

Collection of summaries of WAVE studies and research

(Fiscal 1998)

November 1999

Waterfront Vitalization and Environment Research Center

## Studies and Research Department

### Basic general studies

#### Basic study to discuss port-related policies

Study	Fiscal year when study was conducted	Study outline
Study on port management methods with regard to deregulation (Independent research)	1998	This is an independent research supported by the Nippon Foundation with the aim of promoting efficient management of ports in Japan and improving their user-friendliness. This was pursued by (1) reviewing the schemes and management of overseas ports and statutory regulations on the management of ports in Japan by means of literature survey and field survey on main European ports; and (2) identifying the areas of port management that can be deregulated or subjected to the principle of competition. In fiscal 1998, attention was focused on container terminals and two approaches were presented: (1) private-sector-led efforts to develop and manage terminals (infrastructures and upstream facilities) and (2) advanced use of government-owned idle berths. A joint research with researchers invited from Germany was conducted in view of international collaboration between ports, and a seminar was held to explain and discuss the circumstances of overseas ports.

<p>Study on initiative of seafront recycling complex (First District Port Construction Bureau; Research Group on Initiative of Seafront Recycling Complex)</p>	<p>1997 } 1998</p>	<p>While the world is becoming more concerned with environmental issues, it is necessary to promote the effort to establish a resources-recycling society. Against this backdrop, this study was aimed at considering recycling business as a new industry in seafront port areas and promoting a new way of resources-recycling based on the zero-emission initiative. This aim was pursued by preparing plans based on the development of a network of main industries (such as thermal power, timber, and cement industries) and other related industries, estimating the effects of the plans, and investigating the measures to promote the plans in Noshiro, Naoetsu, and Himekawa Ports.</p>
<p>Study on business to cope with abandoned boats by PFI approach Study on promotion of marina business by using private finances (Ministry of Transport; Japan Marina &amp; Beach Association)</p>	<p>1998</p>	<p>Boats abandoned owing to the shortage of marinas and other mooring and storage facilities are a problem requiring urgent attention. The business practices that can be adopted when introducing the private finance initiative (PFI) approach to cope with abandoned boats were investigated. The issues addressed include the style of construction and management, measures of governmental support, PFI project requirements, the advantage and disadvantage of each party concerned, existing schemes, and problems. Some case studies to confirm the feasibility of the PFI approach were conducted, while setting different scopes for the private sector's development activities. Guidelines for port managers to conduct PFI projects were proposed (such as methods to select projects and methods to call for and select business entities).</p>

<p>Study on use of river vessel transportation for diversifying urban transportation and establishing inland depots for disaster prevention (Development Division of Ports and Harbors Bureau)</p>	<p>1998</p>	<p>The present state of and the statutory regulations on river vessel transportation (i.e. part of or all of the water-borne transportation is on rivers or lakes) in Japan were surveyed, and the possibility of river vessel transportation for the diversification of urban transportation was studied. The issues to be addressed for establishing inland depots for disaster prevention by using river vessel transportation were identified on the basis of case studies on physical distribution after the Great Hanshin-Awaji Earthquake.</p>
<p>Study on development of seafront distribution centers (Development Division of Ports and Harbors Bureau, Ministry of Transport)</p>	<p>1998</p>	<p>With the aim of identifying appropriate locations for seafront distribution centers and discussing the measures to create economic environments that facilitate the siting of such centers, siting requirements and other factors were studied and field hearings were conducted as regards seafront and inland entities. As a result, significant differences in opinions were found between different parties concerned, such as managers, consignors, and shipping companies. Further surveys and discussions are required in the future.</p>
<p>Analysis of changes in socioeconomic situations around ports (Development Division of Ports and Harbors Bureau, Ministry of Transport)</p>	<p>1998</p>	<p>Changes in the socioeconomic situations of ports were analyzed comprehensively on the basis of collection and analysis of existing data as well as hearings from experts. As a result, two key policies in the future administration of ports were identified: (1) provision of improved port services and (2) creation of improved seafront environments.</p>

