

AUGUST 2017

*Protective booming,  
Mauritius*

A wide-angle photograph of a long, narrow concrete boom extending from the foreground into the ocean. The water is clear and turquoise, with sunlight reflecting off its surface. In the background, a lush green coastline with palm trees is visible under a clear blue sky.

# OCEAN ORBIT

THE NEWSLETTER OF THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED

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In case of a spill of oil or HNS (chemicals), please call us on the numbers below for advice and/or to mobilise us to site:

## EMERGENCY CONTACT

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

This is ITOPF's office number; please ask to speak to a member of the technical team.

**OUTSIDE UK BUSINESS HOURS: +44 (0) 7623 984 606 or +44 (0) 20 7566 6998**

These numbers are linked to a message paging system. You should be ready to leave your name, contact number and a brief message. A member of the ITOPF technical team will return your call.

**Please do not rely on notifications of emergencies to ITOPF by email.**



We will require as much of the following information as possible:

### Essential 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 spilt 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

# Managing Director's Review

As an organisation whose remit is to work in concert with others to improve the standard of preparedness and response, ITOPF's focus is on sharing lessons learnt from actual incidents. We do this through our publications, such as this newsletter, and also through seminars, conferences, training courses and exercises. As our first article demonstrates fortunately, serious oil spills from tankers are now a rarity. This means that spill response personnel and those with responsibility for contingency planning need to rely increasingly on the experiences of others in order to anticipate what might be required should an incident occur. This is why we highlight specific incidents in our articles, as well as develop certain topics in more depth where there has been a particular theme or learning point during the course of the year.

As you will see from our infographic on pages 4 and 5, the spread of incidents across the world has been as extensive as ever and the pages following throw the spotlight on incidents to show the variety of issues that the team that has been advising on. Some incidents occurred in the same location as previous incidents in the past and demonstrate the value of establishing good relationships with local authorities and responders through preparedness and response training.

A milestone has been reached in terms of R&D funding provided through the ITOPF R&D Award since 2012. All five past winners have now completed their projects, marking the investment of some £250,000 as at the end of 2016. A synopsis of these projects can be found on ITOPF's website (<http://www.itopf.com/in-action/r-d-award/>). The winner of the 2017 ITOPF R&D Award was announced at the beginning of the year and we look forward to working with the Shanghai Maritime University to develop a fun way to provide training using a virtual reality game.

Our '20:20 Vision' covering our strategy for the five years to 2020 identified priority countries, of which Turkey is one. Political instability means that it remains a challenge to schedule activities with key governmental authorities in the country but it is encouraging to see opportunities arising following the most recent incident near Izmir and the authorities' desire to



Sharing lessons learnt from actual incidents at a training course in Shanghai

*"We remind our readers to call upon ITOPF's services in support of their training, exercises and drills."*

review their response capability.

A number of incidents in recent years involving cargoes of coal has prompted the technical article appearing on pages 12 and 13. Whilst coal might appear relatively innocuous our experience demonstrates that coal can cause problems associated with smothering important resources on the seabed and alter the aesthetics of coastal areas. Long-term environmental studies following exceptional incidents are rare; rarer still are studies that are able to draw upon pre-existing baseline data. It is significant, therefore, that thanks to the work of two dedicated scientists who have been studying the Cornish coastline since the late 1950s, ITOPF was able to support the collation of data and photographs spanning the 50 years since the MTTORREY CANYON incident in March 1967. This anniversary also provided the opportunity for ITOPF to work with the IMO and the IOPC Funds to tell the story behind the impressive reduction in major oil spills from tankers, as illustrated by ITOPF's statistics over the years. The exhibition mentioned on page 15 has received many positive accolades, especially from Member States attending meetings at the IMO.

It is not possible to include all of the

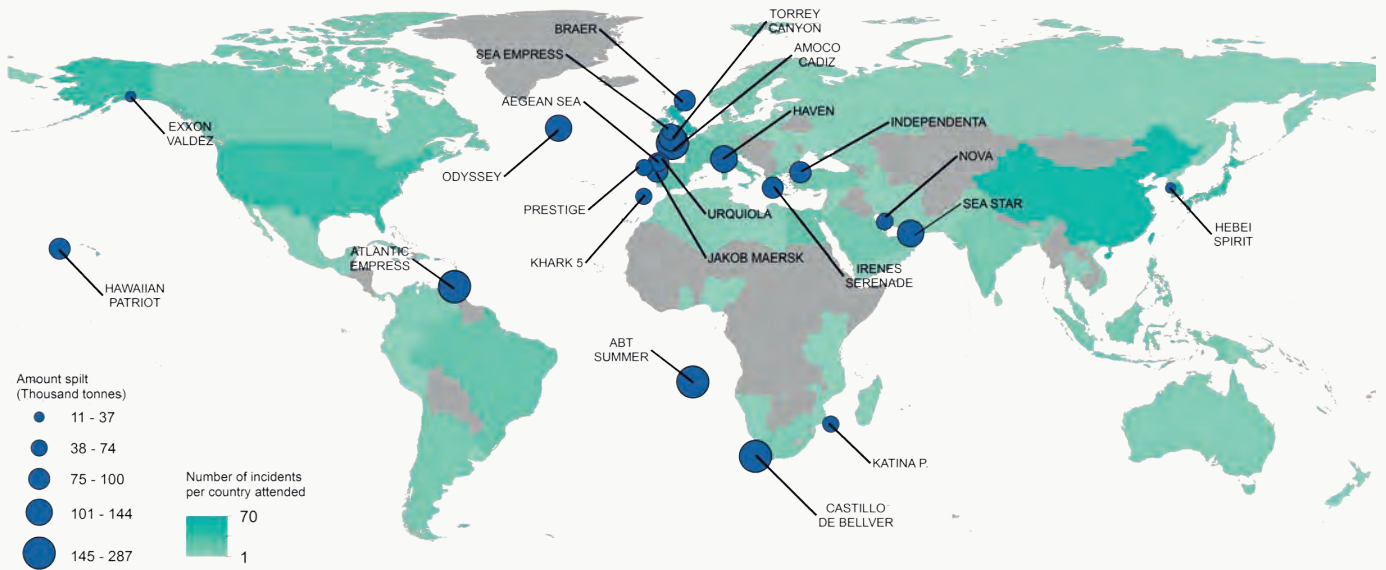


Dr Karen Purnell, Managing Director

many activities that the team undertakes in any one year in our newsletter so we have identified a few of the highlights in each month. We've also taken the opportunity to remind our readers to call upon ITOPF's services in support of their training, exercises and drills.

