

OCEAN ORBIT

THE NEWSLETTER OF THE INTERNATIONAL TANKER OWNERS POLLUTION FEDERATION LIMITED



▲ Olympic rings at Tower Bridge, London 2012

Managing Director's review

As I write this review the London 2012 Olympic and Paralympic Games have just finished and London is basking in the afterglow of these events – even if we weren't able to bask in much sun this year! The Olympic motto, '**Faster, Higher, Stronger**' proposed upon the creation of the International Olympic Committee in 1894, some 118 years ago, remains as appropriate today as it was then. This year also marks the centenary of the symbol of the Olympic Games: five interlocking rings, coloured blue, yellow, black, green and red on a white background, capturing the colour of every national flag competing at that time, and now representing the union of the five regions of the world.

To endeavour to do one's best where a common, global goal is the prize is surely to be commended. In a year that marks the 30th anniversary of UNCLOS, it is fitting to recall that this Convention was agreed in a spirit of mutual understanding and cooperation in order to contribute to the 'maintenance of peace, justice and progress

for all peoples of the world'. Embodied in this Convention are two important parts that codify each Party's obligations to protect and preserve the marine environment and to promote marine scientific research. The Convention calls for progressive development of international law to address many of these objectives and we have seen a burgeoning of legislation aimed at achieving better safety and environmental performance. While I doubt that many would fail to recognise the merit of striving for improvement in these areas, a balance that recognises the need to protect and preserve the environment and facilitate, rather than hamper, the seaborne trade upon which we all rely is necessary. The marine environment is precious yet remarkably resilient in the face of infrequent oil spill events. Nevertheless, in seeking to protect and preserve it, care needs to be taken to ensure that the intent of laws that are put in place is genuine. It is interesting to note that science underpins the parts of UNCLOS identified above, stating for

example that 'appropriate scientific criteria' should be established for the formulation and elaboration of rules, standards and recommended practices. Specifically for ice-covered areas, laws and regulations for the prevention, reduction and control of marine pollution from vessels shall be 'based on the best available scientific evidence'. All too often we see the altruistic aim of protecting and preserving the marine environment sullied by underlying political or fiscal agendas, the effect of which is to compromise good science.

Thinking once more of global goals and standards, the tanker industry has every right to feel proud of reducing the quantity

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of oil spilled into the marine environment to its lowest ever level, as demonstrated by our statistics earlier this year. The topics featured in this edition of *Ocean Orbit* highlight some of the other factors that come into play when incidents occur, such as the environmental consequences of salvage or wreck removal activities and the hazards associated with lost containers from containerships.

To widen the experiences of our technical staff beyond those associated with ships involved in incidents, we have been seeking to join our shipowners on a short voyage. We were very pleased to have this opportunity recently when two of our technical advisers joined the MT ALASKA for a voyage from the Canary Islands to Portugal. They were able to be a part of life on board a ship and to appreciate better the day-to-day pollution control activities undertaken by the crew. The benefits of membership were evident in the positive interaction between ITOPF and the shipowner during this voyage and we've taken the opportunity to draw attention to these benefits in this edition of *Ocean Orbit*.

2012 is also the 5th anniversary of entry into force of the OPRC-HNS Convention, a Convention designed to improve preparedness in the case of spills of hazardous and noxious substances (HNS). While the origin, destination and use of oil is well known, the same is not true of the many and varied HNS transported by sea. An improved understanding of the pattern of HNS transport, as well as their fate and behaviour in the marine environment, will enhance the quality of risk assessments and preparedness planning in the event of an incident. In this newsletter we've taken a look at the type of HNS most often spilled and compared this with our experiences in order to contribute to this understanding.

A key objective identified in our 2011–2015 Strategic Plan was the updating of our technical publications. I am delighted to report that we have renewed our entire set of Technical Information Papers (TIPs) and our book, 'Response to Marine Oil Spills', which is held in ships' libraries and is also available as an e-book. The set of 17 TIPs can be downloaded from our website free

of charge and is also available in Chinese; other languages will follow shortly. The updating of these publications represents an important step in reinforcing our role in raising the standard of education and awareness in spill preparedness and response. In this regard, you may also have seen announcements during the course of the year about the recipients of the 1st annual ITOPF R&D Award. More on this initiative undertaken on behalf of our shipowners can be found on our website and in this edition of *Ocean Orbit*.

Taking advantage of the London 2012 Olympics, we can apply the same motto to our work: we aim higher by taking every opportunity to improve preparedness and response to marine spills worldwide; we are doing this faster by ensuring that we are fully staffed and funded to focus on specific areas of need; and we become stronger as our outreach inspires a new generation of students and our name becomes even more strongly associated with being the primary source of objective technical advice in this arena.