## Study on promotion of computerization in ports

Study	Fiscal year when study was conducted	Study outline
<p>EDI for ports (Ministry of Transport; Japan Coast Guard; 25 port management bodies)</p>	<p>1998</p>	<p>The Total Physical Distribution Policy approved by the Cabinet in April 1997 states as follows: "By fiscal 1999, the electric data interchange (EDI) system will be introduced into the procedures of import and export approval based on the Foreign Exchange and Foreign Trade Control Law and into the clearance, quarantine, and other administrative procedures at the major ports and international airports in Japan. Also, the coordination of the EDI system with the existing customs clearance data processing systems will be promoted. This move is aimed at creating paperless environments for export, import, and other port procedures as well as providing one-stop services." In fiscal 1997, the Ports and Harbors Bureau of the Ministry of Transport, the Japan Coast Guard, and eight major ports prepared the Basic Policies on the introduction of the EDI system into administrative procedures associated with the arrival and departure of ships. In fiscal 1998, the WAVE was commissioned to develop the system based on the Basic Policies, and tentative operation of the system started in fiscal 1999.</p>

## Study on effect of port investment

Study	Fiscal year when study was conducted	Study outline
<p>Study on socioeconomic effect of port investment Nationwide (Ports and Harbors Bureau of the Ministry of Transport)</p>	<p>1997 { 1998</p>	<p>Recently, the transparency and efficiency of decision making are strictly required in public works. Therefore, investment must be evaluated by cost-benefit analysis and other methods when constructing port facilities. In 1997 and 1998, a committee on the socioeconomic effect of port investment was established together with its five special committees (physical distribution, human transport, disaster prevention, living environment, and privatization) to investigate in detail the cost-benefit analysis method applied to 18 port facilities relevant to the Ministry of Transport. This effort included case studies in which the analytical method was applied to actual ports, and an evaluation manual was proposed as an outcome. The results of the survey were published in the "Guidelines for evaluating port investment - 1999."</p>

## Project studies

### Study on seafront vitalization

Study	Fiscal year when study was conducted	Study outline
<p>Study on Maizuru Port seafront reconstruction (Third District Port Construction Bureau of the Ministry of Transport; Kyoto Prefecture)</p>	<p>1998</p>	<p>The Maizuru Port PR 21 Study was conducted in 1992 and 1993. With the slogan "Hub of human, cultural, and physical exchanges in the Sea of Japan Rim area," basic plans were developed for the Nishiko area, mainly around Wharf No. 3, as regards passenger ship terminal facilities, green waterfront areas, and water use. Based on these plans, discussions were made on a committee basis to clarify what can be done to develop physical distribution capabilities and create port areas that are open to the public. Some highly potential projects were proposed, such as mooring of an exhibition ship, operation of ferries and pleasure boats within the port, and provision of a multi-purpose green area for citizens.</p>

## Study on development of import-promoted areas

Study	Fiscal year when study was conducted	Study outline
Study on development of infrastructures for import promotion at Hitachinaka Port (Hitachinaka Port Office of Ibaraki Prefecture; Second District Port Construction Bureau of the Ministry of Transport)	1998	Hitachinaka Port is a major international port that plays an important role in relieving the ports in Tokyo Bay from the excessive concentration of physical distribution in the capital region and promoting the development of the North Kanto region. Ibaraki Prefecture is planning to develop infrastructures for import promotion under the foreign access zone (FAZ) scheme. In this study, opinions were invited on a committee basis from various parties concerned, and an FAZ infrastructure development project was planned. The form of third-sector companies that develop FAZ infrastructures was clarified, required items such as distribution facilities having a capability of container freight station (CFS) were identified, and a project schedule was developed.