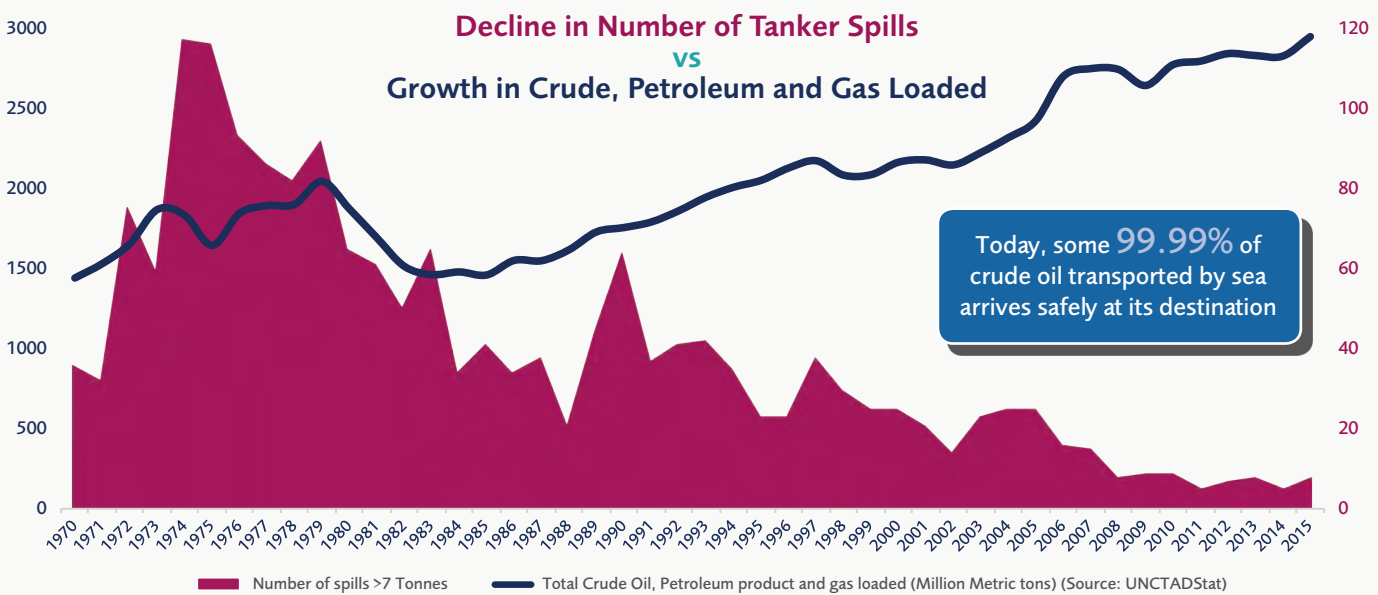
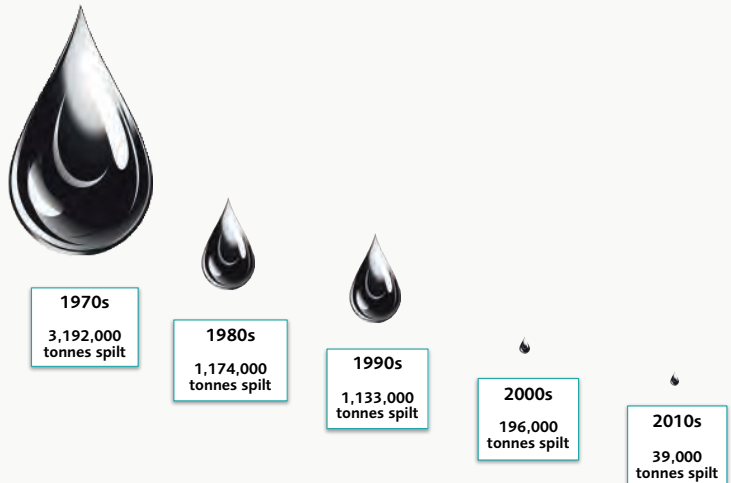
Finally, I am proud to recognise the contribution made by the exceptional team here at ITOPF and to highlight anniversaries for some of them – their 'now' and 'then' images show how little they've changed over the years! We've also welcomed new staff, new babies and, as you will see on the last page, received our own 'baptism' during our white water rafting team event last summer. We hope you enjoy this edition of our newsletter.

# Downward Trend in Tanker Spills

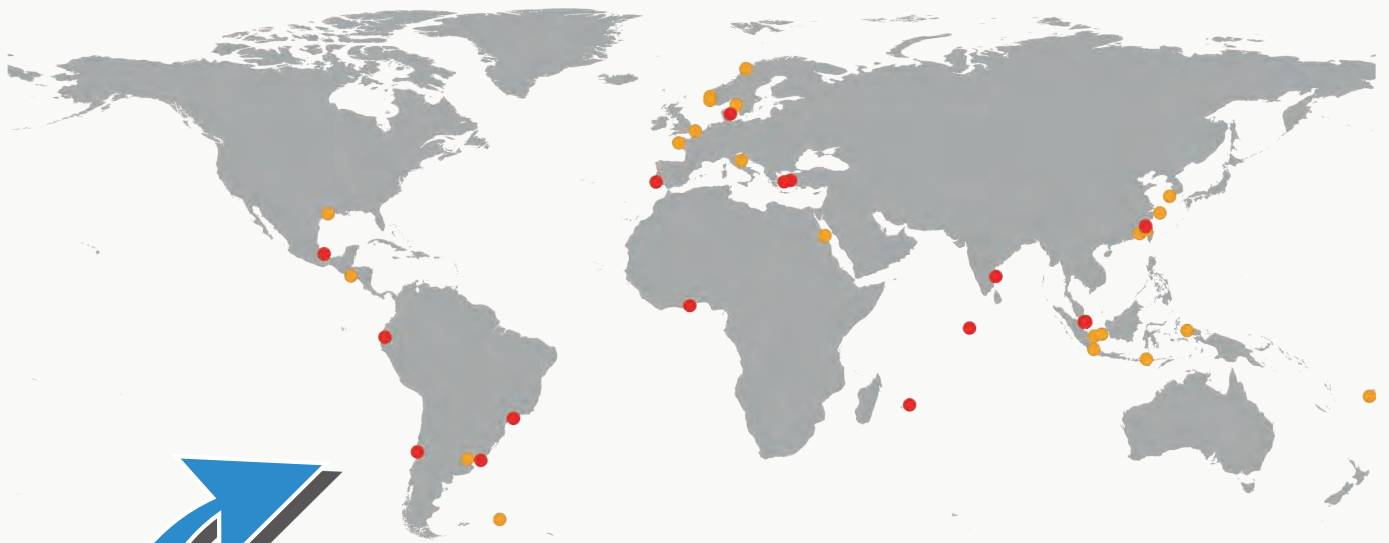


Location of major tanker spills since the TORREY CANYON in 1967 and frequency of incidents attended by ITOPIF (tanker and non-tanker) by country since 1970

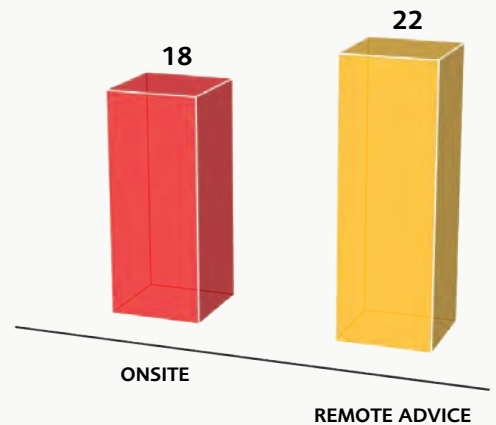
There has been almost a hundred-fold spilt from tankers since the 1970s in the decade to date



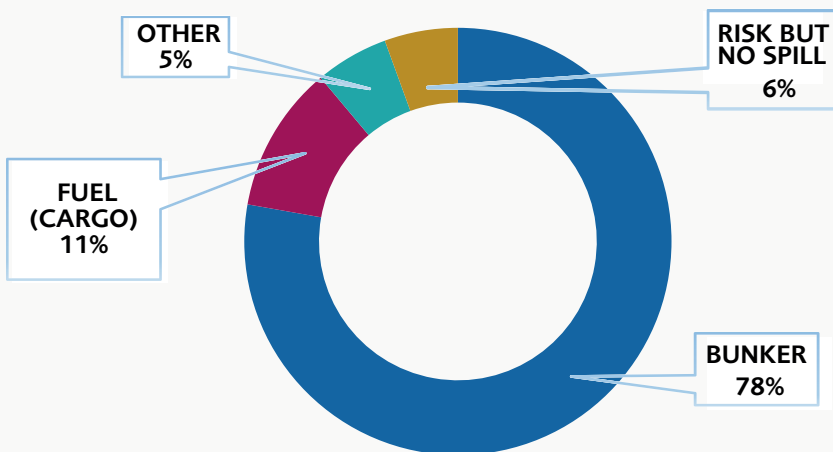
# Where have we been recently?