ITOPF – benefits of Membership

Shipowners may be Members or Associates of ITOPF depending upon the type of vessel that they own. For administrative ease, both in respect of ITOPF and individual shipowners, and to provide a 'package' of insurance benefits for shipowners, membership of ITOPF is put into effect via the shipowner's P&I insurer. This is an effective means of providing the full range of our services, which includes access to:

- emergency 24/7 technical advice and, where necessary, attendance on-site at incidents involving a spillage (or potential spillage) of oil, chemicals or other substances;
- our highly qualified and experienced technical staff to answer queries related to the fate and effects of these substances in the marine environment;
- objective technical advice on the most appropriate response techniques to minimise pollution damage;
- the objective technical assessment of claims for compensation in conjunction with those paying compensation and claimants;
- advice on realistic scenarios for testing during exercises and drills and participation in these, either remotely or in person;
- advice on the preparation or updating of contingency plans;
- advice concerning national, regional



▲ Meeting our Members

- and international approaches to preparedness and response to spills of oil, chemicals and other substances;
- educational seminars and workshops;
- historic information and statistics relating to oil and chemical spills;

- our technical publications.

We encourage our shipowners to make full use of the services available to them and to contact us directly if they would like further information.



▲ *Equipment deployment exercise in the Barents Sea*

Assisting with planning and preparedness

We participate in many drills and exercises at the request of our shipowning Members or Associates, oil companies, governments and inter-governmental organisations, such as HELCOM and the Arctic Council. Those attended this year have ranged from notification exercises, which test alerting and call out procedures, to full-scale exercises involving equipment deployment and designed to test the capability of a local team to respond to particular spill scenarios. Where appropriate, we have provided constructive feedback to planning and operational personnel and also used the opportunities to strengthen relationships with key organisations and government agencies involved in spill response. Two of the larger events are described below.

In April, Miguel Patel and Franck Laruelle were observers at the National Preparedness for Response Exercise Program (PREP) in Delaware Bay, Philadelphia. PREP was developed to comply with requirements under the Oil Pollution Act 1990 and, as part of this program, government-led, multi agency area exercises are organised every three years. These typically involve representatives of federal, state and local government, industry and non-government agencies. The Delaware Bay exercise was office-based and involved a simulated collision between an oil tanker and a barge on the Delaware River. It tested many aspects of the response plans, including

staff mobilisation, communications, transportation, containment and recovery, protection of sensitive areas, personnel support, documentation and procurement. It was a good opportunity for our technical staff to raise awareness of the role of ITOPF among the various agencies, as well as to observe the systems in place for dealing with an incident in the USA.

In June, ITOPF was invited to participate in the Barents Sea exercise organised by the Emergency Prevention Preparedness and Response (EPPR) working group of the Arctic Council, as part of a three day workshop. The exercise involved joint search and rescue and oil spill response

operations and included vessels and helicopters from both Norway and Russia. Henk Renken was onboard one of the participating vessels and observed the deployment of offshore boom around a simulated slick, consisting of fire fighting foam and bark. The exercise also had a shoreline clean-up component, designed primarily to test customs procedures involved with the movement of emergency equipment between Norway and Russia. Henk was able to observe some of the current capability for responding to spills in the Arctic and also to appreciate the logistical challenges of working and responding in such a harsh and remote environment.

▼ *PREP exercise, Delaware Bay, Philadelphia*



ITOPF's role in salvage and wreck removal

Our work in relation to salvage and wreck removal is not necessarily restricted to providing technical advice on oil pollution matters. Salvage and wreck removals are complex operations that can generate concern for the marine environment. With increasing public awareness of the environmental impacts of shipping incidents, both real and perceived, the pressure is on salvors to complete the work without causing any further environmental damage. Local authorities usually require the bunkers or oil cargo to be removed prior to any salvage or wreck removal operations in order to minimise or avoid pollution. However, there are many processes and materials involved that could affect the environment, local commercial activities or the salvage operation itself. The potential for environmental impact depends on many variables, such as the weather and currents at the location of the vessel, its cargo/fuel, the sensitivity of surrounding habitats and the type of commercial activities occurring in the vicinity. Here we highlight some of the salvage-related issues that ITOPF has provided advice on in recent years.

In December 2011 the TK BREMEN (GT 3,992) ran aground on a beach in France within a Natura 2000 site (special designated area of ecological interest), spilling an estimated 70 tonnes of IFO180. After carefully analysing the various salvage options, it was decided that the best way forward was to demolish the ship on site. To achieve this, the salvors required heavy

equipment for which a temporary access road, a storage site and parking needed to be created in a sensitive dune area. Our technical adviser on site provided advice to the local consultancy that was tasked with building the access road and on the subsequent restoration of the dunes once demolition was completed.

Salvage and wreck removal operations involving ships carrying cargoes classified as hazardous and noxious substances (HNS) have their own set of complications. Clearly, the health and safety of those involved in these activities will be a priority and we are often asked to advise on the potential dangers of the cargoes involved. In a recent incident, two trailers holding drums of waste cobalt catalyst fell overboard during bad weather and our advice was sought on the potential effects of this waste on the marine environment. Careful evaluation of the properties indicated that any effects on the environment would be negligible. Nevertheless, during the evaluation it became clear that some components of the waste could react with seawater and generate noxious gases, which could be very dangerous to personnel if exposed to it. In this instance the information provided to the authorities and salvors enabled them to take appropriate actions to ensure workers' safety. Although Material Safety Data Sheets (MSDS) provide useful information, they become of little value when substances are mixed together or when they are fully submerged, thereby changing the potential

exposure pathway. Therefore, knowledge of the circumstances of the incident and the packaging and location of the substances on board will be helpful when performing a risk assessment and considering ways to mitigate the risks.

