended an exercise in Côte d'Ivoire supported by GI-WACAF and hosted by the Ministry of Environment and Sustainable Development and CIAPOL (Centre Ivoirien Antipollution) to test their national contingency plan. Whilst there, we provided training to government authorities on shoreline response. In May 2019, we were invited to support a workshop in Kenya aimed at improving operational aspects for national contingency planning. This was organised by the government of Norway's Oil for Development (OfD) programme, in conjunction with IMO and UNEP, and attended by representatives of national and local government from Kenya, Uganda, Tanzania, Zanzibar, Mozambique, Lebanon and Iraq. Each country left with an action plan of tasks required to further their contingency planning.

Brazil

Brazil is currently one of ITOPF's priority geographic areas where we have been

proactively engaging with the authorities and industry on preparedness, response and compensation related matters over the last few years. In October 2018, we were invited to deliver a seminar and workshop in Rio de Janeiro organised by the Brazilian Navy, IBAMA (Ministry of Environment) and ANP (National Petroleum Agency), which focused on contingency planning and environmental damage and monitoring. In December, we attended an exercise conducted by Petrobras and, looking ahead, have been invited by IBAMA to support the organisation and delivery of an oil spill exercise focused on spill response in the Amazon basin. Feedback from all parties has been positive and awareness of ITOPF's technical services in Brazil continues to rise.

UK

In 2018 we provided comments on a draft UK National Standard for Marine Oil Spill Response Providers, produced by the UK Maritime & Coastguard Agency and the Department for Business, Energy & Industrial Strategy. The Standard, which takes effect in September 2019, aims to ensure that contractors responding in UK waters are sufficiently competent to undertake the range of tasks commonly encountered during an incident.

These are just a small sample of some of the contingency planning and advisory assignments we have undertaken over the past two years. These activities help us develop lasting relationships with government agencies, maritime organisations and the shipping and oil industries. If you are considering undertaking drills, exercises, seminars or workshops, feel free to contact us if you would like us to participate or think we can help with your planning.



CIAPOL exercise, Côte d'Ivoire



Contingency planning workshop, Kenya



Seminar for the Brazilian government

Seven ways UAVs have impacted spill response



Validate trajectory maps:

Frequent observations from UAV footage help to validate trajectory maps and ensure that computer models are doing a good job. With more precise and frequent inputs of an oil slick's position and conditions, trajectory maps can have better accuracy and therefore benefit response planning.

Unmanned Aerial Vehicles (UAVs), also referred to as drones, are now very much the norm across a wide range of sectors, including the world of marine pollution response. Here, their use can overcome some of the limitations encountered by other means of aerial and in situ observations in the aftermath of a spill. UAVs are made up of either fixed wing or rotary wing configurations of varying capability, complexity and expense. In most cases, fixed wing UAVs can fly longer distances, can carry a heavier payload and usually come at a higher cost than rotary wing. Hence, rotary wing UAVs are much more accessible to small companies and the public. So how are UAVs used in spill response? Here are ITOPF's observations from site.



Media: Journalists use UAVs to capture good quality aerial footage without the need to get in a helicopter. Footage posted by government agencies or oil spill response contractors on their websites has also been used by media companies and shared across social media accounts.



Inspect vessel hulls:

UAVs are used by contractors to quickly examine and document the condition of hulls which may have been contaminated when a spill occurs in an area with high vessel traffic, such as near a port. This facilitates rapid cleaning and minimises delays. Later, this evidence may be used to support hull cleaning claims.





Shoreline surveying:

Oil spill response contractors use UAV footage, either taken by themselves or through a UAV specialist, to enable shoreline monitoring and assessment to be performed quickly, with photographic and video evidence. UAVs have proved to be highly versatile and are used along different types of coastlines to perform prompt preliminary survey assessments and recurrent monitoring.

Aerial surveillance: Visual observation of floating oil from the air is the simplest method of determining the location and scale of an oil spill. UAVs are becoming a popular tool to replace some of the overflights undertaken by aircraft and increasing the number of overflights made. One important reason for this is safety. ITOPF has seen them used in hard to access areas that might have presented significant risks for personnel if undertaken from a helicopter.

