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The Nakhodka Case; Lessons Learned and Problems to be solved

Outline of the incident

Early in the morning of January 2, 1997, the Russian tanker Nakhodka carrying 19,000kl worth of grade C heavy fuel oil for power generation suddenly broke off into two portions while sailing stormy Sea of Japan. The stern part sank while the bow section drifted for five days and stranded on the coast near Mikuni in the Fukui prefecture.

All of the 31 crew except the captain were rescued by the Japan Coast Guard and Marine Self Defense Force. However, about 6,240kl out of the 19,000kl total of grade C heavy fuel oil, which was in the damaged tank, spilled out instantly from the damaged section. The spilt oil reached the shoreline of nine coastal prefectures between Shimane and Akita (except for Toyama) within the next five to ten days.

Meanwhile, 2,800kl of oil remained and kept spilling out from the bow section which had grounded on the coast at Mikuni town. The spilt oil was recovered by various machines and equipments and put into temporary pits and drums by a total of over 500,000 people. The recovered volume was about 59,000 tons, which included sand and other debris, was collected in the adjacent ports and other places, and then transported to about twenty disposal facilities widely located around the country by total of 65 water going vessels and countless trucks.

Moreover, preparation for extraction work of the large volume of remaining oil in the bow section brought some extra work such as construction of a temporary causeway between the ground and the wreck. It was decided that the causeway was to be removed after the extraction work was completed, which was actually all finished by the end of March 1998 with an agreement with the local fisheries.

In handling the Nakhodka incident, the Maritime Disaster Prevention Center (MDPC) borrowed 9 billion JPY from the Government, made temporary payments to contractor, and negotiated with the International Oil Pollution Compensation Funds for five years and eight months until being settled, which was August 2002.

Thus, the MDPC played a key role in the Nakhodka incident. From those experiences, I would like to focus on three categories and introduce relevant problems concerning the oil spill recovery operations and systems as follows:

**Fig 1 January 9
Washed up oil and the bow
section grounded on the
coast of Mikuni Town.**



1. Aerial search and the dispatch of oil recovery boats

(1) Discovery of massive lumps of spilt oil.

The sea conditions had been so rough since the time of the occurrence of the oil spill that the accurate location of oil lumps, which should have been drifting on the Sea of Japan were not available even from an aircraft. Nevertheless, on January 8th, as the sea condition became calm, the MDPC started to obtain information about the location and extent of the oil lumps, and finally found one of the biggest ones offshore of the Noto Peninsula on January 10th.

Consequently, recovery work of those oil lumps were only done manually by fishing boats, which was only a small amount. Most of the rest of the oil lumps were washed up on the shore of the northern side of Noto Peninsula. Some of the fishermen who were engaged in the recovery operation later stated that they had collected an oil lump, which was about 70cm thick, by cutting it off with a knife.



Fig 2 Jan 11
The offshore of
Noto Peninsula



Fig 3 Jan 12 The offshore of Saruyama
Promontory. 81 fishermen's boats manually
collecting the oil lump.

(2) Oil recovery plan and operation by bucket grab hopper barges

The MDPC had had succeeded in the recovery work of massive amounts of weathered oil by using a grab hopper barge and the deployment of a boom in three different previous incidents before. From those experiences, the MDPC made arrangements for several bucket grab hopper barges in the early stages of the Nakhodka incident. On January 11th, one of those barges, the Kotobuki arrived into the Port of Fukui and immediately prepared for oil lumps recovery by installing a pump for seawater discharge and loaded ocean boom and other preparations. The MDPC attended a meeting with the Ishikawa Prefectural Government and the local fisheries to discuss the operation strategy. The Prefectural Government decided to dispatch their research vessel, the Hakusan, and prepared for loading booms, a blower fan and other equipment on to the ship until midnight that day.

On the morning of January 12th, the grab hopper barges Kotobuki and Hakusan jointly laid a boom on the offshore of the Noto Peninsula and began searching for massive oil lumps but only recovered some smaller ones. Although it was originally planned to use a large type of boom, since it was too difficult to be loaded on the vessel, a small type (B-type) of boom was used instead. As the result, the volume of oil recovered offshore by the Kotobuki during those two days on 12th and 13th January was 450 tons. The usage of the boom was not very successful due to its structural problems and other issues.