Even innocuous cargoes carried in bulk, such as iron ore, coal, cement or perishable goods, have the potential to harm the environment thus necessitating the risks associated with such cargoes to be carefully evaluated. For example, decomposing cereals in the holds of casualties can generate a build-up of hydrogen sulphide (H₂S) gas, which can be lethal to workers that are exposed to them in confined spaces. In addition, if large quantities of these cargoes are spilt or jettisoned they may harm the marine environment either by smothering benthic flora and fauna or by creating a hostile environment as a result of decomposition of perishable cargoes on the seabed.

For example, in March 2011 the bulk carrier OLIVA (GT 40,170) ran aground and broke in two on Nightingale Island in the remote Tristan da Cunha Island group. The ship was laden with 65,000 tonnes of soya beans, a significant percentage of which spilt in the near-shore area generating concern about the impact of the cargo on the local lobster fishery, which is still being determined. Similarly, the ANGEL 1 (GT 21,000) ran aground on a coral reef in Mauritius in August 2011 with a cargo of 30,000 MT of rice, of which a relatively small quantity spilt onto the coral reefs, with no

▼ TK BREMEN being demolished on site



discernable impact. The salvors proposed to jettison the remaining rice cargo and, as a precaution, we advised that this should be done well off shore to prevent the rice from having a negative impact on the sensitive coral reef.

Local authorities have often permitted vessels to be scuttled, subject to certain conditions being met. In April 2011, our advice was sought in relation to the potential environmental impacts of scuttling the container vessel MSC CHITRA (GT 33,113). The vessel was involved in a collision in August 2010 at the entrance to Mumbai port, resulting in a spill of some 600 tonnes of fuel oil and a challenging salvage operation. Eventually it was decided that, because of the poor physical condition of the vessel, scuttling was the best option. All containers that were holding dangerous goods were removed from the vessel, however a large quantity of other substances remained on board, including those used in the ship's construction and propulsion, and



▲ Soya beans spilt at sea may ferment and create a localised hazard

the contents of the remaining containers. Working together with the authorities, our assessment of the hazards enabled an informed decision to be made and the vessel was eventually scuttled in deep waters (>1,000 m) off the coast of India.

As can be seen, ITOPF's role in salvage and wreck removal activities can be diverse

and goes beyond advising solely on oil pollution matters. Our advice is sought on a wide range of issues, either on site or remotely. As always, it is given on an impartial basis with the aim of mitigating pollution or environmental damage arising from the salvage work, whether it is from the oil, cargo or the wreck itself.

ITOPF funds research into the effects of oil on fish health

As a scientific organisation, we recognise the importance of investing in good quality R&D to encourage improvements in accepted 'best practice' for spill response and environmental monitoring. In 2011 we launched the annual ITOPF R&D Award with the backing of our shipowners, their P&I insurers and the IMO. This Award provides up to £50,000 each year to fund R&D initiatives geared towards developing pragmatic solutions to address some of the challenges faced when responding to accidental oil and chemical spills and assessing their effects on the environment. Applications are reviewed by the ITOPF R&D Committee which comprises members of our technical staff and well-respected, independent scientists with a wealth of experience in maritime and environmental issues, including staff from the IMO's Marine Environment Division.

The 2012 ITOPF R&D Award was given to the promoters of the FishHealth project, a consortium of four research institutes led by the Laboratoire des Sciences de L'Environnement Marin (LEMAR, France), partnered with the University of British Columbia (UBC, Canada), the Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles des eaux (CEDRE, France) and the Consiglio Nazionale delle Ricerche (CNR-IAMC, Italy). The Award is being used to fund a PhD student who will work

with the consortium to study the health and behaviour of fish in the presence of dispersed oil and to provide operational recommendations for using dispersants in coastal waters. The ITOPF R&D Committee found the FishHealth project to be innovative and relevant, especially given the renewed focus on the consequences of dispersed oil following the DEEPWATER HORIZON incident. The first results of FishHealth will be known by the end of the year.

Candidates wishing to apply for next year's Award should visit our website

and complete an electronic application form, submitting it no later than 31 December 2012. The Award is open to any reputable R&D establishment or other organisation worldwide intending to fund a candidate (student, individual or project team) to undertake research related to accidental marine pollution. Applications from all academic disciplines are considered, although preference is given to those with an applied scientific focus, such as marine biology, chemistry, ecology, physics, engineering or economics.



▲ FishHealth: the winner of the first ITOPF R&D Award. Photo © Nicolas Le Bayon, Ifremer



FOCUS ON CHINA

▲ Shoreline clean-up being carried out by a local Ship Pollution Response Organisation (SPRO)

We continue to have a particular focus on spill preparedness and response related activities in China. The country remains in the spotlight due to the ever-present risk of spills associated with the density of shipping traffic in the burgeoning economy, and the introduction of new oil pollution regulations in 2010.

Of the 14 incidents that we've attended on site in the last 12 months, two were in China. In March, a containership carrying HNS and other cargo ran aground spilling an unconfirmed quantity of heavy fuel oil outside the Port of Fuqing, Fujian Province, and in June a general cargo ship was involved in a collision off the coast of Shanghai which resulted in the spillage of over 100 tonnes of heavy fuel oil. During attendance at both of these incidents, our technical advisers liaised closely with the Chinese authorities, particularly the Maritime Safety Administration (MSA), to advise on effective response strategies and potential oil spill impacts. We also provided remote advice at two other incidents in China, including a bunker spill from a tanker.

