Pollution response vessels: Oil spill recovery

Emmanuel de Nanteuil, Engineer, R&D department, Cedre, Brest, France

On 18 March 1967, when the Liberian oil tanker the Torrey Canyon, loaded with 119,000 tonnes of crude oil, grounded between the Isles of Scilly and the British coast, Europe’s eyes were opened to a previously neglected risk; having only experienced a few small-scale accidents. The years following this first major oil spill were sadly to reveal the extent of the threat, through a number of other accidents, as varied as they were tragically famous.

Amongst the different spill response techniques available, the option of using vessels capable of recovering oil slicks at sea before they reach the shore, was initially considered a purely cosmetic solution. However, this technique gradually assumed an ever increasing role with the never ceasing chain of accidents.

Since the 1979 Exxon Valdez disaster in Alaska, which led the way in recovery at sea, techniques have evolved considerably, and with them the effectiveness of operations. When the Prestige was shipwrecked in Spain in 2002, around half of the oil spilled was recovered at sea, thanks to both specialised pollution response vessels and fishing boats equipped with less sophisticated means.

Different types of pollution response vessels

Over the years, the fleet of vessels used for oil slick recovery in high seas has never stopped expanding. Over and above the small, limited craft based in coastal areas and ports, over 200 pollution response vessels with a storage capacity of over 100 m³ exist in the world today.

Specific vessels

A number of these vessels have been specially designed for pollution response operations. Some of them even have an articulated structure in view of facilitating recovery. In particular, Germany worked on developing this type of response means in the 1980s, creating highly original solutions such as split-hull recovery vessels, which open longitudinally to contain the slick, and catamarans equipped with surface skimming systems, stretching between the two hulls, positioned some ten metres apart.

These vessels can generally be considered as the first generation of pollution response vessels. They were however seen as limited because of their somewhat moderate marine capacities and due to the fact that their unique design quickly came to penalise them in terms of their use for other purposes, in order to ensure their cost-effectiveness outside of crisis periods.

Converted vessels

Certain ships have been known to be converted into pollution response vessels, thus abandoning, after alteration, the activities for which they were originally designed. In reality, very few vessels have ever been transformed. The majority of the converted vessels were coastal tankers, their storage capacity being exploited for pollution response purposes.

Convertible vessels

A third category of ‘convertible’ ships is made up of vessels which carry out a variety of operations on a daily basis, but are specially equipped for pollution response and can be rigged in a matter of hours for oil slick recovery.

These ships now form the main part of the pollution response fleet. They have the advantage of providing a cost-effective solution and of undergoing regular maintenance during non-crisis periods. One of the main factors involved in this issue is the selection of supplementary operations which are compatible with the need for immediate availability in the event of an accident.

In this respect, certain countries which carry out offshore activities, Norway being in first place, choose to use platform supply vessels, or PSVs, which are given pollution response capacities. When the need arises, these ships can be rapidly prepared in order to deploy several hundred metres of floating booms, in which the slicks are contained and thickened by towing the boom. The slicks are then pumped into the vessel’s tanks by floating skimmers. This type of solution is particularly popular in the United States and France. The French Navy, in charge of French response at sea, already chartering the PSVs the Ailette and the Aleyon, belonging to the company Surf (Bourbon Group), chartered a new vessel, the Argonaute, in 2004. It was equipped with a 1,500 m³ storage capacity, amongst other specific means.

Other countries, such as the Netherlands and Japan, have developed convertible dredgers, taking advantage of the large tanks for their substantial pollutant storage capacity. The Dutch dredger the Rijndelta, used on the Sea Empress (1996) and the Prestige (2002) spills, has for example the capacity to stock some 3,000 m³ of fuel. These vessels usually use lateral sweeping arms fitted with powerful pumps, allowing the containment and recovery of the oil by positioning the vessel on the slick. These instruments proved to be very effective for collecting highly viscous heavy fuel oil in the latest pollution incidents, and their use has been expanded in the pollution response fleet over the last five years, including onboard PSVs. French pollution response vessels are now equipped with such tools.

Amongst the various other types of convertible vessels, particular reference may be made to buoy tenders, which are relatively common in Germany (the largest examples being the Mellum, the Neuwerk, the Schanhorn and the most recent the Arcona). In the Netherlands, oceanographic vessels are often used, such as the Ana, used in both the Erika and the Prestige incidents.

When pollution strikes...

Unfortunately, simply possessing quality vessels is not enough to entirely resolve the problem of oil spills. Depending on the location of the spill, slicks may either hit the coast almost immediately, or fragment rapidly at sea into a multitude of slicks, which then drift in areas of up to several thousand square metres.
Although it may seem wishful thinking to hope one day to be able to recover the entirety of a major oil spill at sea before it hits the shore, experience from past accidents has proved that the use of pollution response vessels is both useful and necessary, to avoid at least part of the oil arriving on the coast, taking into consideration the potential impact, clean-up costs and the psychological effects on the population.

Recent spills have also highlighted the need for cooperation between different countries in the event of a crisis, by the bias of pooling maritime response means, as allowed for and organised by multilateral agreements (in particular in Europe the European Community, the Bonn, Helsinki and Lisbon Agreements, the Biscaye Plan, the Manche Plan and the Lion Plan). In the Prestige incident, thirteen specialised vessels from nine different countries thus worked together to recover fuel at sea, under Spanish, and later French, organisation.

It is in line with this thinking that the different States are currently expanding equipment stockpiles, in view of creating a balance between regions and complementing the available means. In 2005, Spain acquired five multitask response vessels, the Luz de Mar, the Miguel de Cervantes, the Don Inda, the Sebastián de Ocampo and the Irmáns García de Nodal. A sixth new construction is expected to be completed by the end of 2006. Swede has launched a programme for two large supply vessels, and plans in parallel a renewal of its existing fleet, from 2008 on. Greece on the other hand has planned the construction of nine smaller vessels. Meanwhile three convertible ships are soon to be launched in Malta. Other plans are also in the pipeline in various European countries, including Portugal and Finland. At the end of 2005, Europe eventually set up charter agreements through the European Maritime Safety Agency (EMSA) to provide the affected countries with extra vessels in the event of pollution. It is within this framework that the French cable layer the Île de Brehat (Louis Dreyfus Armateurs) has been altered in 2006 in view of transforming her into a convertible pollution response vessel. Other vessels, of coastal tanker type, have been chartered in the Baltic and Mediterranean area.

These efforts contribute to a continued improvement in the response capacity of different States to pollution at sea. Figures published by the International Tanker Owners Pollution Federation (ITOPF) relating to spills of more than seven tonnes, excluding acts of war, show that an average of 114,000 tonnes of oil were spilled at sea per year during the 1990s. Since 2000, the average is currently around 30,000 tonnes per year.