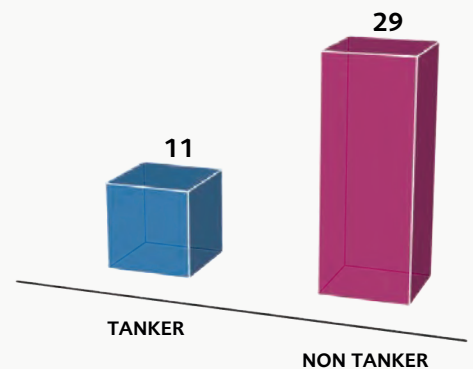
We've attended **18** spills in **16** countries



We've provided remote advice for **22** incidents



**78%** of the incidents we've attended were bunker spills



We've responded to more non-tanker spills than tanker spills



Flushing port infrastructure, Ghana

# Incidents in the Spotlight

Here we highlight our involvement in a selection of the incidents we've attended since the last issue of Ocean Orbit.

## Ghana

**Incident date:** 10 May 2016

**Place:** Tema Port, Ghana

**Vessel:** containership

**Pollutant:** oil contaminated ballast water

**Nature of incident:** A containership discharged an unknown quantity of oil contaminated ballast water whilst at berth in Tema Port, Ghana. The oil was driven eastwards across the harbour by prevailing winds and currents. The Ghana Port and Harbour Authority (GPHA) undertook initial response operations in the marine dock as per the National Contingency Plan for a tier 1 spill. Responsibility then passed to the shipowner who assigned a local contractor to complete operations. This included the cleaning of commercial and harbour authority vessels and approximately 1.5 km of moderately oiled breakwater using manual collection and flushing techniques.

**ITOPF involvement:** ITOPF initially provided advice remotely from the office and was subsequently mobilised five days after the incident and remained on-site for three weeks. ITOPF participated in joint inspections of the affected area and assisted with the development of a cleaning plan for the oiled port infrastructure. This is the first incident ITOPF has attended in Ghana.

## Uruguay

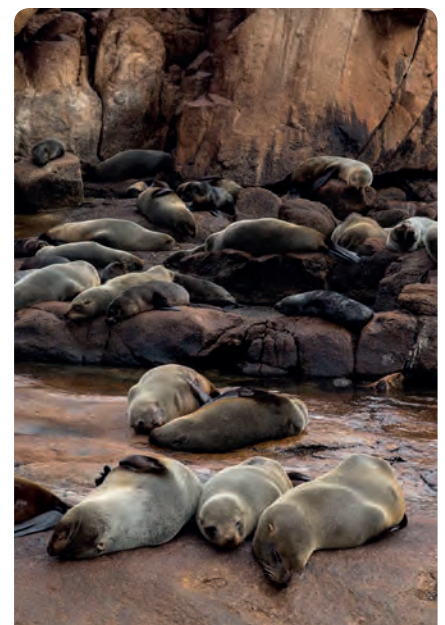
**Incident date:** 17 May 2016

**Place:** Isla de Lobos, Uruguay

**Vessel:** chemical/oil product tanker

**Pollutant:** no spill

**Nature of incident:** Whilst in transit between Argentina and South Korea, a chemical/oil product tanker, carrying a cargo of soybean oil, suffered a mechanical problem and



South American fur seals in the vicinity of the grounding, Uruguay

grounded north of Isla de Lobos, close to the tourist resort of Punta del Este, south-eastern Uruguay. The island itself is a designated nature reserve and home to populations of South American fur seals and southern sea lions (previously impacted by the SAN JORGE oil spill in 1997). The vessel sustained damage to its keel, but cargo, fuel and slop tanks remained intact. Salvors successfully refloated the vessel on 5 June, without any release of oil.

**ITOPF involvement:** ITOPF initially provided advice remotely on environmental and socio-economic sensitivities and the likely fate, behaviour and drift of any oil that might be lost, but was subsequently requested to attend on-site by the vessel's P&I Club, remaining for 20 days until the refloat operation had been completed. Whilst on-site, ITOPF provided technical input on at-sea and shoreline contingency measures to the national maritime authority (Prefectura Naval), salvors and local spill response organisation. ITOPF also maintained regular communication with the National Directorate of Aquatic Resources on likely wildlife impacts and potential mitigation measures on Isla de Lobos in the event of a spill.

## Mauritius

**Incident date:** 16 June 2016  
**Place:** Le Bouchon, SE Mauritius  
**Vessel:** bulk carrier  
**Pollutant:** IFO 380

**Nature of incident:** A bulk carrier ran aground on a rocky islet on the south east coast of Mauritius whilst in ballast. It spilled an estimated 10–15 tonnes of heavy fuel oil which contaminated nearby shorelines. A few additional tonnes of oil were released during the salvage operation to refloat the vessel the following month. A clean-up contractor was engaged to take charge of response operations in cooperation with the Mauritian authorities. A variety of techniques were employed including manual recovery with scoops and buckets, protective booming, skimming, flushing and high pressure washing, using equipment sourced locally and mobilised from overseas. Clean-up activities were completed on 1 October.

**ITOPF involvement:** Two ITOPF technical advisers rotated on-site for a total of eight weeks and provided advice remotely from London. Whilst on site, they attended crisis

committee meetings organised by the Mauritius Shipping Division, conducted joint shoreline surveys with the authorities and cooperated in the implementation of an environmental monitoring programme. ITOPF also prepared a summary report on the risk associated with wreck management and provided guidance on shoreline clean-up techniques.

## Malaysia

**Place:** Johor Bahru, Malaysia  
**Vessel:** product tanker  
**Pollutant:** IFO 500

**Nature of incident:** A product tanker spilled marine fuel oil during loading operations at the port of Tanjung Pelepas, Malaysia in 2016. Due to an ebbing tide at the time of the release, the oil drifted across the Pulai river and contaminated approximately 3.5 km of a container terminal wharf. Because of its persistent nature, the bulk of the oil released adhered to piles and rocky revetments under the wharf. Sheen generated by these oil coatings resulted in the staining of a number of hulls on ships berthed at the terminal during the first few



The grounded vessel, Mauritius



*Cleaning under the wharf, Malaysia*

days after the incident.

**ITOPF involvement:** ITOPF worked with the terminal operator and clean-up contractor to design and implement response measures to mitigate the effects of the spill. Technical input was also given during meetings with the main shipowner using the terminal and the Department of Environment. ITOPF demobilised after two weeks on site but continued to provide assistance on the assessment of clean-up costs remotely.

around the casualty as a preventative measure. Salvors stabilised the vessel and it was taken under tow to a nearby port on 5 October. An Environmental Impact Assessment (EIA) prepared by the state oil company, who was the operator of the vessel, and a local technological institute found that there was no significant oil contamination in the area that could be attributed to the incident.

**ITOPF involvement:** ITOPF was brought on-site to advise on the risk of pollution from the casualty, response options and environmental monitoring, and worked with the oil company, the national park authority, the environment agency, navy and harbourmaster. Aerial and boat surveys of the areas at risk were undertaken and ITOPF provided input into the EIA.

## Mexico

**Incident date:** 24 September 2016

**Place:** Veracruz, Mexico

**Vessel:** product tanker

**Pollutant:** gasoline and diesel

**Nature of incident:** A product tanker carrying a cargo of diesel, gasoline and low sulphur gasoline suffered an explosion and caught fire in a national marine park several miles off the port of Veracruz. The park contains the largest coral reef system in the Gulf of Mexico and is also a wetland of international importance. Responders brought the fire under control the following day and a containment boom was placed



*Booming the vessel, Mexico*



# ITOPF R&D Awards Update

Some £300,000 has now been distributed to research and development projects worldwide since the creation of the ITOPF R&D Award in 2012.