Demand for our services has also been high in connection with the introduction of new Chinese regulations, adopted in 2010, which require the operator of any ship carrying polluting and hazardous liquid

cargoes in bulk, and any other vessel over 10,000 GT, to have a pollution clean-up contract with a Ship Pollution Response Organisation (SPRO) approved by the China MSA before the vessel enters a Chinese port.

In November 2011, we took the opportunity to run a seminar in Beijing in conjunction with our board meeting on the new pollution regulations. The seminar attracted over 100 attendees, comprising a mixture of Chinese government representatives, Chinese and international shipowners, shipping industry bodies, SPROs, P&I Club representatives, lawyers and others, and provided an excellent opportunity for those involved in all aspects of marine spill response to familiarise themselves with the practicalities of implementing the new regulations. During the seminar, the Chinese government's perspective on the regulations was provided by the Director of the Ship Safety and Pollution Prevention Department for the MSA, along with the Deputy Director of the MSA's Oil Spill Response Centre in Yantai. The P&I Club perspective was offered by Steamship Mutual and the shipowner viewpoint was presented by China Shipping Development Co. Ltd.

The regulations came into force on 1 January 2012 and our technical team has assisted the International Group (IG) of P&I

Clubs with providing recommendations to the Clubs and their shipowner members with regard to the signing of SPRO contracts. This was achieved by conducting technical assessments of the proposed response tariffs and comparing them with previously assessed rates in China and reasonable rates from oil spill response organisations worldwide.

We are delighted to have a key role in the development of a new joint IMO-IPIECA Global Initiative (GI) programme for China, with the aim of enhancing the degree of response capability and promoting cooperation between government and industry. The inaugural GI Workshop was held in Qingdao in June hosted by the China MSA and attended by over 70 delegates from international organisations, government and industry. ITOPF's Technical Director, Richard Johnson, and Technical Team Manager, Alex Hunt, provided presentations and participated in the discussions with the IMO, IPIECA, China MSA and other parties. The workshop concluded that the risk of oil spills in China continues to rise with an increase in the number and types of ships trading in the country's ports. As a consequence, there is a need to build on the existing level of preparedness to be able to meet the challenges of the changing level of risk. One key advantage of the GI programme is the potential for greater cooperation between

government and industry. The participants at the meeting approved the options for a biennial programme of joint GI activities and agreed to the establishment of an informal oil spill preparedness and response technical consultative group, which would include ITOPF.

In response to our ever-increasing workload in China, we appointed Rose Ying as a China Liaison Officer in July 2012. Rose is based in Shanghai and her role involves extending and developing our network of contacts with key government authorities, scientific organisations and SPROs in the region, as well as organising meetings, seminars and training courses related to our work. Rose has eight years' experience of liaising and promoting the work of foreign companies in China while employed at the commercial departments of the British, Australian and Swedish consulates in Shanghai. She has also worked as project manager for the China-Britain Business Council. Rose's ability to liaise with key agencies in China provides an excellent opportunity for ITOPF to raise awareness of the important and objective role that we play in improving the effectiveness of oil and chemical spill preparedness and response in the region.



▲ ITOPF's new China Liaison Officer, Rose Ying (far left), with Patricia Charlebois, Head of the Pollution Response section of the IMO, and ITOPF's Technical Team Managers, Franck Laruelle and Alex Hunt

▼ Richard Johnson presenting at the IMO/China MSA/IPIECA GI Workshop on Oil Spill Response



Hazardous & Noxious Substances – trends and trades

HNS transportation and risk

For the purpose of the 2000 OPRC-HNS Protocol (and this article), a hazardous and noxious substance (HNS) is defined as "any substance other than oil which, if introduced into the marine environment, is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea"¹. This definition includes substances that are flammable, explosive, toxic, corrosive or reactive and may be transported as:

- Liquefied substances or gases;
- Bulk solid materials;
- Materials and substances carried in packaged form.

A huge variety of chemical products are transported as bulk cargo on carriers or chemical tankers, or as packaged goods in bottles, boxes and crates loaded onto general cargo or container vessels.

Although the recent global economic crisis caused a sharp reduction in the volume of bulk and packaged HNS goods moved by sea, by 2010 the figures had returned to pre-crisis levels or higher. Bulk cargoes represented the largest proportion of HNS goods transported by sea in 2011, as reported by the United Nations². In 2004 the European Maritime Safety Agency³ (EMSA) reported that 42% of the total cargo transported in European waters was liquefied, while dry bulk accounted for 26%. ITOPF has also reported⁴ previously that methanol and other liquefied cargoes account for 46% of worldwide chemical tanker trade, with vegetable oils making up a further 29%.

When looking at changes in the volume of HNS cargo shipped over the last 40 years, the worldwide marine transport of the five most common bulk solid cargoes (i.e. iron ore, coal, bauxite, alumina and phosphate) increased from 448 to 2,333 million tonnes loaded. This represents a 500% increase in the volume transported and a similar picture emerges when considering bulk liquid cargoes and packaged goods over the same period.

