

PAJ OIL SPILL SYMPOSIUM

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EARL'S Involvement in and Lessons Learned from the Nakhodka Incident.

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Background.

On 2 January 1997, the 21000dwt, 27 year old Russian tanker "Nakhodka" broke in two in stormy weather in the sea of Japan. The tanker was en route from China to Russia with a cargo of about 5 million gallons of heavy fuel oil when she took a list and began taking in water during the early hours on that fateful day.

31 crew members were found adrift in lifeboats and were rescued by the Maritime Safety Agency of Japan. The captain of the ship was missing and presumed dead.

By 6th January, an estimated 1 million gallons of the cargo had leaked from ruptured tanks in the bow section of the vessel. Attempts to contain the oil and efforts to apply dispersants from the air were seriously hampered by the stormy weather in the area. Six metre waves and strong westerly winds forced a 10 kilometre-wide slick towards the coast. The bow and the oil slick drifted for 5 days under the influence of wind and current.

On 7 January, the oil washed ashore on a 29 kilometre stretch of beach at Mikuni. Slicks threatened the rocky coastline of Noto Peninsula. The spilled oil also beached at scattered locations along a 500km stretch of the western coast. The shoreline contamination extended as far south as Sakai and as far north as Kashiwazaki. The heaviest pollution was just north of Mikuni and between Wajima and Suzu at the northern tip of the Noto Peninsula, where an estimated 500,000 gallons of oil-water emulsion stranded.

By 10 January most of the fuel oil released during Nakhodka's breakup had either dispersed or come ashore. Oily sheens continued to surface above the sunken stern section of the ship but were dispersing naturally and did not pose a threat to coastal resources.

As the spilled oil started coming ashore, response crews deployed booms at several strategic locations to protect sensitive shoreline areas, including the water intakes for 15 nuclear power plants in Wakasa Bay. On the shoreline, a total workforce of about 8000 paid and volunteer workers, using vacuum trucks, shovels and buckets to remove oil from beaches and near-shore waters in six affected prefectures, recovered about 1.75 million gallons of oily water, sand and debris by 14 January. The recovered mass was temporarily stowed in large open pits, and then transported in bags and loaded onto vessels bound for incineration facilities elsewhere.

The grounded bow section of the ship contained an estimated 740,000 gallons of fuel oil which had to be removed. The tanker owners contracted Nippon Salvage and Fukada Salvage to conduct the salvage operation. The plan was to stabilise the bow while piercing the hull plating in selected locations to pump the remaining oil into barges. As a backup plan, a causeway was built extending from the shore to the bow section. If the attempt to pump the oil into barges failed due to stormy weather and rough seas, the causeway would allow vacuum trucks access to the bow to remove the remaining cargo.

As long as the oil remained in the bow of the tanker, it threatened to further pollute the already heavily polluted shoreline. On 13 January, ITOPF acting in the interest of the tanker owner, contracted East Asia Response Pte.Ltd (EARL) to counter the above mentioned threat and lend support to the oil recovery operations at sea. At 0125 hours EARL was activated.

EARL' s Involvement.

At about 0100 on the 13th. of January, EARL'S CEO was contacted by the ITOPF representative at the scene of the incident. A discussion was held on what would be the most suitable equipment to transport to the scene of the spill. It was agreed, that for the purpose of standing by the up-ended bow section, a containment boom with an integral viscous oil recovery capability would be the most suitable. It was agreed that the "Ro-Skim" unit would be mobilised to the scene.

The Equipment

The "Ro-Skim" Containment and Recovery System consists of a 50 metre section of inflatable boom with a specially designed weir opening and a hydraulically driven screw pump, which sits behind the weir opening. Attached to this is a 150 metres section of the standard inflatable boom. The combination of boom and skimmer section allow the system to be deployed in an optimum configuration to contain and recover viscous oil in heavy sea conditions without having to deploy a separate skimmer.

The system is powered by a Desmi Powerpack

Two Ro-skims and two reels containing 200m lengths of Ro-booms were selected for the task. By 0210 hours staff had begun to arrive at the Centre and commenced preparations to have the equipment ready for loading onto trailers.

Documentation.

One of the biggest time consumers during a mobilisation operation is the completion of customs documentation. In the past EARL had to withdraw manually from the filing system the documents which matched up with the items of equipment chosen for mobilisation. In the event of a major mobilisation, where most or all of the equipment from the stockpile is mobilised, the manual extraction, matching of documents and making up the cargo manifest, could take up to four hours.

However with EARL'S recently developed computer software the task can be carried out in a fraction of the time.

The "Nakhodka" incident was the first test of the Response Equipment Management System or REMS developed by EARL and it proved a blessing.