Guide response efforts and examine equipment:

Rotary wing UAVs can be used for near-shore waters and the open sea to guide response vessels towards concentrations of oil and to assist with equipment deployment, such as boom. They can also quickly and easily examine the condition and efficiency of response equipment whilst in use.

Assist salvage operations:

UAVs are used by salvors to gain valuable information on wrecks. With the ability to get up close to the casualty and quickly inspect the surrounding area, they have sometimes proved to be more valuable than a helicopter.

UAVs are also being tested for many other uses in pollution response, from carrying an ignitor for in-situ burning of oil, to searching for oiled wildlife. Do you have ideas as to how UAVs could be effective in spill response? Have you observed any not listed in this article? Send us a message with your thoughts and observations to susannahdomaille@itopf.org.



Plastics in the marine environment

While spills of oil, carried as cargoes or bunkers, remain the most common call-outs for ITOFF, we also provide advice on spills of other substances transported by sea. This includes the vast range of raw and manufactured goods and products carried on board containerships. From packaged chemicals and foodstuffs to home electronics and textiles, containerised goods are highly diverse in their nature, but most contain some form of plastic – either as parts of the cargo itself or as a means of packaging. This article highlights some of the issues associated with plastic pollution caused by lost containers, in the context of the global challenge associated with marine litter.

Global concern

Concerns about the risks associated with plastics in the ocean have eclipsed other environmental issues recently, with heightened awareness and understanding of the potential impacts of marine litter on the marine ecosystem. There is currently no consensus about the

global volume of plastic pollution present in the marine environment or its annual influx – but it has been estimated that more than 150 million tonnes of plastics have accumulated in the world's oceans, while 8 – 12.7 million tonnes are added annually². Shipping incidents are only one of many contributors to the global problem of marine litter.

It is estimated that 80% of marine litter originates from land-based sources, and of the 20% associated with marine activities, the majority is attributed to discarded or lost fishing gear.³

What is marine litter?

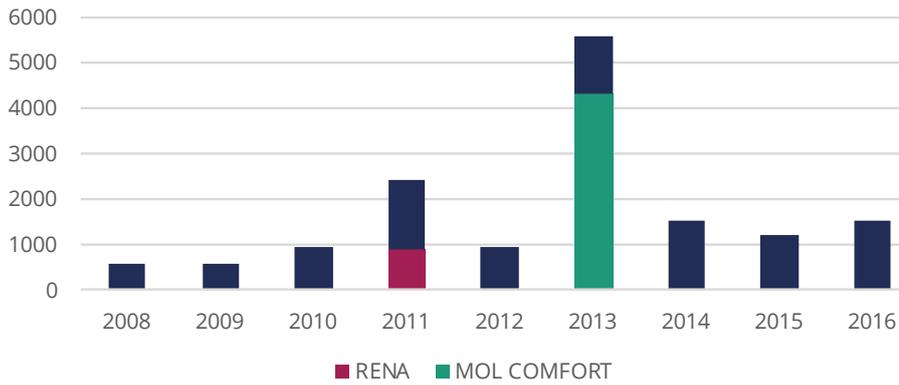
Marine litter is defined by the United Nations Environment Programme as “any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. It consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores”.¹

¹ UNEP, 2009. *Marine Litter: A Global Challenge*. Nairobi: UNEP. 232 pp.

² Figures calculated for 2010 from Jambeck, J.R., Geyer, R., Wilcox, C., Siegler, T.R., Perryman, M., Andrady, A., Narayan, R. and Law, K.L., 2015. Plastic waste inputs from land into the ocean. *Science*, 347(6223), pp.768-771.

³ Li, W. C., Tse, H. F., & Fok, L., 2016. Plastic waste in the marine environment: A review of sources, occurrence and effects. *Science of the Total Environment*, 566, 333-349

Number of containers lost at sea 2008 - 2016



(Data from World Shipping Council, WSC, 2017)

Lost containers

The world containership fleet stood at 5,202 ships in 2017⁴, with the largest vessels carrying upwards of 23,000 containers. According to estimates from the World Shipping Council (WSC), an average of 1,582 containers were lost annually between 2008 and 2016⁵. This is based on a survey of WSC member companies and includes major incidents such as the loss of the MOL COMFORT in the Indian Ocean in 2013 (4293 containers) and the M/V RENA in New Zealand in 2011 (approximately 900 containers). Given that the global containership fleet in 2017 had the capacity to carry almost 22 million standard containers⁶, this figure is

remarkably and encouragingly small. It is worth noting, however, that there are currently no formal or compulsory international reporting procedures in place, so an official assessment of the number of containers lost at sea is unavailable. This matter is now being addressed by IMO and is discussed later.