Loss of packaged goods can occur through storms washing deck lashed cargo overboard or through damage to the vessel as the result of an incident. Sometimes, fuel oil may also be lost and can mix with the cargo. Occasionally, cargo has been

Rank	Substance
1	Iron ore
2	Sulphuric acid
3	Caustic soda
4	Fertilisers
5	Cereals
6	Ammonium nitrate
7	Phosphate
8	Coal
9	Sulphur
10	Vegetable oils

▲ Figure 1: The top 10 substances spilt

deliberately jettisoned to assist in refloating a vessel after grounding.

The IMO reported the findings of a study⁵ on 315 maritime incidents from 1917–2009 and ranked the results in order of the frequency and volume spilt. The top ten cargoes are illustrated in Figure 1. The study showed that 51% of the 315 incidents involved bulk cargoes and 47% involved packaged substances, while the remaining 2% was unknown. A comparable study conducted by the United States Coast Guard over the period 1992–1996⁶ concluded that the nine most frequently spilt HNS cargoes were sulphuric acid, phosphoric acid, caustic soda, acrylonitrile, vinyl acetate, benzene, toluene and xylene and that half of the total volume of HNS spills recorded involved sulphuric acid.

The limited statistics available on HNS transport, together with differences in reporting criteria, make it difficult to assess the risk of these cargoes being spilt. However, logically, the risk will increase in relation to the volume and frequency transported. Bulk liquid cargoes that evaporate, such as methanol, ethanol and toluene, are transported in significant quantities and the risk of such cargoes spilling will have increased as a result of the increase in frequency of transport over the last 40 years. Coal and iron ore together represent 57% of the worldwide dry bulk cargo trade² and, as such, will also have an increased likelihood of being spilt. Thus, the suggested risk of an HNS substance being spilt increases in the order: bulk liquid cargoes followed by bulk solid cargoes and then packaged goods.

Trade routes for the top 10 HNS substances

Worldwide chemical transport, either in bulk or packaged form, is currently centred on the hubs of Europe, Eastern Asia and North America where the main chemical processing and manufacturing facilities are found. For example, much of the liquefied bulk cargoes within European waters are related to the export of refined chemical products. The trade routes for the top 10 substances listed in Figure 1 reflect the variability in concentration of resources and raw materials as well as the dominance of the emerging and developing economies within East Asia, as illustrated in Figure 2 and described opposite:

1 Iron ore

Iron ore is the key ingredient in manufacturing steel and is primarily used in construction. Brazil, India and Australia are the leading exporters of the raw product from numerous mined sources. The global sea trade routes flow primarily towards the major importers of China, South Korea, Japan and Germany. China alone currently accounts for just under half of all seaborne iron ore imports, as growth in the region continues.

2 Sulphuric acid

Sulphuric acid has a wide range of uses, including as an electrolyte in lead-acid batteries, as a cleaning agent and in mineral processing, fertiliser manufacturing, oil refining, waste-water processing and chemical synthesis. It can be shipped in bulk liquid form or as packaged goods on container vessels. The major exporters include Mexico, Peru, Japan and Korea and

¹ [http://www.imo.org/About/Conventions/ListOfConventions/Pages/Protocol-on-Preparedness,-Response-and-Cooperation-to-pollution-Incidents-by-Hazardous-and-Noxious-Substances-\(OPRC-HNS-Pr.aspx](http://www.imo.org/About/Conventions/ListOfConventions/Pages/Protocol-on-Preparedness,-Response-and-Cooperation-to-pollution-Incidents-by-Hazardous-and-Noxious-Substances-(OPRC-HNS-Pr.aspx)

² *Review of Maritime Transport (2011)*. UNCTAD (United Nations Conference on Trade and Development).

³ EMSA (2007). *Action plan for HNS pollution preparedness and response*

⁴ *Are HNS spills more dangerous than oil spills?* (2009). Dr K. Purnell, ITOPF. White paper presented at INTERSPILL, Marseille.

⁵ MEPC/OPRC-HNS/TG 12/5/3. 12th Session, 16th May 2011.

⁶ USCG (1999). *Hazardous Substances Spill Report Vol II (8)*. April 1999.



▲ Figure 2: Examples of bulk cargo trade on the primary and secondary shipping routes⁹

they ship primarily to China, India, the USA and Chile, with smaller volumes frequently being transported to Brazil. Uniquely, India is both an importer and exporter of sulphuric acid in various forms.

3 Caustic soda

Caustic soda is also known as 'Lye' or sodium hydroxide and is used in many industries, mostly as a strong chemical base in the manufacture of pulp and paper, textiles, drinking water, soaps and detergents. It is often transported in solid form as pellets, flakes or granules, but can also be shipped in liquid form. Production facilities are centred in North America, Asia and Europe.

4 Fertilisers

The largest exporters of potash and phosphate crop fertilisers during 2009 were Canada and Russia, who were primarily sending products to India, Brazil, the USA and China. Export of nitrogen-based (nitrogenous) fertilisers from Russia and China is common, whereas smaller quantities of nitrogenous fertiliser are exported from the USA, Ukraine and Saudi Arabia. The main importers of nitrogenous fertilisers are India, Brazil, the USA, with smaller quantities being imported to France and Thailand. Recent published data indicates that the sea trade in fertilisers has remained relatively constant over the past 10 years⁷.