Put simply each item of equipment in the EARL stockpile has an asset number. The asset number is fed into the computer and the computer will do the rest. From just a few prompted entries into the computer, the packing list, pro-forma invoice and the cargo manifest are printed out within minutes.

These documents were then signed and stamped and handed to the forwarding agent who has the job of ensuring the equipment is quickly passed through customs.

Forwarding Agent.

EARL has a number of forwarding agents it can use, but its prime agent is Jardine International Movers, a subsidiary of the International group Jardine Pacific. Most people in the region recognise the name of Jardines for international transportation. The company has a massive network of sub agents and contacts across the region, which assists greatly in moving equipment into countries and providing the infrastructure to get the equipment to the scene of the spill. Reputations and relationships built up over decades of the movement of goods across countries is important when trying to get specialised equipment through frontiers during the hours of darkness. This network and infrastructure proved invaluable in getting EARL'S equipment to the "Nakhodka" spill site in Mikuni in the shortest time possible. Just as important, the company played a significant part in the speedy and effective return of the equipment back to the EARL centre.

Movement of Equipment and Personnel

Some two hours after the initial activation by ITOPF, two trailers arrived on EARL'S site at 0330 hours and loading of the prepared equipment commenced and was completed by 0430 hours. By 0600 hours the trailers had arrived at Seletar airport.

EARL has on a wet lease a civilian version of the Hercules C-130. The type of aircraft was chosen because of its versatility of operation. For instance the aircraft can land in places that other aircraft of the same carrying capacity cannot, and when it does land the aircraft has been designed for easy offloading with conventional equipment. However the prime reason this type of aircraft is chosen for EARL'S use, is its ability to deploy an Airborne Dispersant Delivery System or ADDS Pack. Flying at an altitude of 50 to 100 feet the aircraft fitted with the ADDS Pack system is an unrivaled dispersant spraying tool and has been used effectively by EARL on a number of occasions.

However on this particular occasion the aircraft was to be used to transport the two Ro-Skim systems to Japan and the equipment was loaded into the C130 by 0730 hours. The C130 took off at 0800 hours, some six and a half hours after the initial callout and gave an estimated time of arrival at Osaka Kansai Airport of 2100 local time. The equipment actually arrived at the spill site at about 0300 hours, approximately 25 hours after the call from ITOPF.

One EARL supervisor accompanied the equipment on the C130 while a task force leader with two specialist operators flew on a commercial flight and arrived at Kansai airport at 1745 hours. Contact with ITOPF was made at about 2330 hours upon arrival at Mikuni, twenty two hours after callout.

Equipment Development

The intention at that stage was that the EARL equipment would be fitted to a support vessel and remain on standby in the event that oil, suspected to be in the stranded bow section was released during the salvage operation.

The next morning on the 14th, of January, the salvage vessel "Koyo Maru" arrived at Mikuni and presented herself for an inspection prior acceptance by ITOPF. The inspection was to see if she was suitable for use with EARL equipment. However, her working deck was found to be cluttered with shipboard machinery and she could not be used as presented. Her owner, Nippon Salvage then offered to install a temporary steel deck above the deck machinery and this would create space for the storage, deployment and recovery of the EARL equipment. By the evening of 16 January, the modified deck on the "Koyo Maru" was completed the booms, skimmers and ancillaries were loaded, and the vessel set out to sea with three EARL specialist operators on board.

On the same day, ITOPF further activated another three specialist operators from EARL with the intention to operate the second set of booms and skimmer on another vessel. The men arrived in the afternoon of 17 January and loaded the equipment on the "Shin Kai Maru". As the vessel was not equipped with storage tanks to receive recovered oil-water emulsion from the sea, the owner Fukada Salvage Company, fabricated an open-top portable steel tank with a capacity of 20m³ and welded it to the deck of the vessel to overcome the problem. The vessel sailed the next morning with the EARL team on board.

Between 18 - 29 January, the "Koyo Maru" and "Shin Kai Maru" were operated along the coast between Wakasa Bay and Noto Peninsula under the guidance of the Command Centre at Mikuni which received oil slick reports daily from helicopter overflights. During that time however, their search for the by now highly emulsified oil were at times interrupted by stormy days when they had to anchor and take shelter from the elements in quieter waters .

With the passage of time, strong winds and high seas, most of the spilled oil fragmented into small pieces most of which were no bigger than the size of tennis balls or dinner plates. The oil slicks were widely scattered and mostly driven close to shore by wind and tide. The shallow depth of water and the close proximity to land prevented the use of the classic contain-and-recover method usually employed by vessels in the open sea. As such, the vessels were reduced to recovering the oil by means of nets and scoops from the deck of the vessels. There were however, two occasions when the scattered remains of the emulsified oil were found to be of sufficient quantity in deeper waters away from the shoreline and this permitted the use of the Ro-boom and skimmer resulting in a small measure of success.

