

Summary of Ports and Marine Environment Improvement Work and Example of Latest Measures in Seto Inland Sea

ATSUSHI KAWAI

Environmental Protection Division, The 3rd District Port and Harbor Construction Bureau, Ministry of Transport, Kaigan-Dori, Kobe City, 650 Japan

This report introduces the works undertaken by the Ministry of Transport to improve the marine environment, and example of latest measures in Seto Inland Sea.

1. Outline of the ports and marine environmental improvement work

The ports and marine environmental improvement work in Japan first began with the construction of facilities to dispose waste oil from ships in 1967 and devising of port pollution prevention work in 1972, as represented by removal of polluted-sediments.

Following Port and Harbor Law was revised in 1973. In accordance with this revised law, among other projects were made to.

After the war Japan passed through a period of rapid economic development.

This led to the deterioration of environment and finally to a serious state of affairs in which the living environment and the public's health was threatened.

As a result society as a whole began to demand that something to be done to put a stop to pollution. In response, by the 70's Japan's environmental improvement system had been established with a view towards putting a stop to environmental pollution.

In the port and Harbour areas, transport and production of goods is extensively carried. As a result of these activities, inflow of pollution load and environmental pollution have been serious state. In response, Port and Harbor Law was revised in 1973. Following this revised law, work to construct waste reclama-

tion site, waste from ships disposal facilities, and coastal park were started in 1973. Construction of cleaning ships, disposal of unidentified sunken ships, and Marine clean-up work began in 1974. Work to stockpile the oil fences in 1975, work to construct reclamation site for wide area waste (generated in coastal areas and broader areas inland) disposal began 1981. Work to Marine Environment Creating Work started in 1988, was work such as the sand-covering or improvement of the beach in order to improve the water bed quality. This work was based on the result of the survey of purifying bottom sediments by Ministry of Transport.

As a result of the implementation of measures based on these systems, by the mid 70's the pollution that had threatened people's health had been reduced to a remarkable degree. and apart from a number of problems such as the pollution of closed-in water-areas, pollution affecting people's living environment had also been considerably reduced allowing an escape from a very serious pollution situation.

In 1975 however, a report by the Organization for Economic Cooperation and Development (OECD) on Japan's environmental policy noted that "Japan has won the struggle to eliminate a number of pollution problems, but as far as the struggle to increase the quality of the environment is concerned, Japan is as yet far from victory."

This having been pointed out, in addition to the problem of pollution, environmental administrations began to seriously consider such topics as amenities, the creation of environments and total overall planning.

In the fashion a plan for "Ports in 21st Century" was worked out in 1985, a plan that calls for the limited functions that ports have performed hitherto, such as transport and production of goods, to be harmonized with people's lives in the creation of comprehensive port space.

With this as a basic target, harbor environment administrations are aiming to create a more pleasant, tasteful port and marine environment and are developing a number of measures to realize this aim.

2. The state of Seto Inland Sea Environment

The Seto Inland Sea is about 22,000km², the largest inland sea in Japan.

Only through "Kii Channel", "Bungo Channel", and "Kanmon Channel", exchange sea water for outer sea, is typical closed-in water-area.

As a whole, it is warm and mild in this area and rather few precipitation.

There are a lot of islands, straits, the marine traffic and coastal fishery are prosperous from old. The concentration of population is remarkable in the Seto Inland Sea. Seto Inland Sea surrounded by the Chugoku Mountains and Shikoku Mountains, and total inflow from these Mountains into the sea via rivers is voluminous. In this area, the shallow sea suited for reclaiming into the factory sites is extended, and industrial development was very eagerly made through a period of rapid economic development. Direct-flow of pollutants; from coastal industries, cities and etc., have rapidly accelerated marine environmental pollution. As a result of the regulations of waste-water and improvement of sewerage facilities, marine pollution has shown a tendency to improve.

However, in such closed-in sea areas as Seto Inland Sea, in spite of anti-pollution measures such as reduction of inflow of pollutorial load, a number of problems such as floating-refuse drifted ashore on recreational beach, organic-pollutants dissolved from the sludge on the sea bottom remain.

The following will introduce actual examples of implementation of measures aimed at "dealing with the above-stated problems".

3. The Examples of Environmental Improvement Work in Seto Inland Sea

(1) Marine Clean-Up Work

In the early 1970s, breakage of screw and fishing-net by floating refuse, driftwoods, and ropes occurred frequently and occurrence of offensive-odor-fish by floating oil, too. Marine Clean-Up Work was begun in 1974. This work is to accumulate foating refuse and oil in inner seas and inner bays such as Tokyo Bay, Ise Bay, and Seto Inland Sea as work under the direct supervision of the government.

This work have been carried out by District Port Construction Bureaus under Port and Harbours Bureau, Ministry of Transport.

In 1974, we have recieved appreciation that oil spill accident have serious impact on marine environment from accident at Mizushima kombinat (Okayama Pref.) . Ministry of Transport dispatched oil-skimming-vessel for oil recovery.

At present, emergency dispatch system be established with a view of spilled-oil recovery, apart from usually accumulating floating-oil. Emergency dispatch of oil-skimming-vessel is under the control of District Port Construction Bureaus and dispatch is based on request of Security Center under Maritime Safety Agency.

The 3rd and 4th District Port Construction Bureaus undertake Marine Clean-Up Work in Seto Inland Sea. The 3rd District Port Construction Bureau has eight skimming-vessels and boats based on six ports. These eight vessels and boats removal floating refuse and oil in 12,500km² area. The 4th Bureau has two skimming-vessels and boats based on two ports. Coverd area is 3,500km².

(2) Marine Environment Creating Work

In areas such as the Seto Inland Sea that are closed-in and have large cities located directly behind them, dispite the implementation and strengthening of regulations governing the amount of effluent produced both from domestic and industrial sources on land, the situation has not improved and problems such as red tides cased by eutrophication and bathing restrictions are still a common occurence.

Effective measures to deal with these problems include the purification of the sea bottom, because of these organic pollutants can be dissolved into seawater fromthe sludge on the sea bottom.

For this purpose, a survey relating to the implementation measures to purify the sea bottom has been in area particularly high level of sea pollution--- Suo-nada in Seto Inland Sea.

This survey is field test for work to cover the polluted sea-bed with sand. The sand-covering involves covering the sludge on the sea bottom with non-polluted sand. The outline of field test as follows;

- Date of work : Nov. 1986
- Area scale : 900m²(30m×30m)
- Thickness of sand-covering : 30cm

After 2 year, the sand covering has a beneficial effect on the marine environment and ecosystem. According to the results, the COD-containing quantity of the sea bottom was greatly reduced (reduction of 70%), and the numbers and wet weight of bentos had increased (four times as large as before sand-covering).

Using part of the information gained by the above-mentioned survey related to purification of the sea bottom, work began in 1988 on the marine environment improvement work. Sand-covered area was 140m × 140m in 1988. In 1989, was 200m×250m. From the point of view of economical efficiency, non-polluted sand produced as a by-product of dredging work to develop waterways.

4. Conclusion

From now on it is to be expected that the degree of importance of Seto Inland Sea as places used in common by the entire nation will increase. The Ministry of Transport for its part will continue to support and encourage the prevention of environmental pollution and the creation of a pleasant environment.