

Collection of summaries of WAVE studies and research

(Fiscal 2000)

November 2001

Waterfront Vitalization and Environment Research Center

Major studies conducted by WAVE are described below.

## Studies and Research Department

### Basic studies for reviewing port policy

Study	Fiscal year when study was conducted	Study outline
Study for analyzing port functions over a long period of time (Ports and Harbors Bureau)	1999 } 2000	At the turn of the century, Japanese ports are undergoing drastic structural changes in socioeconomic conditions. This study focused on the matters selected for future review in "How to improve and manage ports under ever changing socioeconomic conditions" prepared by the Ports and Harbors Council in December 1999. The first step was to define the basic direction of port policy for the 21st century in the "vision for ports in the new century".
Basic study concerning the reorganization of waterfront industrial space (Ports and Harbors Bureau)	1999 } 2000	Waterfront space has long been serving as a place of manufacturing and other industrial activities. Efforts have been made to develop not only waterfront and surrounding areas but also Japanese economy as a whole. Recent drastic changes in industrial structure have, however, been greatly affecting the economy and employment in waterfront and surrounding areas. In the meantime, commercial, recycling and emerging industries have been entering waterfront areas.  Port administration should therefore take adequate measures to enable waterfront areas to continuously vitalize national economy and support rich lives of people in cooperation with the public and other stakeholders. Then, this study was conducted. The study results were used for developing the "vision for ports in the new century".

<p>Basic study for using living and exchange space in waterfront areas (Ports and Harbors Bureau)</p>	<p>1999 ) 2000</p>	<p>Waterfront areas have been making contributions to the development of Japanese economy as a place of various industrial activities. Recent changes in industrial structure with declining heavy industries, however, have been affecting the economy and employment in waterfront areas.</p> <p>In the meantime, commercial activities have been thriving in waterfront industrial areas mainly in urban districts. Facilities are built for public excitement and exchange. The areas have been used for additional purposes including the creation of waterfront environment.</p> <p>Based on the analysis of the above developments, this study shows the direction of port reorganization focusing on the use of ports to meet the public needs and on the regional initiative. Study results were used for the development of the "vision for ports in the new century"</p>
---	----------------------------	---

<p>Study for building high-speed maritime transport network (Ports and Harbors Bureau)</p>	<p>2000 ~</p>	<p>An increasing number of freighters have been demanding faster and more frequent transport. There has been a growing possibility of greatly improving the maritime transport environment in Tokyo Bay owing to the advancement of information technology, use of faster ships, encouragement of competition due to deregulation and the settlement of negotiations for compensation for fishing rights in navigation channels at the mouth of the Bay. In the course of study, problems involved in faster transport were identified by questionnaire surveys, corrective measures were reviewed and action plans were developed for the building of fast maritime transport network. Opinions were collected widely from Marine Transport Bureau, Maritime Technology and Safety Bureau, Ports and Harbors Bureau and Maritime Safety Agency, and proposals were made for the alleviation of congestion in navigation channels and surrounding waters and for other purposes to improve both safety and efficiency.</p>
--	---------------	--

<p>Study on the developments in the maritime physical distribution of used products and waste (Ports and Harbors Bureau)</p>	<p>1999 ) 2000</p>	<p>The present conditions of physical distribution of used goods and waste were accurately grasped for developing future policy of physical distribution through ports. Then, the possibility of shifting the mode of physical distribution to ships and the role of ports in developing systems of physical distribution of used goods and waste were assessed. Existing documents were analyzed, questionnaire forms were sent to 430 offices and a study forum was established staffed with members of the organizations concerned and representatives of businesses.</p> <p>As a result, the present flow of waste transport and disposal was organized for nine items, and measures were identified for promoting maritime distribution of waste.</p> <p>For implementing comprehensive policy measures, the "creation of projects for developing hub ports oriented toward resource recycling society" was proposed, and specific measures were presented.</p>
--	----------------------------	--