Plastics

Plastics are a type of synthetic organic polymer consisting of long, chain-like molecules with a high average molecular weight. Most common classes of plastics are composed of hydrocarbons that are typically derived from fossil fuels. A wide variety of additives (such as fillers,

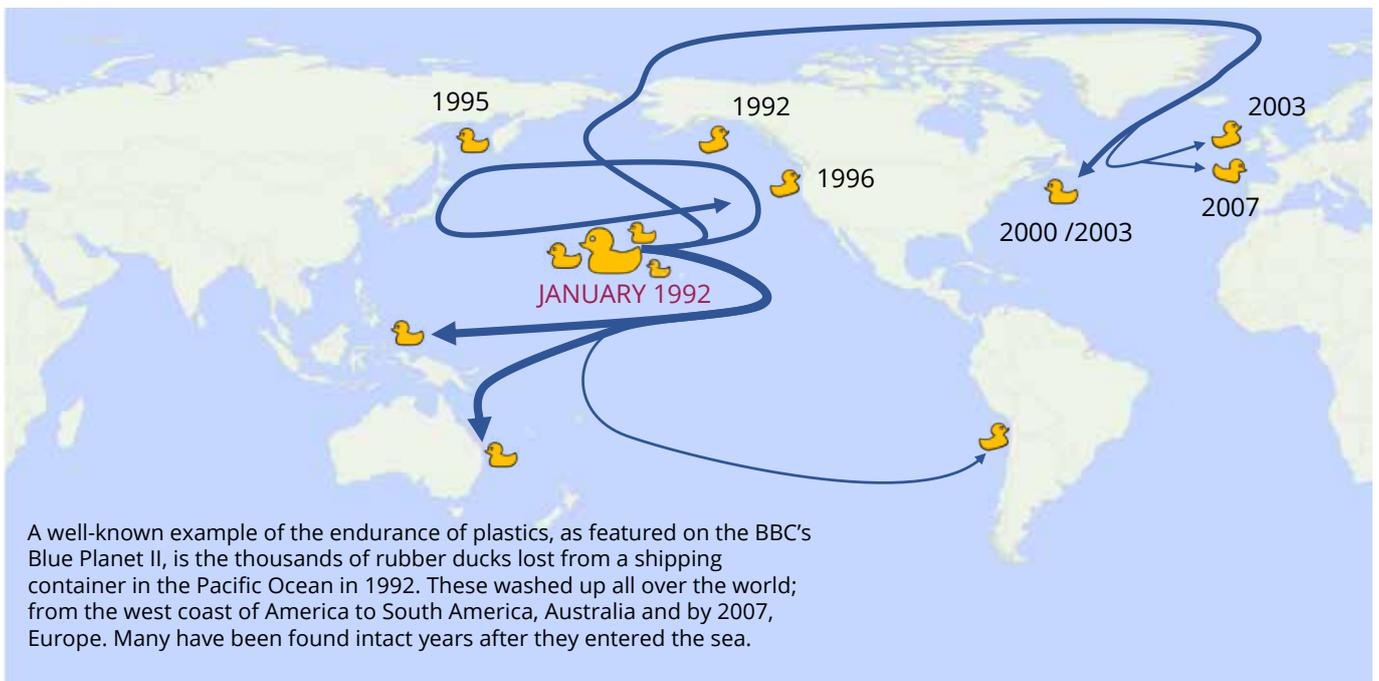
plasticisers, flame retardants, UV / thermal stabilisers and colouring agents) may be used to enhance the performance and appearance of the plastic. The result is a class of materials that have highly versatile and desirable properties and can take many shapes and forms, which is why plastic has become so ubiquitous in our everyday lives.

Persistence

Research indicates that plastic items introduced into the marine environment have the capacity to persist for many years (up to hundreds). They are readily dispersed by water and wind and can therefore be carried over long distances.