ITOPF allocates the money on behalf of its shipowner Members and Associates and their P&I insurers to projects that have the potential to make a valuable contribution to improving our knowledge and understanding of issues related to accidental marine pollution.

The Award is open to any reputable R&D establishment or other organisation worldwide. Applicants are invited from all academic disciplines, although preference is given to those with an applied scientific focus such as marine biology, chemistry, ecology, physics, engineering or economics.

Each year up to £50,000 is made available to fund R&D. This can be awarded to a single project or split between different projects of interest. Applications are assessed by a committee comprising three members of the ITOPF technical team and two well-respected and independent members of the scientific community. Over 70 applications for funding have been received since the start of this initiative.

This year's award went to the Virtual Reality Lab, College of Transport and Communication of Shanghai Maritime University (SMU), China. The award will support a two-year project called the 'Real Spill Response Game' (RSRG). This project uses virtual reality to conduct multi-organisational oil spill response exercises in a repeatable and traceable way and at a lower cost than traditional exercises. The R&D Committee recognised this project as an innovative and fun way to promote good practice in oil spill preparedness and response within the global community.

Two of the previous Award winners completed their projects during the last year. The 2016 winner, ROSDAM (Remote Oil Spill Detection And Monitoring on ice-covered waters) led by the University of Strathclyde in partnership with the Scottish Association for Marine Science (SAMS) aimed to evaluate two types of hyperspectral imaging technology (HSI) systems, i.e. passive and active, and their capability and applicability for the detection of oil spillages in ice-affected waters. Initial observations during Phase 1 of the project showed some promising spectral behaviours in the active system. However, Phase 2 of the project, concluded in May 2017, showed that the HSI devices tested were not suitable for the detection of oil under ice. Despite this negative result, many

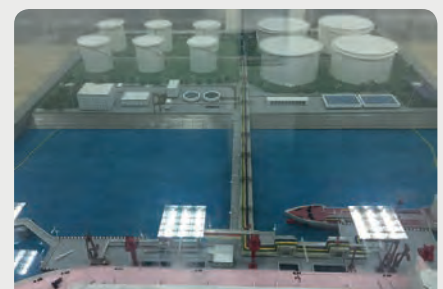
## Past Winners

2012	FishHealth	France/Italy/Canada	Development of a methodology for an assessment of fish health and research into the impact of chemically dispersed oil on marine fish.
2013	SLAM	UK	Development of a novel 'back-pack' system to track rehabilitated oiled birds without compromising their well-being.
2014	FAMERR	UK	Determination of realistic spill profiles for chemicals to improve decision-making for spills in different geographic areas and seasons.
2015	Project Emergrisks	USA	Desktop study to identify and assess emerging risks from marine transportation.
2016	Rosdam	UK	A feasibility study to investigate the detection capability of hyperspectral imaging technology (HSI) for oil spillages in ice-affected waters.
2017	Virtual Reality Lab, Shanghai	China	Creation of a 'Real Spill Response Game', an exercise platform designed to improve preparedness and training for oil spills.

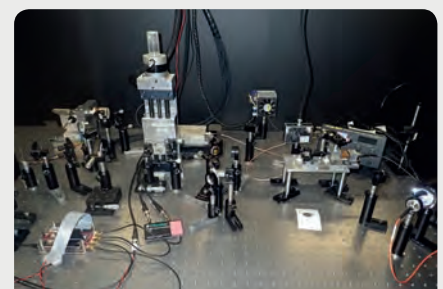
competencies when imaging in sub-zero temperatures were developed during the project which will facilitate further testing when new technological solutions become available.

The 2015 Award winner, Emergrisks, by the University of Washington (with input from NOAA) aimed to identify the short and long-term emerging risks facing the shipping industry. Three areas of interest were identified: (i) developing technology; (ii) changing environment and (iii) changing trade. ITOPF is working with the university and NOAA to disseminate the findings to the shipping industry and related parties.

Information on ITOPF's R&D Award including updates on previous award winners can be found on our website: <http://www.itopf.com/in-action/r-d-award/>. Potential candidates should not hesitate to contact us if they have any questions regarding the Award, or if they are unsure whether their project will qualify, by emailing us at [rdaward@itopf.com](mailto:rdaward@itopf.com).



Facilities at the virtual reality laboratory at SMU



Active HSI system with assisted split laser beam, ROSDAM



© Canaran/Shutterstock

## Country Focus – Turkey

**T**urkey has an extensive and complex coastline, bordered by four seas. The Turkish straits connect the Mediterranean, Marmara and Black Seas, providing a maritime transport link between Europe and Asia. The straits are subject to intense maritime traffic and considered to be of vital economic and social importance to Turkey and the wider European area.

### Priority Country

Turkey has been identified as a priority country for ITOPI in its new strategic plan, '20/20 Vision'. This is driven by the high density of maritime traffic within its waters, which are characterised by narrow and winding shipping channels and unpredictable currents.

In the past, Turkey has focused primarily on prevention rather than developing response capacity. A number of recent and concurrent incidents resulting in oil spills have caused the authorities to review their response capabilities.

### Risk

The Bosphorus Strait transecting Istanbul is an important waterway for trade and international affairs. Over 50,000 ships pass through the strait on a yearly basis, 10% of which are oil tankers.

Shipping activities are well established along Turkey's 8,483 km of coastline, but particularly within the Marmara and Mediterranean Seas. In recent years, there has been a significant rise in the Turkish Merchant Navy fleet and short-sea shipping in general. Coastal transportation of oil throughout Marmara and the Mediterranean has also increased, accounting for 12% of all cargo handled by Turkish ports.

Despite political instability in recent years, coastal tourism remains a large contributor to the national economy, and is well developed across the entire coastline. With more than 50% of the population living in coastal areas, fishing and aquaculture for human consumption are also important industries. This is especially the case in the

regions bordering the Black Sea, where there is little opportunity for economic diversification.

These factors combine to make the likelihood and impact of pollution incidents throughout Turkey high.

### Preparedness

Pollution response in Turkey is determined by Act 5312, where the Undersecretary for the Ministry of Transport, Maritime Affairs and Communications has overall authority. Although the Undersecretary does not become involved in day-to-day activities, he/she appoints the authorities and individuals that will respond to the incident. A Damage Commission of these authorities is then convened and it is usually chaired by the Provincial head of the Ministry of Environment and Urbanisation.

The Governor or Mayor may direct the Damage Commission at a local level. Daily implementation of the response is usually overseen by the port authority or harbour master, depending on the location.

Containment and recovery of oil is the preferred response strategy. Although

the use of chemical dispersants has been banned in recent years, there are some chemical 'degreasers' for the removal of oil from hard surfaces that are pre-approved for use by the authorities.

In large facilities or industrialised areas, the local person in charge usually has extensive first-hand experience in managing a response. However, in some less industrialised areas, the local authorities do not always have oil spill specific training or experience. There are only a limited number of specialised clean-up contractors in Turkey, and so the general capability for undertaking clean-up is relatively uniform throughout the country.

## Spill History

ITOPF has attended five spills in Turkey over the last ten years. Since our records began, Turkey has experienced 14 spills from tankers, four of these >700 tonnes (INDEPENDENTA in 1979 and three others in the 1990s).

The most recent on-site attendance involved a non-tank vessel. A tuna carrier (reefer) grounded within the Bay of Ildir, close to Izmir on the Aegean coast in December 2016. The grounding resulted in the breach of two fuel tanks, and a release of IFO 180, which contaminated shorelines across Turkey's foremost seaside destination for national tourism, Çesme. Strong winds and uncharacteristic, persistent snowfall hampered shoreline operations. Clean-up was undertaken using primarily manual techniques, assisted by machinery in some areas. In places, large quantities of pooled oil were recovered using pumps. Due to the high amenity value of the entire affected area, a high standard



Manual clean-up in Çesme

of cleanliness was considered necessary. Hot water, high pressure washing was used throughout to achieve the desired end point.