5 Cereals

The largest exporters of wheat and coarse grains during 2010/2011 were the USA, Brazil, Canada, Australia, Ukraine

and Argentina. The sea trade routes for most cereals primarily flow in the direction of the importing areas, which are Africa, South America, Asia and the Middle East. Interestingly, North America accounts for approximately 50% of the worldwide wheat and coarse grain exports and yet also approximately 2.5% of worldwide total cereal imports².

6 Ammonium nitrate

Commonly found in solid form, ammonium nitrate is heavily utilised in the production of high nitrogen fertiliser products. It is transported in bags and containers, primarily following the same shipping routes as fertilisers.

7 Phosphate

Phosphate is considered one of the primary substances transported in bulk and is a raw material that is used in agriculture and industry. Phosphate mines are primarily located in the USA, Egypt, Morocco, Jordan, Israel, Saudi Arabia, Iraq and Australia, although not all producers export significant quantities of phosphate abroad. Morocco alone produces up to one third of the phosphate transported globally. The main importers of phosphate are China, India, the USA and Brazil, with the majority being used to manufacture fertiliser.

8 Coal

Coal is another of the primary cargoes transported in bulk and is mostly used as a fuel source in power plants and large-scale manufacturing. The largest coal exporting countries in 2011⁸ were Indonesia (309Mt), Australia (284Mt), Russia (124Mt), the USA

(97Mt), Colombia (75Mt), South Africa (72Mt) and Kazakhstan (34Mt). The largest importers of coal during the same year were China (190Mt), Japan (175Mt), South Korea (129Mt), India (105Mt), Taiwan (66Mt) Germany (41Mt) and the UK (33Mt).

9 Sulphur

The main use of sulphur is in the manufacture of sulphuric acid for the production of fertilisers. A total of 95% of the worldwide sulphur production is as a by-product of crude oil and natural gas processing, with the only remaining elemental sulphur mines located in Poland. It is commonly transported in bulk as a solid, as crushed lumps, or in coarse grain form. Major exporters of sulphur include Canada, the USA and the Middle East (producing from gas refineries). China is by far the largest importer of sulphur.

10 Vegetable oils

There are various types of vegetable oils transported by sea. These include palm oil, soybean oil, rapeseed oil, sunflower seed oil, palm kernel oil, cotton seed oil, peanut oil, coconut oil and olive oil. They are used in cooking oils and bio-fuel blending. The primary exporters are Indonesia, Malaysia

⁷ Shipping statistics yearbook 2011 edited by B. Lemper (2011). Published by the Institute of Shipping Economics and Logistics (ISL), Germany.
⁸ 2012 Edition of the IEA Coal Information, 2012 Edition of the BP Statistical Review of World Energy.

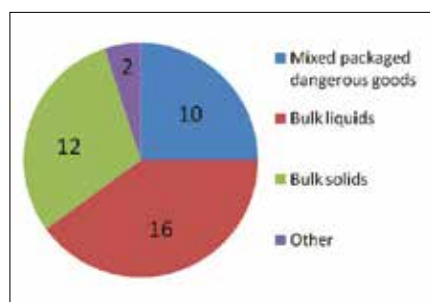
⁹ Information sourced from: GAC world Jan/Mar 2011 published by GAC. 10: Dry bulk and Understanding chemical pollution at sea – a learning guide published by Cedre in partnership with Transport Canada, 2012.

and Argentina, with the majority of products being imported to China, India and Europe. Production of vegetable oils is increasing, with palm oil and soybean oil seeing the greatest increase in recent sea trade².

HNS-related incidents

Excluding hydrocarbon based oils, ITOPF has recorded 207 HNS-related incidents during the period from 2002 to 2006, and a further 231 during the five-year period from 2007 to 2011. The increase in reported incidents is most likely to be the result of a combination of improvements in reporting and information sharing as well as the previously mentioned increase in shipping activity.

ITOPF has provided advice on 40 incidents in which HNS was actually spilled over the 10-year period from 2002–2011. Of these, 70% of the incidents involved bulk cargoes as compared with only 25% of incidents involving HNS in packaged form. The substances most commonly involved were sulphuric acid and iron ore, followed by methanol, toluene and ethanol. When comparing the proportion of substances involved, 16 included at least one product