The fate and behaviour of plastics lost at sea varies: whereas polypropylene (PP, i.e. bottle caps) and polyethylene (PE, i.e. plastic bags) tend to float, polyvinyl chloride (PVC, i.e. plastic film), polyethylene terephthalate (PET, i.e. soft drink bottles) and polyester resin (textiles) tend to sink⁷.

Over time, plastic fractures and fragments into smaller pieces, the timescale depending on environmental factors such as light exposure, oxygen concentration, temperature and biofouling⁸. The size of the plastic items will affect the likely consequences for animals exposed to marine litter. These can include entanglement, leading to injury, trapping or smothering; and consumption, causing physical injury,



⁴ Equasis (2018) The world merchant fleet in 2017

⁵ World Shipping Council, 2017. Containers lost at sea. http://www.worldshipping.org/industry-issues/safety/Containers_Lost_at_Sea_-_2017_Update_FINAL_July_10.pdf

⁶ UNCTAD, 2018. Review of maritime transport 2018. https://unctad.org/en/PublicationChapters/rmt2018ch2_en.pdf

⁷ GESAMP, Kershaw, P.J. and Rochman, C.M., 2015. Sources, fate and effects of microplastics in the marine environment: part 2 of a global assessment. Reports and studies-IMO/FAO/Unesco-IOC/WMO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) eng no. 93.

⁸ Jambeck, J.R., Geyer, R., Wilcox, C., Siegler, T.R., Perryman, M., Andrady, A., Narayan, R. and Law, K.L., 2015. Plastic waste inputs from land into the ocean. Science, 347(6223), pp.768-771.



Manual collection and segregation of container contents, including sweet wrappers, battery cases and aerosols on Mykonos, Greece



Nurdles can spread over vast distances and are difficult to recover from the shore

Response challenges

Trajectory	Plastics travel over long distances. Modelling their drift trajectory is difficult as they can be carried hundreds of miles and then remobilise.
Fate	Most plastics are made to last and degrade slowly in the marine environment.
Response	The recovery of containers is challenging in itself. For breached containers, the sheer amount and variety of material to recover typically requires a lengthy response and predominantly manual labour.
Endpoints	Endpoints are very difficult to establish, particularly in polluted areas where container contents may be difficult to distinguish from background levels of contamination.

obstruction of the gut and accumulation of indigestible material; all of which can be fatal.

In addition, there can be a chemical hazard associated with plastics, since they tend to accumulate, harbour or absorb persistent, bioaccumulative and toxic substances and microorganisms. The transfer of chemicals from plastics to animal / human tissue through the food chain remains a topic of research.

ITOPF experiences

ITOPF has attended a number of incidents involving plastics over the last decade. These include several tonnes of

nurdles (small plastic pellets) distributed over South African shores, used tyres on the French coast and heavily oiled waste plastic stranded in mangroves in India. With plastics, the challenges are linked to the often unpredictable trajectory of individual items, their long-lasting existence, lengthy response (often manual) and the difficulty of establishing endpoints. The added complication of the plastics interacting with numerous other substances potentially lost from containership incidents, including dangerous goods or oil from the casualty's fuel tanks, present an additional set of considerations and challenges.



Oil contaminated plastic entangled in mangroves will need to be removed manually



Great British beach clean-up

On a local level, the ITOPF team joined other volunteers picking up litter along the Essex coast on 20th September 2019 as part of the Great British Beach Clean. This annual event is organised by the Marine Conservation Society to help tackle plastic pollution and record information about the most common types of rubbish found on UK beaches.



Outlook

In 2018 IMO's Marine Environment Protection Committee (MEPC) adopted an Action Plan to address marine plastic litter from ships, which aims to enhance existing regulations and introduce new supporting measures to reduce plastic litter in the marine environment. This includes a proposed study to improve understanding of the contribution of ships to this issue; consideration of the establishment of a compulsory mechanism to declare the loss of containers and identify the number of losses; and ways to communicate the location of containers lost overboard.

From ITOPF's perspective, we will continue to respond to incidents involving plastics where requested and build on the knowledge and expertise we have gained, through research and first-hand experience, towards a greater appreciation of the fate and effects of plastics in the marine environment and appropriate response techniques.