## Study on long-term regional planning

Study	Fiscal year when study was conducted	Study outline
<p>Study on project of Tokyo Bay coastal area development and revitalization (Second District Port Construction Bureau)</p>	<p>1997 } 1998</p>	<p>The six principal ports in Tokyo Bay are facing the need to restructure the role of each port in view of changes in trading structure (as exemplified by increases in the export of capital goods and the import of consumer goods) and changes in the sea lanes in East Asia and other regions. In consideration of this backdrop and the Basic Concept of the Tokyo Bay Port Project as well as the present status and the expected trend, collaboration on a regional basis was discussed and new structural and basic development policies on the Tokyo Bay coasts were prepared. Case studies were carried out for the Keihin seafront area (existing area) and the Chiba area (new area). In consideration of the past approaches, creation of new functions using public money, promotion of infrastructure development through the integration of land readjustment and port roads, and promotion of tentative use were suggested</p>

### Study on planning of port development

Study	Fiscal year when study was conducted	Study outline
Study on requirements for accepting an international cruise liner (Okinawa General Bureau)	1998	Star Cruises, which is growing remarkably in recent years among Asian cruise companies, has launched in March 1997 an international cruise liner that departs from and returns to Keelung, Taiwan and call at Naha. This was the first international cruise liner to stop in Japan. The results of hearings from Star Cruises and other ship companies suggest that Taiwan and Japan represent an important market for Asian cruise companies and that Okinawa has a good potential of becoming a hub port for Asian cruises because of its geographic situation at the center of the market and its good resort environment.

## Study on planning and commercialization of waterfront facilities

Study	Fiscal year when study was conducted	Study outline
Study on improvement of seafront accessibility for passengers (First District Port Construction Bureau)	1998	Port areas where passenger terminals are sited are often not easily accessible from city centers. Improvements in accessibility in terms of barrier-free design are required in particular in marine transport that serves remote islands. Against this backdrop, the present status of urban public transport was investigated in relation to the Niigata-Sado line. As a result, introduction of simple guideway systems, such as lightweight monorail and streetcar systems, was found to be most appropriate for the relevant port transportation.
Study on Fushiki-Toyama Port project (Fushiki-Toyama Port Construction Office of First District Port Construction Bureau; Toyama Prefecture; Takaoka City)	1998	In the Fushiki-Toyama area, facilities are being developed in Fushiki Outer Harbor to improve physical distribution in the port and to solve maintenance and dredging problems. In the Fushiki Outer Harbor project, a deep quay (14 m in depth) addressed in an existing project was discussed. Moreover, burial and dredging in the inner harbor as well as burial in the outer harbor were scheduled for efficient and effective relocation of functions in consideration of the state of the outer harbor development and a plan of using the existing bulkheads in the inner harbor area. Furthermore, measures to use the existing facilities effectively after the relocation of the inner harbor distribution function and measures to coordinate the Minatomachi Fushiki area with the surrounding facilities were discussed.

<p>Study on Shimoda Port upgrading project (Shimoda Public Engineering Office, Shizuoka Prefecture)</p>	<p>1998</p>	<p>In Shimoda Port, a basic plan on the development of a distinctive community making full use of the resources and characteristics of Shimoda City was prepared under the guidance of "Working Party on Shimoda Port Marine Town Project" formed in 1989. Four main development areas were selected, and the corresponding plans discussed in detail. The existing plan was reconfirmed, and a development plan for the Takegahama area, which is close to the main areas but was not included in the previous study, was discussed.</p>
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## Study on projects related to physical distribution

Study	Fiscal year when study was conducted	Study outline
Study on Hososhima Port container terminal (Miyazaki Prefecture)	1998	Container terminal facilities are being constructed in the Shirahama area of Hososhima Port under a port project that is targeted for completion by fiscal 2010. On the basis of planar layouts (presented in the fiscal 1997 study) for fiscal 2000, when services will start tentatively, and fiscal 2010, a circulation plan based on straddle carriers and a drain/pavement plan were developed. Furthermore, measures of container terminal management and a stepwise development approach were proposed.
Tamashima area land reclamation Design of total plan for foreign and domestic trade container terminal on Wharf No. 6 (Okayama Prefecture)	1998	A full-scale international container terminal, to be a physical distribution center, is being planned in the Wharf No. 6 (12 m in depth) area on the east side of the Tamashima artificial island in Mizushima Port. The terminal should be efficient, cost-effective, modern, and competitive so that it can cope with not only the amount of cargo estimated in past studies but also potential increases. A basic plan on the facilities, equipment, management, and operation of the container terminal was prepared, and a basic design that forms a basis for an execution design was developed.
Study on improvement of physical distribution efficiency in regional port (study on physical distribution management in Kitakyushu City) (Fourth District Port Construction Bureau of the Ministry of Transport)	1998	The problems that hinder the efficiency of physical distribution in Kitakyushu City were identified, specific measures to address the problems by making use of the potential of the region were discussed, and a regional distribution management plan was prepared with the aim of encouraging international and regional distribution and a modal shift.