(3) Lessons learned and problems to be solved

- 1 Even though it was known that there were massive lumps of oil in advance, they were not collected by a bucket grab hopper barge or an oil recovery boat.
- 2 The structure of recovery boats in our hand are unsuitable for highly viscous oil recovery operations.
- 3 Further development of techniques of spilt oil recovery with booms is necessary.
- 4 Since the efficiency of a bucket grab hopper barge was not officially known, it was difficult to have an agreement of increase the usage of the barge.
- 5 It took so long (about three hours) for an aircraft to convey the information to the MDPC regarding the locations of oil lumps that the information was no longer useful when it was finally received.

**2 Response to a massive oil drift ashore on the sand beach
(The case of Shioya and Katano sand beaches, Kaga City)**

- (1) We observed oil drifted ashore landward across the intertidal zone due to rough weather. The sand beach between Shioya and Katano of Kaga City, Ishikawa Prefecture, which is about 3.8km long, has abundant vegetation. During the stormy night of January 8th, a massive amount of spilt oil washed up on this particular beach. The next morning the sea condition became calm and oil recovery work was done by dozens of heavy machineries such as backhoe and other equipment. The collected oil was either buried into dug holes on the beach or piled up by being moved around by those machines for some time, which made the beach sand mixed up with lots of oil. Therefore, a large number of volunteers had to manually separated the oil from the sand and collected it later on. The volume of collected oiled sand was about 5,200 tons, which was later burnt or disposed of in a landfill site. The shoreline, over several years of observation, was shown to be severely eroded. In the future, in order to deal with massive oil spills washed ashore on the beach like in this case, we need to plan and examine methods of collecting it.



(2) Lessons learned and problems to be solved

- 1 The usage of heavy machinery caused a massive amount of sand to be mixed with the oil.
- 2 The geographical features of the shore were changed by being moved landward due to damage of vegetation by heavy machinery.
- 3 A massive amount of beach sand was contaminated with oil, which was wasted and disposed of. However, there is not enough disposal methods or facilities for oily waste.
- 4 Examination of the most suitable recovery methods
 - deployments of suction tanker trucks, beach cleaning machines, and etc.

3 Countermeasures to the remaining oil inside the bow section that washed ashore on the coast (at Mikuni Town on January 7th.)

It was estimated that about 2,800kl of heavy oil remained inside the bow section which drifted across the Sea of Japan and beached on the shore at Mikuni Town and the remaining oil had been spilling out in accordance with the destruction of the hull, so extraction of this oil was necessary. However, due to the adverse sea conditions, the extraction operation was readily seen to be both demanding and time consuming.

It was under these circumstances that the insurance company initiated surveys and invited tenders, but this response was so lax that the Japanese Government decided to take forcible measures and ordered the MDPC to execute the task.

Then, on the shore side, a temporary causeway was constructed to allow access to the bow section from the shore in order to carry out the extraction work regardless of weather conditions.

(1) From the seaside

Work vessels started the operation by opening a hole on the bottom plate of the Nakhodlka, from which they pumped out the remaining oil and collected it into tankers aside. The extraction work was done by a joint venture of two salvage companies for three times in total during calm sea conditions. A total of 2,800kl of oil-water mixture was collected.

Fig 9

During calm sea conditions, the extraction operation was done all night long.



(2) From the temporary causeway

On the shore side, a temporary causeway was constructed to reach the bow section of the ship from the shore, which was 130m long, in order to carry out the extraction work regardless of the sea conditions. This construction ended up using a total of 58,000 tons of large and small sizes of rocks and tetra pods. When originally planned, it was expected to be constructed within a week, but soil and sand were washed out and eroded by waves, and it took 26 days from January 15th through February 9th for the causeway to be finished.

This construction work was done by a joint venture of seven companies from the Japanese Dredging and Reclamation Engineering Association. When this causeway was constructed, the suction work was almost already in its last stages. Consequently, only about 380kl of oil was removed from the bow section from the shore side. Nevertheless, removal of this causeway later ran into difficulties and all the site work was completed in October, when 95% of abandoned rocks were collected. Then the MDPC started negotiating with the local government. It was March 1998 when the government agreed to the completion of the work. Upon the removal of the temporary causeway, it faced problems of handling the large amount of oiled rocks, irremovable rocks, and fisheries' anger and so on.

(3) Lessons learned and recommendations for the future

- 1 In Japan, we have had several experiences of tanker incidents that they drifted ashore with large amount of oil in the tanks and, it was common manner to extract oil by hose line installed from wrecked to work vessel brought alongside.
- 2 In the case of construction of temporary causeway, it is required to clarify every aspect of planning, implementation procedure, matter of concern to the parties, demolition and financial matters by all means..



Fig 10

The extraction work from the temporary causeway