ITOPF news

Celebrating 50 years



Our 50th anniversary gala dinner

2018 marked ITOPF's 50th anniversary and we celebrated with a gala dinner in the City of London. Staff and directors, past and present, were joined by many friends and partners from government and industry to mark this important milestone.

At the dinner, ITOPF's Chairman, Paddy Rodgers, then CEO of Euronav,



ITOPF staff at the anniversary dinner

praised the commitment of shipowners and their insurers in supporting ITOPF far beyond its original administrative remit to become what it is today – the world's most respected authority on the fate and effects of oil spills from ships, available to attend on-site at incidents 24/7, 365 days a year.

To coincide with our 50th anniversary celebrations, ITOPF launched a new logo and officially dropped the full version of its name. Established as the International Tanker Owners Pollution Federation Limited, ITOPF has already been known by its acronym for many years and on 12th July 2018 its name was officially changed to ITOPF Limited.

ITOPF's website and email addresses have also changed from .com to .org (www.itopf.org and central@itopf.org / firstname.lastname@itopf.org) to reflect our not-for-profit status.



ITOPF was delighted to have been awarded a certificate of special recognition for its work supporting the objectives of the International Maritime Organization (IMO). The certificate, endorsed by the IMO Council, was presented to Dr Karen Purnell by Secretary-General Mr Kitack Lim at the IMO Awards Ceremony on 6th December 2018, during the 100th session of the Maritime Safety Committee.

(Photo courtesy of IMO)



ITOPF was voted winner at the Lloyd's List Global Awards ceremony in the category for best Environmental Programme. This award honours the institution, company or individual that has done the most to reduce pollution of the marine environment from maritime sources.

Karen Purnell and Richard Johnson are pictured with Lloyd's List reporter Anastassios Adamopoulos and event host, comedian Jon Culshaw, at the London Hilton Hotel, Park Lane on 11th December 2018.

Anniversary publication

ITOPF was created on Christmas Eve 1968, in the wake of the TORREY CANYON incident, to administer TOVALOP, a voluntary oil spill compensation scheme. The history of ITOPF's development into the leading and trusted provider of technical advice on ship-source spills worldwide is charted in our anniversary publication which is freely available on our website: http://www.itopf.org/fileadmin/data/Documents/Company_Lit/LR.ITOPF_Anniversary_Brochure.pdf.



ITOPF R&D Award

Study on low sulphur fuel oils

ITOPF's 8th annual R&D Award is funding a project on the characterisation of low sulphur fuel oils (LSFO).

As widely reported, the global cap on sulphur content in fuel oil for general shipping will reduce from 3.50% to 0.50% from 1st January 2020. There is an even stricter limit of 0.10% already in effect in emission control areas (ECAs) established by IMO in the Baltic Sea, North Sea, North American area and United States Caribbean Sea area.

The sulphur cap is part of IMO's response to heightening environmental concerns on the harmful impact of shipping emissions. Sulphur oxides (SO_x) are linked to respiratory symptoms and lung disease in humans. In the atmosphere, SO_x can lead to acid rain, which can harm crops, forests and aquatic species, and contributes to the acidification of the oceans¹.

For the 70,000 ships² which will be affected by this regulation, one option

is to switch from traditional 'bunker' fuel (heavy or intermediate fuel oils) to a lower sulphur fuel, such as marine gas oil (MGO) or a new type of residual fuel known as low sulphur fuel oil (LSFO).

LSFOs are new to the bunker market and there is, understandably, a lack of knowledge and experience about their potential fate and effects in the marine environment. Through its annual R&D Award, ITOPF will be supporting the research organisation, SINTEF, based in Norway, on a project to document the weathering properties and behaviour of LSFOs when spilled at sea, with relevance to the mitigation effectiveness of different oil spill response options. The project is also funded by the Canadian government 'Multi-partner Oil Spill Research Initiative program' (MPRI) and the Norwegian Coastal Administration (NCA). Findings from this important and timely study will be made available on our website next year.

New brochure

In January 2019, ITOPF published an updated and rebranded version of its Technical Services Brochure. This provides an introduction to ITOPF and the services we provide. The brochure has been translated into French, Mandarin and Spanish, and Portuguese and Japanese versions are currently in the pipeline.