## Compensation & Fines

Turkey is a party to the Civil Liability Convention 1992 (CLC 92), the Fund Convention 1992 (Fund 92) and the Supplementary Fund Protocol 2003. For non-tankers, the 2001 Bunkers Convention came into force in Turkey in 2005 and the 2016 tuna carrier incident was the first case

to fall within its scope.

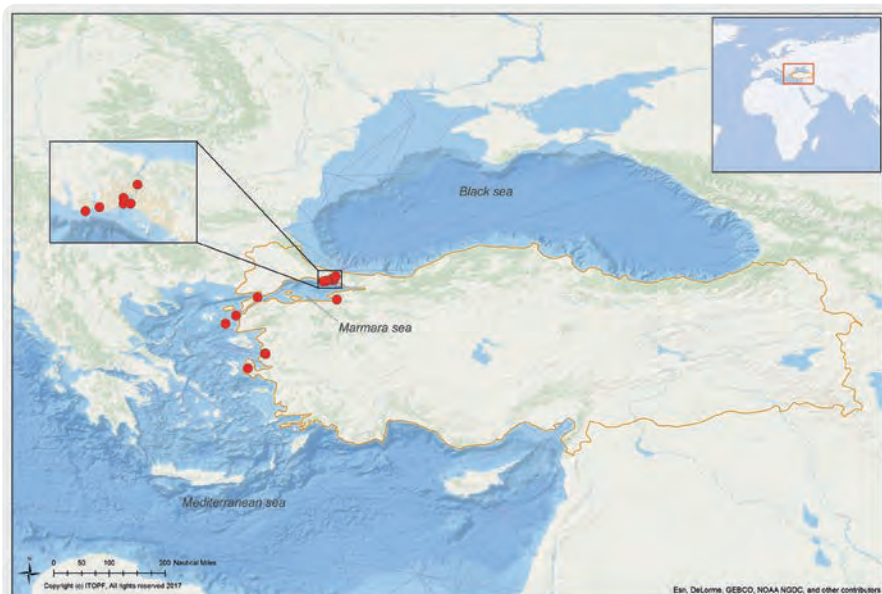
In practice, and as relates to punitive and environmental damages, fines are determined by the authorities overseeing individual spills. Act 5312 transposes the liability and compensation regimes, and also confers power to the authorities within the Damage Commission for that particular incident to determine the extent of environmental damage and to 'rehabilitate' the environment.

Recently, as a direct result of the 2016 incident, the authorities have amended the 'Port Regulation'. Any pollution from a vessel to which the regulations apply will now be subject to an automatic administrative penalty of TRY 5,000,000 (approximately £1.1 million). Essentially, this applies to all foreign flagged vessels >500 GT and national vessels >1000 GT.

## ITOPF in Turkey

During the response to the 2016 incident, positive and constructive relationships were maintained amongst all stakeholders. ITOPF's input to meetings of the Damage Commission was actively requested, and the harbour master in particular sought our advice throughout the response.

Building on the relationships developed during the response, discussions with the Ministry of Transport, Maritime Affairs and Communications are underway. The aim over the coming months is for ITOPF to provide a series of training workshops and seminars for the various authorities.



Spills attended by ITOPF in Turkey

# Coal Spills: ITOPF's Viewpoint

Though the majority of incidents ITOPF attends involve spills of oil, we are also called upon to provide technical advice at incidents involving other types of cargo, such as coal. ITOPF has attended 17 incidents involving coal cargoes in the last 18 years. In each case where a large amount of cargo was spilt, ITOPF was able to provide technical information about the risks and appropriate mitigations to help alleviate long term consequences.

In shipping, coal cargoes are separated into two categories according to their primary use, steam coal (also called thermal coal) and coking coal. Steam coal represents the majority of coal cargoes transported and is used for power generation, whilst coking coal is used for the production of coke and for metallurgical purposes. However, the reality is more complex, coal is a heterogeneous material (one occurring in different phases) and its form can vary from young soft lignite coal, through bituminous coal to hard brittle anthracite which has the highest concentration of carbon.

The hazards of carrying coal as bulk cargoes are well documented. IMO's International Maritime Solid Bulk Cargoes (IMSBC) Code categorises coal

*"The most common problem ITOPF has come across with coal spills is smothering and abrasion. This has occurred in every case we have attended."*

(both bituminous and anthracite) as a Group B material; hazardous due to its potential to create flammable atmospheres, spontaneous heating, depletion of oxygen, release of toxic gases and creation of metal corroding acids. This article focuses on the problems associated when coal cargoes are spilt at sea.

## HAZARDS OF MARINE COAL SPILLS

### Smothering & Abrasion

The most common problem ITOPF has come across with coal spills is smothering and abrasion. This has occurred in every case we have attended.

Large spills of coal may smother the

seabed, blocking water and light from the area underneath. Any fixed or slow moving organisms on the seabed, including corals, may be crushed or trapped and have limited access to their food source, resulting in mortality. Negative impacts are exacerbated by high wave energy which throws particles repeatedly against the substrate causing physical damage through abrasion. The low specific gravity of coal compared to other particles, such as quartz sand, means particles can potentially be carried and the damage spread over large distances.

Research indicates that juvenile and adult fish migrate to other areas in the event of a spill<sup>1</sup>. However, any loss of habitat and associated organisms may potentially increase pressure on resources in surrounding areas depending on the scale of the incident.

### Coal Fines

Items sink in the marine environment if they have a higher density than sea water, but the rate of sinking may be affected by particle size as the surface to volume ratio changes. All types of coal are denser than sea water and are expected to sink but studies have shown that fine particles up to



Manual removal of spilt coal from the shoreline during the FINACIA 32 incident

10 mm can remain in suspension for a long time. They will move with ocean currents and around 15% of spilt cargo may remain suspended.

Oceans and rivers usually have sufficient energy and dilution capacity to quickly dissipate the fine particles but in calm waters coal 'clouds' can block light and reduce the ability of organisms to photosynthesise. Mobile organisms can move to better light sources but fixed organisms such as corals are vulnerable to starvation. Furthermore, fine particles may settle onto corals, which will be unable to expel the polluted mucus if sufficient flushing is not available. The ongoing physical stress may damage and cause mortality over several days to weeks. In very low energy environments, coal particles can settle to become a significant component of the seabed. Although effects on organisms, such as crabs, are non-toxic, physical impacts to gills may occur due to small particle sizes<sup>3</sup>.

The effects of coal particles on mangrove or salt pond environments are not fully understood. For mangroves, productivity and gas exchange may be affected if breathing roots are covered but otherwise the physical effects can be similar to any other sediment in the same medium<sup>2</sup> due to coal's low toxicity.

Coal fines released close to mariculture facilities or water intakes can block pumping equipment, such as was observed during the HYUNDAI SPIRIT incident in South Korea (1999). Efforts should be made to evaluate and avoid these risks where possible, for example by using sediment screens, temporarily suspending pumping or, in extreme cases, moving mariculture cages.

## Buried Coal

A spill close to shore may result in coal reaching land. When this occurs, the stranded coal can become buried by subsequent tides and difficult to remove. The removal of coal from beaches often causes logistical challenges, especially in remote environments, as was seen during the FINACIA 32 incident in Indonesia (2015). If the coal particles are a different colour from the beach substrate aesthetic impacts can also cause problems.



Shoreline deposits of coal should be addressed as quickly as possible to avoid burial and potential spread of the pollution

## Mineral Toxicity

Burning coal breaks down its structure, potentially releasing toxic materials. Unburnt coal however remains largely intact in water. This means that spills of unburnt coal are not likely to release large amounts of toxic substances and the huge dilution and buffering capability of moving waters mean impacts are usually undetectable. Significant issues are only likely when coal cargoes come ashore or are spilt into waters with little mixing.