<p>Study on basic planning of Hibikinada deep-sea container terminal (Kitakyushu City, Fukuoka Prefecture)</p>	<p>1997 ) 1998</p>	<p>Kitakyushu City has the Kitakyushu Port Pan-Yellow Sea Zone Hub Port Plan, which aims to develop a large-scale, efficient, advanced container port that serves the entire western Japan and has an extensive feeder network into northeastern and northern China with frequent travel of very large container ships on a major sea lane. To pursue this initiative, measures to enhance the competitiveness of the Hibikinada area were discussed in terms of services, facilities, and information. A basic plan of container terminal facilities including the land use of the surrounding areas was developed.</p>
<p>Study on expansion of foreign and domestic trading of Fukui Port (Fukui Prefecture)</p>	<p>1998</p>	<p>Based on the results of the Basic Study on the Functions to be Developed in Fukui Port conducted in fiscal 1996, the possibility of introducing a regular cargo line between Fukui Port and Kitakyushu Port for expanding domestic trading at Fukui Port was investigated. The status of physical distribution between both port areas and the needs of shippers and carriers in the hinterland areas were surveyed by questionnaires. As a result, a certain level of demand and the feasibility of liner departure on alternate days were confirmed. The challenges to be addressed include cost competitiveness and improvement of the image of Fukui Port.</p>

<p>Study on Hakata Port Island City container terminal (Fukuoka City)</p>	<p>1998</p>	<p>Development of a foreign trade container terminal is being planned in Hakata Port Island City in order to cope with changes in recent port transportation, such as use of more containers and larger ships, and changes in trading structure, such as the expansion of product import. To make Hakata Port an internationally competitive port with advanced functions, a total plan of developing the foreign trade container terminal was discussed, and a basic plan of C1 terminal was prepared. The present status of terminal automation and potential problems associated with automation were summarized.</p>
<p>Design of Wakayama-Shimotsu Port reclamation Study on management and operation system of container terminal in Nishihama area of Wakayama-Shimotsu Port (Wakayama Prefecture)</p>	<p>1998</p>	<p>A foreign trade container line was introduced between Wakayama-Shimotsu Port and Pusan in 1995. With well-developed expressways in the hinterland areas, Wakayama-Shimotsu Port is expected to grow as a distribution center in the Kansai area. In developing foreign trade container terminal facilities in the Nishihama area (quay of 13 m in depth) against this backdrop, a straddle carrier system was proposed as an optimum cargo handling system, and a basic plan, basic design, and execution design were developed on the basis of this system. Then, an optimum management and operation system based on the third-sector scheme was proposed.</p>

## Ports, Harbors and Marine Environment Research Institute

### Study on technologies to create environment

Study	Fiscal year when study was conducted	Study outline
Study on preparation of reference book for Eco-Coast Program (Coast Administration and Disaster Prevention Division of Ports and Harbors Bureau, Ministry of Transport)	1996 } 1998	Beaches are indispensable for certain biologic species to survive. When conducting projects in coast areas, special care should be taken not to ruin the beach functions that help the survival of such species. To address this requirement, a reference book (plan) was prepared that presents methods to consider living organisms and ecosystems when conducting projects in coast areas.
Basic study on introduction of biotope in port area (Niigata Survey and Design Office of First District Port Construction Bureau, Ministry of Transport)	1996 } 1998	To preserve and create natural environments along the coasts of the Sea of Japan and to promote port development in harmony with living organisms and ecosystems, the idea of introducing biotopes in port areas was discussed, and a case study was conducted by adopting the Fushiki-Toyama Port (Fushiki area) as a model area. Introduction of biotopes in coast areas in three stages (landscape planning, site planning, and landscape design) was planned. A guidebook describing the basic idea, evaluation methods, and other aspects of biotope development was prepared.