Hard copies of the brochures are available free of charge from Terry Goodchild; electronic copies can be downloaded from <http://www.itopf.org/knowledge-resources/documents-guides/document/itopf-technical-services-brochure/>.



¹ <http://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx>
² <https://www.dnvgl.com/maritime/publications/global-sulphur-cap-2020.html>

Chemical vs natural dispersion

The 7th annual R&D Award was granted to ExpOS'd (Experimental Oil Spill Data-sharing), a research project led by the NHL Stenden University of Applied Sciences (Netherlands), in partnership with the Royal Netherlands Institute for Sea Research, the University of Essex (UK) and the Wageningen University & Research (Netherlands).

The Award is being used to fund a one-year study to investigate the fate and behaviour of an oil slick subject to different dispersion mechanisms. The results will be used to validate and calibrate a dispersion model to allow decision makers to compare the benefits of chemical versus natural dispersion.

ITOPF was invited to participate as an observer of the experimental oil spill at the core of the project. After two aborted attempts due to weather conditions, the experiment was successfully completed in the North Sea in April 2019. Further updates on this project will be available on our website in due course.

Information on the ITOPF R&D Award, including updates on previous award winners, can be found on our website: <http://www.itopf.org/in-action/r-d-award/>.

The deadline for applications for the 2020 ITOPF R&D Award is 30th November 2019. Potential candidates should not hesitate to contact us if they have any questions regarding the Award by emailing rdaward@itopf.org.



ITOPF Seminar

Following our Board meeting last year, ITOPF delivered a half day seminar on 'Ship-source spills – it's not just about oil' in London to an 80 strong audience from the P&I Clubs, governmental and non-governmental organisations and our Board of Directors. The event provided an opportunity to share some of our recent case histories, with a focus on marine pollutants other than the usual crude and heavy fuel oils that our technical team are typically faced with. Copies of the presentations are available on our website. The reception that followed the seminar provided an excellent opportunity for us to meet and network with some of our many colleagues within the industry.

Meet the team

2019 marks milestone anniversaries for some of the team at ITOPF. Our Managing Director and Technical Director both celebrate 25 years' service, and our Technical Team Manager for the Asia-Pacific region has served for 15 years. Here they share their thoughts about their time at ITOPF.

25 years at ITOPF



Karen Purnell
Managing Director

Joined as the first female
Technical Adviser in
December 1994



What made you join ITOPF: A job that combined my love of the sea, my interest in the marine environment and law, and allowed me to put my chemistry knowledge to practical use in such a fascinating industry and for such a worthwhile aim, was an opportunity too good to miss.

How has ITOPF changed: In terms of the team, we've grown, become more diverse and younger which, in itself, opens up new possibilities and new team dynamics. I've seen a change towards greater ITOPF involvement in the complexities arising from an incident, especially environmental issues and those associated with spills of different cargoes, not just oil. This means that time spent on clean-up issues might sometimes be less than it was 25 years ago, but our involvement overall might now extend for much longer. I've also seen greater interest in being prepared for incidents, which has led to a growing demand for ITOPF's educational services, particularly as our team can speak with the benefit of practical, on-site experience.

Typical Day: This begins and ends with my commute to the office by catching up on e-mails and reading reports etc. in my 'in-tray' and, occasionally, I have the luxury of 'thinking time'. I like to wander through the office when I get in to say 'hi' to the team and catch up with those who've been 'on mission'. Then, Jo (PA) and I will discuss my plan for the day; meetings, obligations, reporting etc. and decide what I need to have to complete these things, as well as what other things are on the horizon. Much of my work now (as opposed to when I was in the Technical Team) is centred around engaging with our Directors and our other stakeholders, company governance, planning and reporting. Occasionally, I dip into the technical arena, especially if input is needed in connection with a difficult case or on chemical spills.

Best bits: I'm fortunate in that my work is quite varied and I can be juggling a multitude of different tasks in any one day, which keeps me stimulated. I get most satisfaction exploring ways in which we can stay at the 'top of our game', and I get inspiration from the ideas and enthusiasm coming from the team, as well as the challenges associated with our work. I particularly enjoyed the preparation and celebration of our 50th Anniversary last year.