Coal mineral composition is extremely varied but in general the majority of elements, both beneficial and toxic, have low bio-availability to animals and plants because they are bound within the coal matrix. This bond increases with the coal's age and type (lignite to anthracite).

When minerals from coal are released under normal conditions they are in a solid, undissolved form which is not easily taken up by organisms. Samples taken following two incidents ITOPF attended confirmed the lack of bioavailability.

Concerns may be raised when coals have high pyrite content because the sulphur can oxidise and produce sulphuric acid leachate. This leachate not only promotes degradation of the coal matrix but enables the minerals in the coal to dissolve and become

more bioavailable. As such, spills of sulphur rich coals in low energy environments may warrant additional attention.

## Hydrocarbon Toxicity

Coal is a potential source of polycyclic aromatic hydrocarbons (PAH), a class of hydrocarbon with multiple carbon rings that may be toxic to both humans and aquatic organisms when present in a bioavailable form<sup>4</sup>.

Thankfully PAH are generally water repellent and poorly soluble<sup>5</sup>, so they are not biologically available to organisms. However, water samples taken with coal particles in them may indicate high levels of PAH (because the method of analysis dissolves the particles) even though there is low biological availability, whereas samples typically show low or undetectable levels of PAH containing no solid particles.

No evidence of hydrocarbon toxicity from coal to marine invertebrates has yet been published and no evidence of any digestive contamination from consumption of coal fragments has been seen. Despite this, coal composition is extremely varied and a precautionary approach should be adopted, where each case is evaluated upon its own merits to determine potential toxicity.

<sup>1</sup> UJTL. (2013). *Evaluacion ambiental del impacto causado por la barcaza TS-115 en el area de anclaje de puerto Drummond, Cienaga Magdalena, Caribe Colombiano* [Environmental impact assessment caused by the TS-115 barge in the harbour 102 anchorage area Drummond, Cienaga Magdalena, Colombia Caribbean Sea] (pp. 406). Santa Mata, D.T.C.H.: Universidad de Bogotá Jorge Tadeo Lozano.

<sup>2</sup> Ahrens, M., & Morrissey, D. (2005). *Biological effects of unburnt coal in the marine environment*. *Oceanography and Marine Biology*, 43, 69-122.

<sup>3</sup> Hillaby, B. (1981). *The effects of coal dust on ventilation and oxygen consumption in the Dungeness crab, Cancer Magister*. Vancouver, B.C.: Department of Fisheries and Oceans.

<sup>4</sup> Tavakoly Sany SB, Hashim R, Salleh A, Rezayi M, Mehdinia A, Safari O (2014) Polycyclic aromatic hydrocarbons in coastal sediment of Klang Strait, Malaysia: distribution pattern, risk assessment and sources. *PLoS ONE* 9(4): e94907. <https://doi.org/10.1371/journal.pone.0094907>.

<sup>5</sup> Ahrens, M., & Morrissey, D. (2005). *Biological effects of unburnt coal in the marine environment*. *Oceanography and Marine Biology*, 43, 69-122.

# 50 Years of Post-spill Environmental Monitoring

To mark the 50th anniversary of the TORREY CANYON oil spill, ITOPF has provided support to publish a long-term data set that has been compiled for the rocky shores around Cornwall, UK in the vicinity of the incident.

## Incident

The TORREY CANYON oil tanker ran aground on Seven Stones Reef off the coast of Cornwall on 18<sup>th</sup> March 1967, spilling its entire cargo of approximately 119,000 tonnes of crude oil over a period of 12 days. The oil contaminated many parts of the south west coast of England, and drifted towards beaches and harbours in the Channel Islands and Brittany, France. Although oil pollution at sea was not a new problem in 1967, the scale of the spill from TORREY CANYON was unprecedented, catching the governments of the affected countries unprepared. Without suitable

plans, the response to the incident was largely improvised, including the first wide-scale spraying of detergents to disperse the oil. The scientific community was mobilised to assess the environmental impacts of both the spill and response measures.

## Baseline data

Unusually, there was an extensive baseline against which to judge recovery of some of the rocky shores worst affected by beached oil and detergent. For over a decade prior to the incident, scientists Alan and Eve Southward of the Marine Biological Association (MBA) in Plymouth had been charting fluctuations of rocky shore fauna and flora – particularly barnacles – to climate change. They carried on monitoring after the spill to measure the recovery of rocky shore species from the oiling and clean-up. This work has continued until the present day under the lead of Professor Steve

Hawkins and colleagues from the MBA.

## Recovery

Southward and Southward (1978)<sup>1</sup> estimated that most shores took up to 10 years to return to what they considered a pre-spill state. At Porthleven, one of the most heavily-sprayed shores, indications are that it took between 13-15 years to return to normal. The detergents killed the dominant grazer, limpets, which triggered massive subsequent colonisation by algae (their food source). The resulting thick canopy of algae encouraged dense recruitment of limpets, which subsequently grazed the seaweeds down, before largely dying off themselves. This then prompted a subsequent bloom of algae before a return to normal levels of fluctuation charted from the mid-1980s to date. In contrast, Godrevy Island (a site managed by the National Trust), although affected by oil, was not sprayed with



Capt Kevin Wong, Portmaster and Capt M Segar, Assistant Chief Executive (Operations) Singapore MPA with Richard Johnson, ITOPF Technical Director

A new Memorandum of Understanding was signed by the Singapore MPA and ITOPF in April 2017. The MoU comprises rates for use of vessels and equipment operated directly by the SMPA, as well as SMPA personnel, and for similar resources operated by service providers acting under the direction of the SMPA. These rates have been reviewed by ITOPF and will be applied for resources used in a response to pollution incidents involving vessels entered in the International Group of Protection & Indemnity Clubs (IGP&I) or incidents in which the IOPC Funds are involved.



TORREY CANYON aground (© Imperial War Museum)

detergents because of concerns about the resident colony of grey seals. Here, recovery appeared to occur much more quickly, within 2-3 years (Hawkins and Southward, 1992<sup>2</sup>; Southward and Southward, 1978).

## ITOPF

In April 2016, Dr Mark Whittington joined a team of marine biologists to survey some of the shore sites around the tip of Cornwall impacted by the TORREY CANYON spill and response. The monitoring work focused on the diversity, abundance and distribution of some commonly encountered rocky shore plants and animals, in particular limpets, barnacles and fucoid algae. ITOPF is supporting this research with the aim of producing several scientific papers highlighting the long-term recovery of the shores and the development of post-spill monitoring techniques. This will provide a valuable contribution to discussions on the long-term effects of oil spills.

ITOPF is also funding the digitisation of some of the vast slide library of TORREY CANYON-related photographs from the Southwards' collection. The aim of this work is to produce a time series of pictures over



Dr Mark Whittington with Prof Stephen Hawkins surveying shore sites in Cornwall, UK

a 60 year period that illustrate the impacts of the spill and the subsequent recovery of the shores against the background of natural fluctuations.

<sup>1</sup> Southward, A.J., Southward, E.C. (1978) Recolonization of rocky shores in Cornwall after use of toxic dispersants to clean up the Torrey Canyon spill. Presented at: Symposium on Recovery Potential of Oiled Marine Northern Environments; Halifax, Canada. *J. Fish. Res. Board Can.*, 35: 682-706.

<sup>2</sup> Hawkins, S.J. and Southward, A.J. (1992) The Torrey Canyon oil spill: Recovery of rocky shore communities. In, *Restoring the Nation's Marine Environment.* (Ed. G.W. Thayer). Maryland Sea Grant College. pp 583-632.

Incidents like the TORREY CANYON are unfortunate and no-one would wish them to occur again. However, this event acted as the catalyst for a series of safety, operational, legislative and environmental initiatives adopted by industry and government. The statistics produced by ITOPF showing the significant reduction in major oil spills from tankers over the last few decades is testament to the success of this work.