<p>Study on development of environmental impact assessment methods involving life cycle assessment (Shimonoseki Survey and Design Office of Fourth District Port Construction Bureau, Ministry of Transport)</p>	<p>1996 } 1998</p>	<p>The concept of life cycle assessment was introduced into port development in order to evaluate and quantify the environmental loads (CO2 emissions and energy consumption) generated during the lifetimes of structures (from production to disposal). Environmental loads were discussed comprehensively for port structures with very long lifetimes. The Guideline for Introducing Life Cycle Assessment into Port Development (plan) and the Simple Computation Program for Life Cycle Assessment in Port Development were prepared, and case studies were conducted to discuss the applicability of life cycle assessment methods to port facilities.</p>
<p>Study on development of ports compatible with coral (Development and Construction Department of Okinawa General Bureau)</p>	<p>1998</p>	<p>Based on the results of field survey and testing of coral conducted in Naha, Hirara, and Ishigaki Ports for more than ten years since 1986 by the Development and Construction Department of Okinawa General Bureau, the relationship between coral reefs and environmental conditions were summarized, and the port development methods were discussed with concern for the preservation, creation, and use of coral reefs.</p> <p>The survey results were summarized and published as the Manual for Port Development Compatible with Coral Reefs (plan).</p>

<p>Study on socioeconomic effect of port environment improvement projects (Environment Division of the Ministry of Transport)</p>	<p>1997</p>	<p>There are generally no market prices for the benefits of port environment improvement projects, such as green space development. Such benefits, with no market prices, should be given money value to allow cost-benefit analysis. Cost-benefit analysis methods based on the contingent valuation method (CVM) and the travel cost method (TCM), which are environmental economic methods, were established, and improvement targets were set so as to evaluate aspects that cannot be evaluated only from efficiency.</p> <p>The results of this study are partly incorporated in the 1999 Guideline for Evaluating Port Investment, a cost-benefit analysis manual published by the Ministry of Transport.</p>
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## Study on waste and recycling

Study	Fiscal year when study was conducted	Study outline
<p>Study on possibility of establishing recycling bases in Tokyo Bay (Second District Port Construction Bureau; Coastal Environment Development Resources Utilization Center)</p>	<p>1998</p>	<p>Generation of construction byproducts and wastes in municipals facing Tokyo Bay as well as the present status and future plans of treatment systems were investigated. The types of waste that will require regional treatment, including interim treatment, were identified.</p> <p>The challenges to be addressed by port administrators were identified, and the measures to be taken were discussed and proposed.</p>
<p>Study on waste disposal revetment technologies (Fifth District Port Construction Bureau; Osaka Bay Regional Offshore Environmental Improvement Center)</p>	<p>1998</p>	<p>Existing waste disposal revetments were studied by means of questionnaires to port managers and waste treatment departments in the hinterland areas with regard to the types of accepted waste, revetment structure, design conditions, and the use of land after operation. The basic data obtained were analyzed and summarized as a set of examples. Technical problems in waste disposal revetments were identified and methods to address the problems were suggested.</p>

