

To carry or not to carry?

Onboard spill response equipment - is it practicable?

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The question as to whether oil tankers should carry oil spill response equipment onboard has been the subject of debate for many years. The idea received considerable attention in the early part of this decade during the preparation of regulations by the United States Coast Guard as a result of the US Oil Pollution Act of 1990 (OPA'90). In this instance, and after much debate, the resultant US requirement stipulated the carriage of limited equipment for small on-deck spills only and not that for a spill of oil into the sea.

In some circles there is still the perception that the carriage of 'over-the-side' spill response equipment on tankers might promote a quicker and easier clean-up of any spilled oil. However, despite the attraction of the immediate availability of resources at the scene of the incident, there are many reasons why the carriage of boom, skimmers and other on water spill response equipment is neither practical nor likely to achieve a better response.

Deployment of onboard equipment

The majority of spills from tankers result from routine operations such as loading, discharging and bunkering which normally occur in ports or at oil terminals. The majority of these operational spills are small, with over 90% involving quantities of less than 7 tonnes. It is common for these ports and terminals to have their own, often significant, resources together with trained personnel in readiness to respond to these incidents, thus duplicating and diminishing the role of any onboard equipment.

In contrast, larger spills are normally associated with one or a combination of grounding, collision, explosion and hull failure. A significant number have resulted in extensive damage sometimes leading to the total loss of the vessel and loss of life. In many of these catastrophic incidents, including examples such as the AEGEAN SEA, ATLANTIC EMPRESS, AMOCO CADIZ, BRAER or HAVEN, no amount of on-

board equipment would have prevented shoreline impact. In all likelihood the equipment would have been damaged, destroyed or simply lost.

Not all major incidents result in such disastrous consequences. In these cases the priorities of a ship's crew are to ensure firstly the safety of life, secondly the stability of vessel and then thirdly to attend to the cargo and any loss of oil. It should be noted that oil tankers are manned with the minimum number of crew required for the safe and efficient operation of the vessel. In a casualty the crew need to concentrate their efforts on activities such as the internal transfer of cargo from ruptured tanks or the preparation of the vessel for salvage operations rather than the mobilisation of on-water response gear. Vessel crews are not trained spill responders and sending them over the side of a vessel to tend any equipment would be inefficient and potentially highly dangerous.

It has been suggested that storing equipment on deck for use by shore-based responders would remove the additional and onerous task of the crew to respond. Where a small vessel is trading on a dedicated, perhaps inter-island, route where it is known that very little resources are available then this may facilitate any response. However, it is preferable for responders to bring their own equipment on which they have been trained. They are able to select this equipment for optimal efficiency given the environmental factors and the type of oil spilled. This equipment will be probably more reliable given the unknown level of maintenance of that on board a vessel. Indeed, the harsher conditions to which the deck of a tanker is exposed will accelerate deterioration of equipment stored there in comparison to that stored on land.

In practical terms, pipework and other fittings do not make the deck of a tanker the ideal place to store and launch equipment. Cranes, intended for handling manifold hoses or loading stores in the calm conditions of a port cannot be used efficiently and safely in a heavy swell or strong winds. A tanker can have a high freeboard and any equipment could be easily damaged or cause further damage to the tanker if deployment were not performed carefully.

Limitations of an at sea response

The success of any open sea response is severely restricted by the inherent shortcomings of containment and recovery techniques, primarily that caused by the

rapid spread of oil over the sea surface and the effects of wind, waves and currents on equipment performance. As a result, even highly trained shore based responders with the latest equipment have difficulty recovering significant amounts of oil.

For the operation of equipment to be safe and efficient it would have to be effective in the extremes of weather and locations likely to be encountered, with the variety of oils carried on different voyages and with differing spill rates. It would also have to be reliable and require minimal maintenance. This is a tall order and meeting these requirements, even with shore based equipment, can be difficult.

While boom placed around the vessel to reduce the rapid spread of oil can facilitate clean-up, safety should be a prime consideration as the confinement of oil and vapours can pose a hazard to crew health and increase the risk of fire and explosion. Furthermore, boom so placed will limit the movement of salvage and other vessels and may become fouled in ships propellers.

Even in calm conditions a boom can become easily swamped by a large instantaneous discharges of oil. As an example, it is likely this would have been the case if boom had been placed around the EXXON VALDEZ in the initial stages of that incident. Besides, boom is able to contain a limited amount of oil for a finite period only before currents and wind cause oil to leak out.

The boom should be held at a proper distance from the vessel, as allowing it to lie against the hull would severely restrict its ability to contain oil. However, anchoring boom in deep water is a difficult if not impossible exercise. While the use of sea anchors may allow the boom to maintain its position, these are difficult to manage, being highly susceptible to changes in the current and would provide additional obstacles to rescue and response operations. The use of workboats to hold the boom has been proposed but would require further equipment storage and their operation is labour intensive and time consuming. Lifeboats should specifically not be used for this or any other purpose for which they were not designed.

To prevent the loss of oil from a boom, the oil must be recovered using skimmers. As with booms, this equipment has severe limitations in an at sea response and would require additional manpower and vessels to handle not only the skimmers but any attendant power supplies, pumps and hoses. Again, the presence of hoses in the water may impede other operations.

Once any oil has been recovered, it must be pumped to storage. Such storage would be either in barges deployed from the deck of the tanker, on the deck of the tanker, or in an empty, sound tank within the tanker. Additional equipment such as oil/water separators may reduce the amount of storage required but the volume will be large. While the discharge of the entire cargo into the sea is unlikely, except in catastrophic circumstances, the discharge of even one tank may involve the loss of over 10,000 tonnes of oil. For a successful operation, temporary storage of this or higher capacity might be required. Careful preparations would have to be made to ensure that the onboard storage of any recovered oil does not upset the stability of the vessel which may already be precarious.

Dispersant application

On rare occasions it has proved possible to apply dispersant from the deck of a vessel as a way of treating a slow leak of oil. While the use of dispersants may remove some oil from the sea surface and reduce the need to send resources over the side, problems such as the amenability of the oil to dispersion, contact with the oil and subsequent mixing, and the constraints set by national regulations will all tend to limit its use.

Where dispersant is applied through fixed spray arms the location of these arms relevant to the breach in the hull is crucial to allow effective contact with the oil and subsequent dispersion. The use of portable hoses is limited by the ability to manhandle them around the often very large deck and numerous deck fixtures of the vessel and would again divert the crew from other tasks. Significant quantities of dispersant may be required and the limited shelf life could make storage an uneconomic proposition. Despite these reservations, the carriage of modest amounts of dispersant may nevertheless be viable. However, where spraying is an option, the large scale application by shore-based resources such as aircraft is clearly more effective.

Conclusion

To manage an entire response safely and effectively there must be sufficient trained response personnel on scene, numbers of whom will not be available from the crew in the event of an incident. Vessels simply cannot carry on board sufficient resources

to fulfil the requirements of a satisfactory response. The preparation of suitable vessel contingency plans is a much more practicable alternative to achieving a successful response to a spill of oil.

This has been recognised internationally by the International Maritime Organisation and reflected in the Convention for the Prevention of Pollution from Ships (MARPOL), which requires tankers to carry a shipboard oil pollution emergency plan. This plan must include emergency activation procedures for the notification of the relevant authorities, the coordination of shipboard action with national and local authorities and the reduction or control of the discharge of oil following the incident. It has been acknowledged that these actions rather than the carriage of equipment onboard will do significantly more to mitigate the effects of any oil spill.

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