To mark the important achievements since this incident, ITOPF, IMO, IOPC Funds, along with other shipping and oil industry partners came together to tell the story of the progress made in the last fifty years at an exhibition shown at the IMO from January – July 2017 and this is currently available on-line at <http://www.imo.org/en/About/Events/Pages/50-Years-Working-Together.aspx>.

The exhibition tells the story of the collaborative work which today has resulted in a comprehensive regulatory framework, a demonstrably improved shipping industry, good systems of preparedness and response and adequate compensation for those affected by spills.



Opening of exhibition by Mr José Maura, Director of the IOPC Funds, Mr Kitack Lim, IMO Secretary-General, and Dr Karen Purnell, Managing Director of ITOPF (pictured left to right) at the meeting of the IMO Sub-Committee on Pollution Prevention and Response.

# Out and About with ITOPF

ITOPF undertakes training, contingency planning and advisory assignments around the world. These help develop lasting relationships with government agencies, maritime organisations and industry, as well as developing in-house expertise. Such work also maintains ITOPF's profile and reputation and enables the transmission of key messages outside of spills, during the preparedness rather than response stage.



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.

## MAY 2017



**USA:** Members of the team attended the International Oil Spill Conference in Long Beach, USA in May 2017 variously running a short course, presenting papers, chairing sessions and raising awareness of ITOPF at our booth in the exhibition area.



**ARGENTINA:** ITOPF participated in a seminar organised by P&I correspondents, Pandi Liquidadores, working with the Argentine Coast Guard to raise awareness of marine pollution issues including environmental damage and monitoring, contingency planning, claims handling and compensation.

## APRIL 2017



**SINGAPORE:** Richard Johnson and Mark Whittington took part in Singapore Maritime Week; Richard was conference chairman on day one of the International Chemical and Oil Pollution Conference and Exhibition and Mark delivered a paper on wreck removal at the Asian Marine Casualty Forum.

## MARCH 2017



**MYANMAR:** Franck Laruelle participated in a national seminar on oil pollution preparedness, response and cooperation in Myanmar, providing assistance to the relevant ministerial departments on the development of the national oil spill contingency planning framework, strategies and policies.

## FEBRUARY 2017



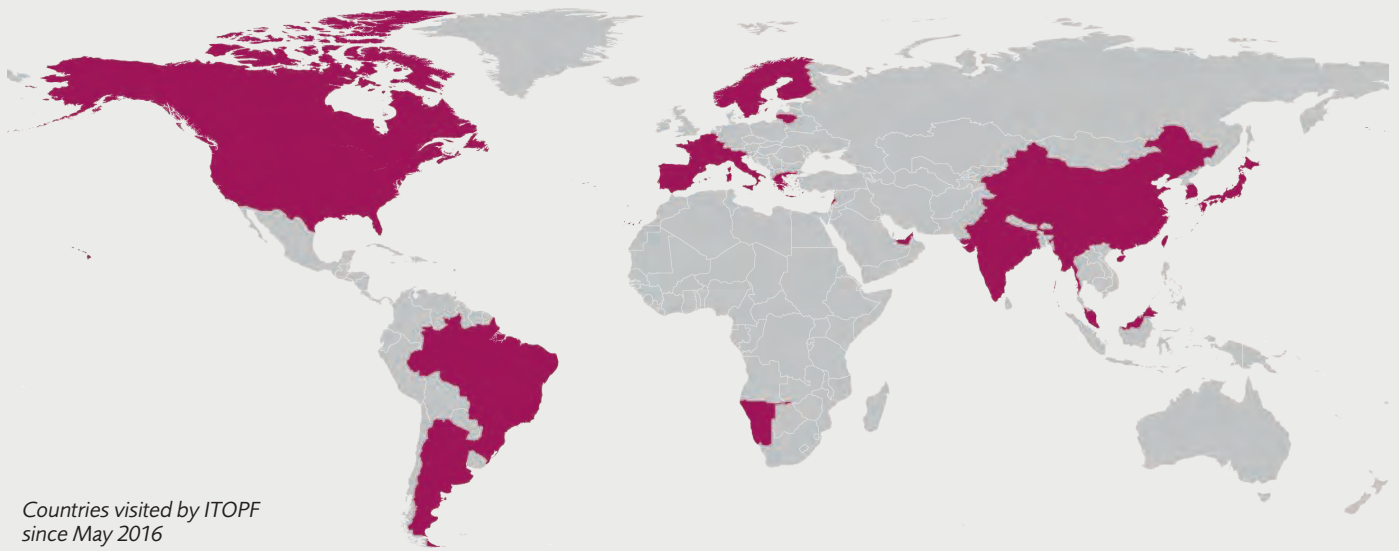
**JAPAN:** Richard Johnson gave the keynote speech on 'NAKHODKA Reflections: Looking backwards to see forwards' at the Petroleum Association of Japan's (PAJ) annual oil spill response workshop which marked 20 years since that spill event.

## JANUARY 2017



**USA:** Mark Whittington participated in the Coastal Response Research Center's (CRR) workshop 'SCAT for tomorrow' aiming to develop a consensus on data standards for shoreline oiling that will spur the development of advanced data collection and management tools for oil spill response.





Countries visited by ITOPF since May 2016

## DECEMBER 2016



**CHINA:** Miguel Patel and Iain Harrison helped deliver an exchange programme for oil spill response officers in Shanghai under IMO's Integrated Technical Cooperation Programme (ITCP).

## OCTOBER 2016



**LEBANON:** David Campion was one of the trainers at a course in Beirut for stakeholders involved in the implementation of the Lebanese National Oil Spill Contingency Plan.

## SEPTEMBER 2016



**NAMIBIA:** Nicky Cariglia helped deliver GI WACAF's workshop on the use of incident management systems (IMS) and net environmental benefit analysis (NEBA) in oil spill preparedness and response.

## AUGUST 2016



**MALDIVES:** Franck Laruelles supported the IMO and SACEP (South Asia Co-operative Environment Programme) at a regional workshop in Malé to finalise an update of the Regional Oil and Chemical Pollution Contingency Plan for South Asia.

## JUNE 2016



**BRAZIL:** ITOPF was invited by IBAMA (Brazil's Ministry of the Environment) to run a training course for senior-level government personnel exploring the management of large-scale environmental incidents.



**LITHUANIA:** Iain Harrison attended the BALEX DELTA exercise undertaken annually to ensure the cooperation of countries party to the Helsinki Convention in case of a pollution incident.

# Meet the Team

Meet some of the ITOPF team who are celebrating milestone anniversaries this year.

## 15 years at ITOPF



**Terry Goodchild**  
Reception & Events Coordinator

**Joined ITOPF:** 2002



**Previous experience:** Receptionist/admin roles for market research and publishing companies.

**First impressions of ITOPF:** I'd never heard of ITOPF before and didn't know a company like this existed, so it was an exciting few months getting to know the ropes. It was a small team when I joined (almost half the size it is today) and had quite a family feel. The job was also much more varied than a normal front of house role; in addition to the regular meet and greet with our Directors, P&I Clubs and spill contacts, the role involved a lot of admin support (and now events management).

**Typical day:** There's not really a typical day as you don't always know who's going to walk through the door! As part of my role, I organise lunches, socials and other events (currently preparations for ITOPF's 50th anniversary are in hand), minute staff meetings, order supplies, keep our contacts up-to-date, distribute publications, deal with broken down machinery and many other things that come along. I'm also company first aider and fire marshal.

**Best bits:** I enjoy going out and sourcing new venues for events and get a lot of satisfaction when something I've organised comes off successfully. As first point of contact for ITOPF, I also like meeting new people and keeping up with some of our older acquaintances.

**Worst bits:** Packing up, lugging round the office and shipping large quantities of publications and dealing with coffee-deprived staff when the machine's out for repair.