▲ Figure 3: ITOPF HNS case statistics 2002–2011

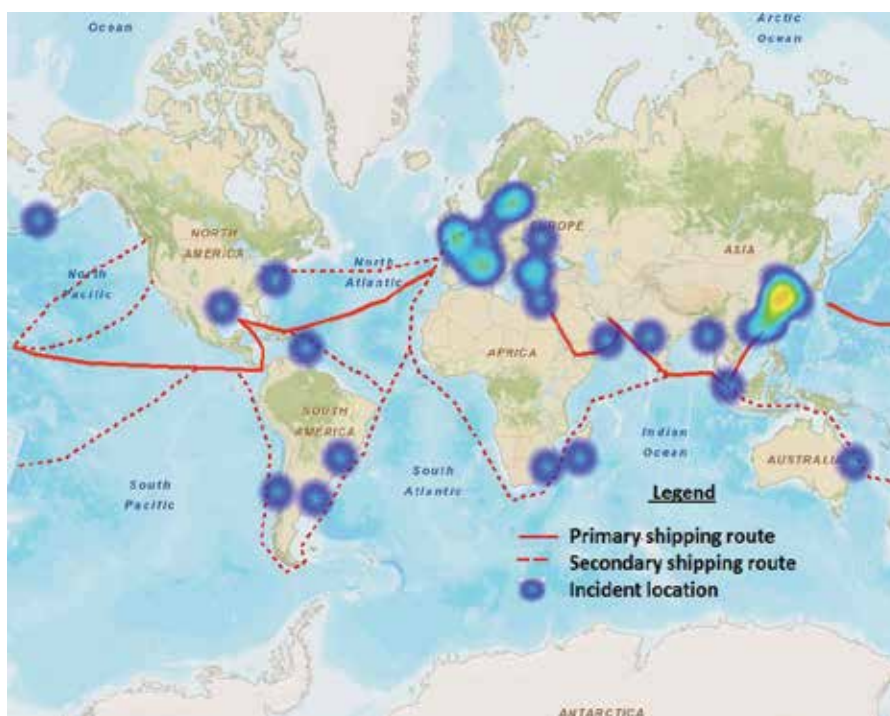
in the IMO's 'Top 10' list in Figure 1. When compared with the list of 'Top 10' substances transported by sea as reported by the United States Coast Guard (USCG), ITOPF's statistics reflect the risk associated with the transportation of large volumes of these substances and follow the trend in risk described earlier.

The cause of the incident may have an effect upon the volume of cargo lost as groundings or collisions may potentially lead to a partial rather than a full loss of the cargo. When looking at the HNS cases that ITOPF has been involved in, it becomes apparent that a significant proportion of the cases are related to a vessel sinking rather than a grounding or collision. Nonetheless,

the number of HNS incidents attended by ITOPF remains lower than that for spills of bunker fuel.

Locations of HNS spills – ITOPF data

When reviewing the location of HNS-related incidents that ITOPF has advised upon, a strong correlation between shipping routes and the location of the largest chemical facilities was identified. Figure 4 illustrates the incident locations alongside the primary and secondary HNS trade routes, with 'hot spots' noted in Europe and East Asia.



▲ Figure 4: HNS incidents with ITOPF involvement, 2002–2011

Work experience at ITOPF

ITOPF provided an opportunity for three students to gain work experience this year. In the spring, a Year 10 student spent two weeks in the office exploring options for creating a dedicated webpage on ITOPF's site for young people. Shortly after this, a sixth form pupil spent some time interrogating ITOPF's archives and updated a number of case studies for the website. Then, during the summer, an MSc student from University College London (UCL) undertook a project that combined his studies on geophysical hazards with ITOPF's spills database to analyse the

meteorological hazard profile of major oil tanker shipping routes. The student produced a risk hazard map showing shipping traffic intensity and storm tracks and found that many of the busy shipping routes tended to pass through areas of high storm risk, especially in the South East and East Asian regions, close to Vietnam and the south of China. When evaluating ITOPF's spill data, he found a positive correlation between the location of oil spills attended by ITOPF and areas of heavy traffic and frequent storms. However, his initial research suggested that the number

of actual cases where storm or weather conditions were identified as being the primary cause of the incident was small, although it is acknowledged that poor weather could be indirectly responsible for navigational errors, collisions and groundings etc.

If you have an interest in the marine environment and would like to undertake a short work experience placement with ITOPF next year, please contact Carol Remnant (carolremnant@itopf.com). Opportunities are limited due to the emergency nature of our work.

ITOPF undertakes voyage with the crew of the MT ALASKA

As part of our internal training programme and outreach to our Members and Associates, Andrew Tucker and Rebecca Coward travelled 691 nautical miles from Tenerife to Portugal on board the oil tanker ALASKA, owned by the Tsakos Group. This gave them first-hand experience of daily life on board a tanker and provided them with a better understanding of the operations and equipment involved with bunkering, loading and discharging of the cargo.

While on board, Andrew and Rebecca undertook extensive vessel layout familiarisation visits with various members of the crew, including tours and explanations of the engine and pump rooms, the bridge and the manifolds. They also had the opportunity to observe a pollution response drill conducted to simulate an over-fill of crude oil during loading. They were able to examine the vessel pollution response plans and equipment as well as gain a better understanding of the actions of the crew should they actually need to deal with a spill.

Andrew and Rebecca gave a presentation about the role of ITOPF and provided a case study of a tanker incident involving a significant oil spill. This included the clean-up techniques employed and the consequences of the oil on the local economy and population. The crew expressed interest in past ITOPF cases and were keen to know more about the issues arising from a large loss of cargo in the event of an accident.

We are very grateful to Tsakos for hosting Andrew and Rebecca onboard one of its tankers and for giving them an insight into the practicalities and potential hazards of transporting oil. The voyage was a valuable experience for both ITOPF and the officers and crew of the ALASKA and the opportunity to exchange ideas and experiences was a key benefit. It is hoped that further training voyages can be scheduled for other members of the ITOPF team.



