

# The pollution risk from mega box ships

A mega box ship has an environmental risk commensurate with its size. Following an incident, the pollution response would need to match.



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ITOPF is celebrating 50 years of involvement with ship-source pollution incidents and, during this period, has provided technical advice to more than 100 investigations of incidents involving container ships. A number of these incidents resulted in a release of bunker fuel only, some the loss of containers overboard and others a loss of both bunkers and container cargoes. These latter examples have given rise to some of the most complex casualties attended by ITOPF.

The rise in containerised shipping and in the size of container ships has resulted in efficiencies of transport unheralded 50 years ago. In this same period, the combined efforts of the shipping industry and governments have led to an overall decrease in shipping casualties. Nonetheless, accidents cannot be ruled out and this article considers the potential for pollution from an incident involving a mega box ship.

## The risks

The largest mega box ships have the capability to carry as much bunker fuel oil as a small tanker, with the latest G-class container ships, of over 21,000 TEU, having bunker tanks with a capacity in excess of 14,000m<sup>3</sup>. Only in the most catastrophic of incidents might this amount of oil be released from such a ship, but nonetheless, the potential for release of a significant volume of fuel oil exists. The persistence of fuel oil when spilled into the marine environment may result in a protracted clean-up response, with the effects of the oil on economic activities, primarily fisheries and tourism, generating substantial third-party claims, in addition to environmental damage. ITOPF is regularly asked to provide advice on oil spills and has built a wealth of experience to assist shipowners, insurers, governments and others who may be affected.

These same ships might be expected to have upwards of 10,000 to 15,000 individual containers on board. While a proportion of the containers may be empty, these mega box ships can have a broad range of products on board and this may include a percentage of isotanks or 'tanktainers' for the carriage of bulk liquids.

## Initial response – dangerous goods

An initial focus for responders to a casualty will be the presence of dangerous goods. Even if only 1% of containers on board have dangerous goods, the possibility exists for greater than 150 containers with contents that pose a potential for harmful effects, if breached.

When ITOPF is notified of a casualty with the potential for damage to containerised cargo, an initial task will be to obtain the ship's manifest and stowage plans to locate those containers identified as holding dangerous goods. Once identified, the location of these containers on board will require analysis to understand whether an identified dangerous goods container has been damaged or lost, or is at risk of falling overboard or becoming submerged if the ship develops a list. ITOPF would expect to work closely with salvors in this regard.

With this information to hand, ITOPF technical advisers will gather information on the physical state of each of the hazardous substances while transported (for example, whether it is transported as a solid, a liquid or a gas) and its behaviour if released (for example, whether it will sink, dissolve, float or evaporate upon release). In addition, the potential for reaction of the substances if exposed to air or water or the contents of other containers will be sought, particularly if different dangerous goods are located in close proximity on board. Similarly, a knowledge of the toxicity, flammability, explosivity, corrosiveness and irritability of the substances and their reaction products is important. A fire on board the casualty would further add to the complexity and threats posed by the cargoes.

To assist ITOPF in this situation, an arrangement is in place with the National Chemical Emergency Centre (NCEC), in Oxford, UK, to allow ITOPF to obtain this important information as rapidly as possible. ITOPF holds regular exercises with the NCEC to ensure the effectiveness of this service.

The presence of dangerous goods on board a stricken container ship will compound an already complex situation. Spilled oil may be the most visible pollutant and while slicks can

cause widespread damage, they rarely present a threat to life in the way that hazardous substances can. The immediate concerns will be the potential risks to local populations, for example, by direct inhalation or through contaminated water supplies. Dissolved or floating chemicals may pose a threat to local fisheries and mariculture. ITOPF can assist with sampling and analysis regimes to ensure compliance with food safety standards. At the same time, the presence of hazardous substances may affect the ability of responders to work at sea or to clean affected shorelines. In such instances, risk assessments and monitoring equipment may be required before work can continue.

The ship's manifest is crucial to this process and co-operation would be sought from the shipowner and shipping agencies to obtain this as rapidly as possible. Nonetheless, incorrectly declared container contents will result in a manifest that does not accurately reflect the cargoes on board and will introduce further complications to the emergency response.

#### Other cargoes

Other containerised cargoes may be considered to be innocuous and inert. Nonetheless, such cargoes may become a pollutant if released from

breached containers, particularly if contaminated by spilled oil. Incidents attended by ITOPF have included a billion nurdles (small plastic pellets) distributed over South African shores, thousands of oily packets of biscuits on the French shoreline and heavily oiled waste plastic stranded in mangroves in India. Considerable time and effort were required to remove, transport and dispose of these items. Perishable goods in refrigerated containers may degrade to produce noxious gases that can be a concern, particularly when containers are recovered and opened to check for integrity. Released containers and their contents may sink to the seabed with a potential to affect benthic organisms and to damage seabed fisheries. The use of divers to recover items can be time-consuming. The logistics for dealing with recovered containers and cargo can itself be complex, requiring careful management, secure bonded areas, waste handling, etc.

#### Conclusion

Fortunately, the experience of ITOPF has been limited to incidents with relatively small-sized container ships. While ITOPF has the experience and knowledge on which to base advice for future incidents, it is clear that the scale and complexity posed by very large container ships could result in a challenging and costly response.



Investigating damaged containers can require full personal protective equipment where the potential for danger to human health exists – Image courtesy of ITOPF



Oiled waste plastic strips released from a damaged container and covered with spilled bunker oil stranded in mangroves. Considerable effort was required to clean the area – Image courtesy of ITOPF



Plastic nurdles spilled from a damaged container are recovered from a beach and sieved to separate the sand to minimise the amount of waste generated – Image courtesy of ITOPF