Demobilisation

By 30 January the grounded bow section of the vessel was believed to contain little or no oil at all. The threat of a large release of fuel oil from the bow section was no longer there and ITOPF therefore commenced to demobilise EARL. Our equipment was offloaded from the vessel and transported to an open pit lined with heavy-duty plastic sheets for their cleaning.

It took three days for 6 men with a hot water pressure washer to clean the two units of Ro-booms and Ro-skims. By the evening of 2 February, the equipment was judged to be sufficiently cleaned to be accepted for loading on to a commercial cargo plane. Nevertheless, to ensure that the equipment would not be rejected on the grounds of possible contamination of other cargo in the plane, they were completely wrapped over with heavy-duty plastic sheets.

Whilst the cleaning operation was going on arrangements were being made by EARL staff in Singapore to bring the equipment back to the base in the most cost effective manner. After discussing the various options with ITOPF it was decided that the equipment should be transported back to Singapore by scheduled air freight rather than going by sea. Jardines arranged the flight and the necessary documentation for the equipment's return. On 3 February the equipment was loaded on to three trucks and at about 1600 hours, the EARL team was ferried by bus to the airport bound for home. On February 4th. at about 2320 hours the equipment was loaded on a Nippon Cargo Airline aircraft bound for Singapore where it arrived at 0445 hours the following day, some 23 days after EARL had been first alerted.

Lessons Learned.

No response to oil spills will ever be perfect with everything working like a dream from start to finish, regardless of the number of times that one may have gone through it. But a well-trained and determined response team will usually overcome most shortcomings strewn in its path, learn from the experience and come out the better for it. Thus the Nakhodka incident is in that respect no different from all of the other incidents that we have attended to, and the lessons learned are mentioned here to share the experience with you. The important thing is to recognise the problems for what they were, learn the lessons and avoid the same mistakes the next time around.

1. The Vessels of Opportunity.

"Koyo Maru"

Her main deck as presented was not suitable for our purpose. There was no clear deck space of an area of about 8m x 6m to house the equipment and to deploy and retrieve them safely without damage. The modified deck gave the means to house the equipment in an area free of obstruction, which was good. But what was not realised at the time was that the added height to the new freeboard deck presented greater difficulties both in deployment and retrieval of the equipment. The greater height meant that additional weight of the boom was suspended between the deck and the waterline which increased the stress to the fabric and accessories of the boom, causing the weakest part of the boom to tear. Also with a higher freeboard and the rough weather conditions, a greater degree of difficulty was encountered during deployment and retrieval of the Ro-skim because of its substantial weight, which is 330kg.

The second problem was that the "Koyo Maru" had only one storage tank for recovered oil emulsion and it was situated in a remote area not easily accessible. To reach it, one would have to climb down into a cargo hatch, walk to the very back of it and drop a transfer hose into a small manhole at the back of the hatch. This meant that an extra length of transfer hose had to be connected to the original 60m hose attached to the skimmer and the increased length of the hose also meant a decreased effectiveness in the skimming operation. Additionally, determining the ullage from a small opening in the cargo hatch, and in poor lighting, also added to the difficulty of the operation.

"Shin Kai Maru."

The problem here, which happily remained latent, was the fact that there was no in-built tank to receive any recovered oil. It had already been mentioned earlier that a 20m³ portable tank was used to overcome the lack of a storage tank. Because little oil was encountered and less still recovered, this problem did not materialise, but if a large body of oil had indeed been encountered, given the fact that our skimmer has a rated capacity of 100m³/h, it would in theory have taken only 12 minutes to fill the tank after which we would have had to stop the operation for the day and return to the nearest port to empty the tank. The tank would then prove to be totally inadequate for the job.

From the above, it would seem that the two vessels were not ideally suited for the task at hand, which was to use the equipment that we brought out with us. One might argue that in almost every oil spill, one would be hard put to match the equipment in hand to the vessels of opportunity available, and that would be a perfectly true statement to make. Therein lies the problem. However if every contingency plan makes a point to identify suitable vessels for booming and skimming purposes, the problem would be less acute.

It is perhaps worth mentioning here that an Australian shipbuilding company was recently contracted by a harbour authority in Indonesia to build a Search and Rescue vessel with an oil spill response capability which could deploy oil spill equipment specifically from EARL.

2. Riding Shotgun.

The term 'riding shotgun' has its origin in the old wild west in the days of the American cowboys when an armed guard carrying a shotgun rode on the stagecoach to protect its contents. Even though those days are long gone the term 'riding shotgun' is still used today to mean more or less the same thing i.e. to guard a valuable cargo to ensure its safe delivery.