▲ The deck of the ALASKA



▲ Andrew Tucker presenting to the crew of the ALASKA

Designated Person Ashore

Our Members and Associates have first call on ITOPF's services but this is not always fully appreciated by those within the technical departments of shipowning or ship management companies who might be in the frontline at the time of a spill. A key group of individuals with whom we would like to establish closer contact is the Designated Person Ashore (DPA). Under the International Safety

Management (ISM) Code, the DPA is responsible for monitoring the safety and pollution prevention aspects of the operation of their ships and for ensuring that adequate resources and shore-based support are available.

Since May, we have been contacting designated persons through our Members, their agents or ship management companies in order to update and expand our DPA

database. This will enable us to establish a point of contact in the event of a spill, as well as help us to increase awareness of ITOPF and the services we provide. Furthermore, it will make it easier for us to invite these individuals to events that they may find informative in their role.

If you are a designated person, we would appreciate your assistance by completing a survey, which can be found on our website at <http://www.itopf.com/information-services/designated-person-survey/>.

Staff news

In the last 12 months we have recruited four new Technical Advisers. **Miguel Patel** joined ITOPF in October 2011. He has a degree in zoology and a master's degree in environmental management. Miguel is a native English and Spanish speaker and previously worked voluntarily at the National Energy Foundation designing and implementing an Environmental Management System. **Dr Joe Green, Nicoletta (Nicky) Cariglia** and **Dr Shengwen (Ann) Zhang** all joined ITOPF in October 2012. Joe has a degree in marine geography and researched the sustainable reuse of oily waste from marine spills for his doctorate. He previously worked for Natural England as a statutory adviser on marine and coastal nature conservation in English waters. Nicky has a degree in marine biology and a higher degree in tropical coastal management and was previously employed by a marine resources and fisheries consultancy. She is fluent in Italian, in addition to English. Ann is a Chinese national, with an MSc in environmental engineering and a PhD in chemical engineering. Since completing her doctorate in 2009, Ann has worked on a

variety of applied projects at the University of Leeds.

We have also recruited **Dr Tim Lunel** in the new role of Support and Development Director. This position is designed to develop some of ITOPF's support activities, in particular those functions that serve to raise our profile and provide a reliable claims assessment service. Tim formerly worked with AEA Technology where he was involved with the SEA EMPRESS incident. He was later Director of Regions with the Countryside Agency and joins us from his most recent role as Chief Executive of the

National Energy Foundation. Tim has a BA in natural sciences, a PhD in oceanography and an MBA. He starts work with us in December.

Unfortunately, in September 2012, **Andrew Tucker**, a Senior Technical Adviser, left us to join BP as an Oil Spill Adviser for their crisis management and business continuity team. We wish him well. We congratulate two of our Senior Technical Advisers, **Colleen O'Hagan** and **Kelly Reynolds**, who recently gave birth to baby girls. Both mothers and babies are doing well and we hope to welcome Colleen and Kelly back to ITOPF later next year.



▲ Left to right: New Technical Advisers: Ann Zhang, Joe Green, Miguel Patel and Nicky Cariglia

OBE for ITOPF's Company Secretary



We congratulate Peter Michelmores on his appointment as an Officer of the Order of the British Empire in the Queen's Birthday Honours 2012. Peter was awarded the OBE in recognition of his contribution to British business interests and to the community in Abu Dhabi. Peter is a senior partner at the Middle East branch of international law company Reed Smith LLP and has been legal adviser and Company Secretary to ITOPF since 1980.

If you would like to be added to our mailing list for *Ocean Orbit*, or wish your details to be amended, please email us at terrygoodchild@itopf.com, indicating your preference for a printed or electronic version or both. A PDF version of *Ocean Orbit* is also available on our website.

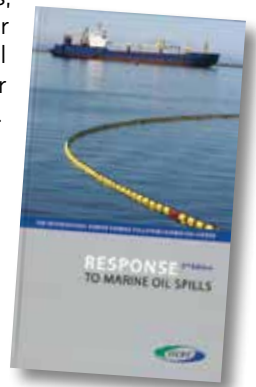
New publications

We are pleased to announce that in March we published a new set of 17 Technical Information Papers (TIPs) which provide practical and detailed guidance on various aspects of oil and chemical spill response in the marine environment. Topics covered include clean-up techniques, the fate and effects of oil, response to chemical incidents and the preparation and submission of claims. These publications were written by our technical team in between attending actual pollution incidents and draw on extensive first-hand experience of the realities of spill response.

In order to reach as wide an audience as possible, the TIPs have been translated into Chinese, and French editions are being prepared. Other key languages will follow next year. The TIPs have been placed on our website and can be downloaded free of charge. Hard copies are also available; the first set is provided free of charge and subsequent sets are priced £17 each, plus postage. Please

contact Terry Goodchild (terrygoodchild@itopf.com) for further information.

The second edition of ITOPF's book 'Response to Marine Oil Spills' was published in August. This book is an important addition to ships' libraries and provides a comprehensive and pragmatic review of the problems posed by marine oil spills. The publication discusses potential response measures, highlights relevant case histories, and is fully illustrated with photographs and diagrams. It should benefit anyone involved in training programmes, contingency planning or actually responding to oil spills and is suitable for non-technical readers. Response to Marine Oil Spills is available as a book or ebook from Witherby Seamanship at www.witherbyseamanship.com and at all good maritime chart and book stockists, priced £95.



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