Worst bits: Being a small company, the number of tasks that I need to juggle at any one time can mean that I don't get out and about to see our shipowners, P&I insurers and governments as much as I'd like to. It can also mean that I miss out on some social time with the team. E-mail management is a perpetual 'headache', but Jo now helps me with this!

25 years at ITOPF



Richard Johnson
Technical Director

Joined as Technical Adviser
in December 1994



What made you join ITOPF: I'm a marine biologist. I enjoy travelling. I have an environmental conscience. The opportunity was too good to miss! In fairness, at that time it was the pull of working in marine pollution rather than being aware of ITOPF and the good work that it does. It was answering a New Scientist advertisement, not following a carefully crafted path. Strangely, my school career's adviser in the West Midlands never mentioned ITOPF!

How has ITOPF changed: Sir Alex Ferguson has often been acclaimed for not just building one Premiership winning team but for building and rebuilding several successful teams over the years. ITOPF's 50 years has certainly seen different personnel in different positions over the generations and it's a pleasure to see that the organisation continues to thrive in providing quality knowledge and service at times when it is most needed. The characters change but our basic tenet and core values haven't, and it's good to know that we remain well regarded in many quarters. The pollution types we deal with have certainly expanded over the years and technology has moved on too; we had a pool Nokia mobile phone when I joined, and a dusty telex machine and faxes, no emails. The use of GPS and GIS mapping and satellite imagery in pollution response has come on leaps and bounds in quarter of a century too.

Typical Day: It starts with a bike ride. After that I haven't got a typical day as such. I am responsible for overseeing our Technical Services and helping to coordinate our operations, but, whilst I am available 24/7 for our mobilisations, it isn't me that is travelling to site anymore. We have a small but high calibre and dedicated team who punch above our weight but there is a balance to be struck and spinning the plates or fitting the pieces of the jigsaw together is all in a day's work.

Best bits: The technical aspects of the job, problem solving and working with the team are the best bits. It's great also watching new colleagues evolve into their careers and flourish. The work at ITOPF can be very rewarding when our input is valued and recognised, and it influences things for the good. I do of course still love getting out and about and working with key partners and colleagues who I have known for many years or meeting new people with new ideas in new fields.

Worst bits: A bit more breathing space would be good, but doesn't everyone say that? There are the usual frustrations of course, when we have not been able to influence things as we would have liked, and the grass is definitely always greener. When I was travelling all the time I sought respite, and when I am tied to the desk I want more travel!

15 years at ITOPF



Alex Hunt
Technical Team
Manager

Joined as Technical Adviser
in February 2004



What made you join ITOPF: When Richard Johnson gave a series of talks on oil spill response at my university 17 years ago, I thought 'I fancy that job!'. The Technical Adviser role seemed to offer everything I wanted at the time. I had the opportunity to put my marine science background and practical experience of habitat damage assessment and coastal management to good use while helping people to manage emergencies affecting their coastlines and livelihoods. The international remit of ITOPF's work was also a major draw for me, as was the variety and problem-solving nature of the work itself – never really knowing what new challenges we would be facing on a given day.

How has ITOPF changed: Although in many ways ITOPF is much the same as it was then, there have been some major changes over the years, not least in personnel. But, while there are different (and younger!) faces in the office and in the field representing ITOPF nowadays, the spirit of the group remains very similar. Another big change is the way in which technology has affected our work. When I joined, we had laptops and mobile phones of course, but smartphones were not commonplace. Now much of our fieldwork can be carried out using smartphones, which means less heavy gear to carry around. There is also more reliance on emails and social media for communication. However, we do try to initiate face-to-face meetings where practicable, since this often still proves to be the best way to talk through issues and solve problems. There have also been a few subtle changes in recent years that have really improved our day-to-day working lives, with a working from home policy and flexible working hours.

Typical Day: If there's one thing that staff in the technical team will tell you, it's that there's no such thing as a 'typical day'. In my current role, as one of the Technical Team Managers, I am still part of the active response team, although I am less likely to be routinely mobilised to spills nowadays. When managers are sent out to the field it is usually for the purpose of training new recruits, or for more complex cases. So, I'm more likely to be found in the office, dealing with technical issues, managerial duties, or representing ITOPF at a conference, workshop, exercise or training course.