## Study on port environmental planning

Study	Fiscal year when study was conducted	Study outline
Study on Tokyo Bay environmental planning (Second District Port Construction Bureau)	1998	Development of ports in a way compatible with the environment is being required recently. To this end, compatibility with the natural environment, creation of port environments, and consideration of environmental issues are being pursued more extensively according to the environmental characteristics of the port and the region. An ideal Tokyo Bay environment and the new system of measures to pursue this were proposed, and the necessity and effect of specific environmental measures were discussed. A basic Tokyo Bay environment plan was prepared.
Commissioned study on basic plan of Hakata Port environment (Fukuoka City, Fukuoka Prefecture)	1998	Hakata Bay, which is a small sea area surrounded by coasts, has many natural coasts with scenic places and tidal flats where migratory birds arrive. It is strongly desired that economic and civil activities in the area are in harmony with the natural environment. In addition to the various environmental measures taken in the past in Hakata Bay, more extensive environmental measures and a comprehensive systematic approach based on a long-term perspective need to be introduced in order to address appropriately various recent challenges associated with port environments. As a basis for this effort, a basic plan for the Hakata Port environment was developed with the aim of preserving port environments and creating environments in consideration of ecosystem, hydrophilic, and purification capabilities.

<p>Study on environmental impact assessment (Ministry of Transport)</p>	<p>1997 } 1998</p>	<p>When the Environmental Impact Assessment Law becomes fully effective, reclamation of public waters and planning of ports will be subjected to the Law. Standard procedures and concrete examples for the items and methods of environmental impact assessment, required for applying the Law and related government ordinances smoothly and appropriately, were discussed, and technical reference materials were prepared.</p>
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### Study on planning of Ecoport Model project

Study	Fiscal year when study was conducted	Study outline
<p>Study on Nanao Port Ecoport Model project (First District Port Construction Bureau, Ministry of Transport; Ishikawa Prefecture; Nanao City)</p>	<p>1998</p>	<p>Nanao Port, which is a topographically advantaged port, has developed in combination with downtown Nanao. Because seawater is stagnant in the port area, the water quality and sediment of the area are deteriorated by the inflow of environmental loads from the downtown.</p> <p>Measures were discussed for the improvement of the port in harmony with the environment and the creation of a port environment acceptable to citizens and tourists. For the Fuchu and Yatashin areas, which are close to the downtown, proposals were made as to the following: improvement of existing revetments in consideration of hydrophilic properties and biology, development of shallow and seaweed beds using dredged soil, creation of shoreline areas comfortable to people, integrated development including the downtown, and public involvement in port development.</p>

### Study on promotion of Eco-Coast project

Study	Fiscal year when study was conducted	Study outline
<p>Study on planning of Eco-Coast project in Kojima Port (Karakoto area) (Okayama Prefecture)</p>	<p>1998</p>	<p>Enhanced measures of disaster prevention are urgently required in the Karakoto area of Kojima Port, because of the substantial aging of revetments and the experience of damage to houses in the hinterland by overtopping. The Kojima Port coast is in Setonaikai National Park and designated as a prefectural natural coast preservation area. Before the shoreline shifted landward, the coast was used by citizens for sea bathing and other recreation. Presently, there is a Zostera bed in the frontage.</p> <p>To develop a coast area that can be used as a recreation area in harmony with the natural environment including the Zostera bed, coordination between disaster prevention, environment, and use on the basis of an integrated shore protection system was pursued.</p>

## Study on project of port landscape and green space

Study	Fiscal year when study was conducted	Study outline
Study on project of coloring Hitachinaka Port facilities (Hitachinaka Port Office of Ibaraki Prefecture)		Based on the results of the Study on Hitachinaka Port Landscape Formation Model Project conducted in 1997, the coloring of facilities in the north wharf area, which is already partly in use, was discussed with the aim of implying brightness and hope. A slightly greenish yellow color was proposed as a symbol color for this purpose, and color criteria were set for different areal zones.
Study on planning of Sasebo Port landscape formation model project (Fourth District Port Construction Bureau of the Ministry of Transport; Sasebo City)	1998	The Miura area of Sasebo Port is adjacent to the downtown area where redevelopment is underway. In consideration of this situation and the planning of surrounding towns, and in order to form landscapes that reflect the characteristics of the port, a landscape formation project, which has a philosophy of creating various waterfront landscapes that enhance the impression of Sasebo, was discussed. A master plan for the landscapes of public facilities was proposed.