## 10 years at ITOPF



**Mark Whittington**  
Technical Team Manager

**Joined ITOPF:** 2007



**Qualifications:**  
BSc and PhD in Marine Biology from University of Liverpool

**Previous experience:** A variety of roles around the world within academic research, marine conservation, marine environmental consultancy, commercial diving, expedition guiding and lecturing, commercial fisheries and mariculture and humanitarian demining.

**What made you join ITOPF?** When I first heard about the job opportunity at ITOPF, it appeared tailor-made for me with a strong focus on marine science, an opportunity to continue my exploration of the world and the chance to do something that was clearly going to benefit the marine environment and the lives of people dependent on it. I am very happy to say that my career at ITOPF has certainly lived up to my early expectations.

**Typical day:** I am not sure if anyone at ITOPF, including me, has a typical day as a large proportion of our activities are focused on responding to the demands of unpredictable incidents around the world or supporting events or projects at the invitation of governments and industry. Outside of supporting our core technical services, I contribute to the management and administration of day-to-day company matters, lead the excellent members of my technical team in activities within the Americas region, help keep our travelling staff safe through developing our risk management system and act as a Pension Trustee. The wide variety of work and the challenges it presents certainly keeps you on your toes.

**Best bits:** For me, I get a lot of satisfaction in knowing that I am helping to make a tangible and positive difference to the lives of people and the marine environment impacted by pollution incidents and I have had fantastic opportunities to work alongside many people around the world who share a common passion for the sea. I also find helping to develop the skills and experience of the technical team very rewarding.

**Worst bits:** I am not the greatest fan of all the inevitable administrative jobs and associated paperwork which I know are necessary but keep me away from tackling technical issues. If an incident response is going badly it can be difficult and I certainly miss my family if I am on the road too long.

## 5 years at ITOPF (11 years in total)



**Jayne Foster**  
Office Coordinator

**Joined ITOPF:** Rejoined in 2012  
(previously 1999-2005)



**Qualifications:** BA Hons Degree in Three Dimensional Design



**Previous experience:** Various administration roles as well as experience in running a family business.

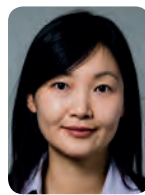
**First impressions of ITOPF:** I am in the unusual position at ITOPF to be the only member of staff to join, leave, and re-join again years later. I left to start a family making my time away potentially the world's longest maternity leave! So effectively, I can look back over two 'first days' and compare like for like. First time round I found it quite daunting arranging travel to remote destinations under the time pressures of an emergency. But in many respects things back then were much simpler. One of my duties was distributing incoming faxes, we only received about six a day. That seems incredible when I compare it to the number of emails our server currently receives which must be in excess of 1000 emails daily! And of course there's the complicated arrival of office speak. These days all I seem to be doing is 'catching low hanging fruit', 'moving forward' or 'touching base'! On the plus side I love the miracle of electronic filing. Less paper in the office definitely alleviates my job in allocating storage space and it means I can do nice things with the office rather than filling it with filing cabinets!

**Typical day:** As Office Coordinator I constantly work towards maintaining and improving the office environment, not just how it looks and functions but how members of my team provide admin support. My day always starts by checking the influx of overnight emails then the rest of my time is spent juggling concurrently running projects which involve meeting with the admin team, checking the services provided by contractors, ordering and arranging office furniture and fittings, or contributing towards internal working groups.

**Best bits:** My job plays to my natural strengths for organising, planning and problem solving so most days I'm in my element. I'm also a people person and love being busy so I thoroughly enjoy being in the hub of a bustling office.

**Worst bits:** Being asked if I'm 'singing from the same hymn sheet' and insurmountable emails!

## 5 years at ITOPF



**Ann Zhang**  
Technical Adviser

**Joined ITOPF:** 2012



**Qualifications:** PhD in Chemical Engineering, MSc and BSc in Environmental Engineering

**Previous experience:** Before joining ITOPF, I worked on a variety of research projects on energy storage systems, aquatic toxicity relating to nanomaterials, etc. In the eight years of post-graduate research, I have also co-supervised MSc and PhD projects, and collaborated with industrial and academic partners in many parts of the world.

**First impressions of ITOPF:** My first impression of ITOPF was that it's a dynamic organisation full of energetic people. People do things with such enthusiasm, at work as well as in life. It was great to meet marine biologists who are into cycling, hiking and mountain climbing, published chemists who're also keen sailors and gardeners, and many colleagues who can run a marathon without breaking a sweat! I'm glad to say that five years on this impression hasn't changed a bit.

**Typical day:** As any member of the technical team would tell you, a 'typical day' could be anything from walking 10 miles on a rainy beach for a site survey, sitting at a meeting table with officials, making presentations for the government and industry, writing in-depth reports, etc. It is not exaggerating to paraphrase that the only constant thing is change.

**Best bits:** For me, the opportunity to work with different people in different parts of the world, including many remote areas, is the most amazing bit. The adrenaline rush we get while working on an emergency often keeps us in a positive flow.

**Worst bits:** I'm more sceptical (or even cynical) than my previous self, due to the amount of alternative facts we are exposed to in some lines of our work.

## TIPs in Japanese

The TIPs are now available in Japanese and are available for downloading from our website. These have been translated by the Oil Spill Response & Industry Support Department, Petroleum Association of Japan (PAJ).

The TIPs are now available in nine languages: English, French, Spanish, Arabic, Russian, Korean, Chinese, Japanese and Turkish, with Portuguese in progress.



# Staff News

We successfully filled two vacancies that arose in the last year. In September, **Susannah Domaille** joined ITOPF as a Technical Support Coordinator. She has a bachelor's degree in mathematics and a master's degree in atmosphere, ocean and climate sciences. She previously worked in the finance industry and as a marine conservation volunteer in the Fiji Islands. Susannah's role at ITOPF includes the evaluation and assessment of claims arising from incidents and providing support to the wider technical team.

In October, **Naa Sackeyfio** was recruited as Information Data Analyst to manage ITOPF's incidents and claims database, and provide data analysis and GIS mapping services. Naa has a degree in natural resources management and a masters in GIS and previously worked for an environmental consultancy.

This year has seen the departure of two members of the technical team. **Kelly Reynolds**, a Senior Technical Adviser, resigned in June. Kelly has been with ITOPF since 2008 and has attended 24 spills, anchored many others and presented at numerous training courses and seminars. She also led our internal environmental



*New recruits Naa Sackeyfio and Susannah Domaille*

damage working group. In March, we said goodbye to **Romain Chancerel**. Romain has been a Technical Adviser at ITOPF since January 2015 and left to join an oil spill consultancy in France.

We are currently recruiting for new Technical Advisers to join the team.

In April, we also bid farewell to our China Liaison Officer, **Rose Ying**. Rose has worked tirelessly to raise awareness of ITOPF's technical services in China for five years and we wish her well in her future

endeavours. Going forward, ITOPF will work to build on the important relationships that Rose has established by liaising directly with China from our base in London.

We offer our congratulations to four members of staff who had babies during the last year; baby girls for **Ann Zhang**, **Claire Keogh** and **Karen Young** and a baby boy for **Nicola Beer**. Our congratulations also go to ITOPF's Managing Director, **Karen Purnell**, on her marriage in June.

## Interspillage 2018

ITOPF is part of the INTERSPILL steering committee and helping to develop the themes and streams for the next conference which will take place from 13-15 March 2018 at ExCel in London. INTERSPILL is the leading European oil spill conference and exhibition looking at issues related to spill prevention, preparedness, response and restoration. ITOPF is also working with Cedre and OSRL to develop the programme for the Science Workshops which will run alongside the industry seminars during the conference.



*The ITOPF team enjoyed a day of white water rafting on the Olympic course at Lee Valley last summer*



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