Best bits: For me, the best bits relate to the job itself, and the people in the team. The variety of the work, and the nature of it: problem-solving in genuine emergency situations, where our advice can make a real difference. The other aspect is the people in the team. Despite the changing face of the team over the years, we've always had an uncanny ability to stick to the unofficial motto of 'work hard, play hard' – and I can't imagine finding a more professional, enthusiastic, hard-working and fun-loving bunch of people at another workplace.

Worst bits: Although the job can be exciting and very rewarding at times, when our work is making a real difference to the response, we can often find ourselves in situations where our presence on site is not appreciated, and where we're seen as being linked to the shipowner, who is 'responsible for the spill'. This can result in us being on the receiving end of some intense emotions from government leaders, the fishing community and local people. Sometimes it can be difficult and take time to win them round.

Our newer recruits

Our new recruits undergo extensive training (in and out of the office) en route to becoming fully fledged Technical Advisers. This is often undertaken with established members of staff to ensure a good team spirit and up-to-date skills across the board.



Attending a marine ecology course hosted by Jon Moore



Undergoing Arctic survival training



Receiving helicopter underwater escape training

Staff news

Prisaca as Team Secretary and Alan Smith as IT Systems Manager.

Leavers

In the last year we have seen the departure of Senior Technical Advisers Nicola Beer and Nicky Cariglia; Technical Advisers Anne Reglain, Ann Zhang and Nancy Wong; Senior Technical Support Coordinator Iain Harrison; IT Systems Manager Chris Pavey; Technical Team Secretary Claire Gorrington and HR and Pensions Administrator Claire Keogh.

Congratulations

We offer our congratulations to five members of staff who have recently had babies; baby girls for Annabelle Nicolas-Kopec (Senior Technical Adviser), Alex Hunt (Technical Team Manager) and Claire Keogh (HR and Pensions Administrator) and baby boys for Duarte Soares (Technical Adviser) and Miguel Patel (Senior Technical Adviser).



New staff: Afshan Prisaca, Alan Smith, Natalie Boyle, Conor Bolas, Christopher Black and Sam Durrance

There have been a number of staff changes since the last issue of *Ocean Orbit*.

Joiners

We have welcomed seven new Technical Advisers to the team: Julke Brandt and Duarte Soares in October 2017; Sam Durrance in October 2018 and Lauren Fear, Angela Pinzón-Espinosa, Conor Bolas and Andrew Le Masurier in 2019. Susannah Domaille, formerly Technical Support Coordinator, also successfully applied for a position as Technical Adviser and began her new role in October 2019.

Julke holds a Master Mariner Certificate of Competency, a BSc in nautical science and an MSc in international marine environmental consultancy. She previously worked as a Navigation (Deck) Officer on board cargo ships and private yachts and as a visiting researcher for Newcastle University.

Duarte is a geologist with an MSc in petroleum geoscience and a PhD in seismic stratigraphy. Before joining ITOPF, he worked for the hydrocarbon industry (UK), in mining (Angola), and on geoarchaeology and environmental impact studies (Portugal).

Sam holds a BSc in marine biology and an MSc in international marine environmental consultancy and previously worked for a fisheries resource management consultancy.

Lauren has an MSc in biology and previously worked as a consultant ecologist, involved in assessing the impacts of large infrastructure projects on protected species and habitats in the UK.

Angela has a PhD in environmental sciences and previously worked on projects related to the clean-up of oil refining waste, chemical diversity in marine organisms and the recovery of coral populations in the Caribbean.

Conor holds an MChem in chemistry and a PhD in atmospheric and analytical chemistry. He has experience of environmental monitoring of tropical field sites in Southeast Asia and temperate ecosystems in the UK, as well as research in materials and organic chemistry in industrial laboratories.

Andrew has a Master's degree in environmental monitoring and assessment, and has experience working in an engineering consultancy, specialising in contaminated land.

We have also welcomed Chris Black to the team as Technical Support Coordinator. Chris has a degree in biology and previously worked as a Claims Team Manager for a multi-national insurance company.

On the administration and support side, we have been joined by Vanessa Holliday as HR Manager; Natalie Boyle as HR and Pensions Administrator; Afshan



New staff: Top: Julke Brandt and Duarte Soares; middle: Lauren Fear and Angela Pinzón-Espinosa; bottom: Andrew Le Masurier and Vanessa Holliday



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