EARL has a policy in which any equipment sent out for use anywhere will be accompanied by at least 1 supervisor from our Centre. His task is to ensure that the equipment gets to its destination safely and to assist with customs formalities.

So it was with the equipment sent out to Osaka. EARL had a supervisor 'riding shotgun' on the equipment flown in on our C130 aircraft. At Kansai Airport he was to accompany the equipment to Mikuni. Alas, it did not work out like that. Whilst he was away from the aircraft clearing immigration on his arrival in the country, the equipment was unloaded from the plane, quickly passed through customs and loaded onto trucks, which then left without the supervisor. However one should applaud the efficiency of the ground staff at Kansai and the recognition by the customs authorities of the urgency of the situation.

3. Cold Weather Gear.

Although in EARL we are equipped with some amount of cold weather gear, coming from the heat of the tropics to be suddenly exposed to a severe cold front blowing in from the Sea of Japan was quite a shock to the task force. Luckily there was sufficient time before the vessels were ready to sail for the Team to purchase further cold weather clothing.

4. Dead Batteries.

Although it is common knowledge that battery life is severely shortened in cold weather, the Team were nevertheless surprised when they had dead batteries whilst trying to start the equipment. Difficulty in starting the power packs due to the cold caused the batteries to go flat and the lesson learned is the need to bring along not only bigger batteries but to carry spare ones and a charging unit.

5. Covers on Power Packs.

The covers were designed to slip with ease over the power packs. The corners of the covers were cut such that they allowed the lifting lugs to project through the covers. Unfortunately, these lugs were also used to secure the power packs to prevent them from moving about on the decks of vessels in heavy seas. When it was time to use the power packs, it was found that the covers could not be removed without untying the lashings on the lifting lugs. Apart from the time wasted in tying and untying the lashings, safety was also compromised during the brief period when the lashings were removed. The covers are presently being modified such that they are able to be removed without the need to lift them clear of the power packs. Velcro strips will be used instead.

6. Cleaning of Equipment.

It is common knowledge that sea water is harmful to all things metal. When the Team requested fresh water to clean the equipment, they were told that it was not available and that they should use the water from the harbour instead. Luckily the open pit which they were told to use for cleaning the equipment contained water from melted snow as well as some rain water. It was fortunate that the pit was newly finished and had not been put to use, consequently the water was relatively clean for our purposes.

7. Equipment Demobilisation

Equipment demobilisation is as important as mobilisation. Once it has been ascertained that the equipment is no longer required then it must be returned in the most cost effective manner without compromising the overall response capability of EARL.

There were three options for returning the equipment to Singapore that were open to EARL.

- (i) Ship the equipment by sea
- (ii) Airfreight the equipment back using the EARL aircraft
- (iii) Airfreight the equipment using scheduled freighter

To ship back by sea on a scheduled freighter would have required a pre-booking period of at least a week incurring extended hire charges on the equipment, whereas bringing in the EARL aircraft would have been expensive as she would have flown into Japan empty. Fortunately through Jardines EARL was able take advantage of a late cancellation on a scheduled aircraft and the most optimum option was used. EARL need to begin assessing return options very early in the response operation, thus giving the client more early information to assist in his decision making regarding demobilisation.

"In Use or on "Standby"

To suit their clients ' specific requirements EARL hire charges have three categories, "In Use," "On Standby" and "Training" However within the contract between EARL and its clients the terms are not clearly defined. As a result, in the "Nakhodka" incident when EARL invoiced the client, there was some dispute over whether the equipment was on standby or whether it was actually in use. EARL is now in discussions with the other two international oil spill response centres in UK and USA to achieve a consistent definition of these terms.

Conclusion.

The foregoing are the main lessons EARL learned from the "Nakhodka" incident. Even as the Company prepares itself to implement new procedures as a result of these lessons learned, there will always be other lessons to be learned from other incidents in the future. It is becoming an oil spill cliché but is absolutely true that no two oil spill incidents are the same. However, one thing is certain, and it is common to all spills - that all spills should be tackled as early as humanly possible. Therefore, it is critical that if there is a need for assistance from a Tier 3 Centre, then the call to activate should be made early, in order for the response to be successful.

One of the outstanding positive elements from this response was the level of cooperation that EARL received from the Japanese authorities and responders. This unconditional cooperation given in the typical Japanese fashion of friendliness and courtesy enabled EARL to carry out its task to the best of its ability. EARL'S involvement in this incident, plus the developing relationship with the PAJ through training has developed a relationship between EARL and Japanese oil spill responders which bodes well for the future.