<p>Study for improving passenger terminals (Kyushu Regional Development Bureau)</p>	<p>2000</p>	<p>New developments have been taking place in the Japanese cruise market. Star Cruises and other foreign-based cruise companies have recently been entering Asian markets including Japan offering unprecedentedly low fees. There also have been drastic changes in type of the user. Leisure cruises have been increasing while the number of cruises chartered by businesses is on the decline. The dimensions of cruise ships such as draft, total length and beam have also been changing.</p> <p>The objective of this study was to obtain basic data for improving cruise terminals in the Kyushu and Yamaguchi areas. The present conditions of domestic cruising, and of port facilities and port hinterland were grasped. Future potential was assessed in areas under the control of the Kyushu Regional Development Bureau. Future demand for cruising was estimated. Effects of cruise terminal construction on regional economy were examined in the Port of Kagoshima as an example.</p>
---	-------------	---

<p>Port user survey in Okinawa (Okinawa General Bureau)</p>	<p>2000</p>	<p>Cost-benefit analysis shall be made for port facilities development according to "Port investment evaluation guidelines 1999" prepared in fiscal 1999. In the Okinawa area, however, national measurement procedure is inadequate for analysis. Return on investment was therefore analyzed fully considering the regional characteristics of Okinawa. Facilities users were interviewed and examples in other areas were reviewed.</p> <p>Specifically, analysis was made of the benefit of averting the influence of discontinuation of consumption by visitors from other countries on the local economy, benefit of preventing damage to facilities, alternative port in the case without port improvement, and how to designate areas to be subjected to TCM (travel cost method) and CVM (contingent valuation method)</p>
<p>Study for introducing port facilities using new energy source (wind) (Hokuriku Regional Development Bureau)</p>	<p>2000</p>	<p>Using new energy sources friendly to the global environment has recently been becoming an important issue in our energy policy to control global warming and exhaustion of resources.</p> <p>Port and waterfront areas with few obstacles are said to be fit for wind power generation.</p> <p>In this study, based on the above conditions, the applicability of wind power generation to supply power to an immersed tunnel in Niigata Port was evaluated and a review was made as to how to use wind power, as a new source of energy, in ports and ocean..</p>

<p>Feasibility study for installing wind power generation systems (Kagoshima Port and Airport Construction Office)</p>	<p>2000</p>	<p>As part of the above port and ocean use survey, the applicability of wind power generation in major ports in Ibaraki Prefecture, namely Kagoshima, Oarai and Hitachinaka Ports was assessed. Parameters included the location of wind power generation facility, efficient method of use and the effect of introduction of wind power generation. A rough study was made of the possibility of using ports as sites of large-scale wind power generation.</p>
<p>Study on the effects of the development of Akita Port (Akita Port and Airport Construction Office)</p>	<p>2000</p>	<p>Various activities have been taking place using port facilities of Akita including physical distribution and human exchanges. Effects of improvement of Akita Port were identified and the effects of the port on regional economy were quantitatively grasped.</p> <p>Amounts of production and gross value added for businesses located in Akita Port were identified through questionnaire surveys. Based on the amounts obtained, ripple effects, tax revenue and employment were calculated using interindustry tables.</p>
<p>Basic study for reviewing dredged material disposal sites in Kanmon Waterway (Kanmon Waterway Construction Office)</p>	<p>2000</p>	<p>Water depth will be increased to 14 m in the Kanmon Waterway to accommodate larger vessels. Large quantities of material are expected to be produced while the water depth will be increased and the navigation channels will be dredged for maintenance, which will have a great impact on project costs. Then, methods were proposed for disposing of dredged material and their economic efficiency was verified through cost-benefit analysis.</p>

<p>Study concerning the future port operation (Ports and Harbors Bureau)</p>	<p>2000 ~</p>	<p>"How to improve and manage ports under ever changing socioeconomic conditions" prepared by the Ports and Harbors Council in December 1999 suggests that more studies are required for appropriately defining the roles of public authorities and public corporations in view of the present port conditions, in relation to port management.</p> <p>This study was conducted based on the recommendations of the Council, discussions made in the Ports and Harbors Bureau simultaneously with the debate of the Council and the results of researches conducted by WAVE at its own initiative. Methods of Japanese port operation for increasing global competitiveness through the reduction of physical distribution cost and the enhancement of services were assessed focusing on container terminals. The concept of "public benefit" was considered in the process.</p>
--	---------------	---

### Basic physical distribution studies

Study	Fiscal year when study was conducted	Study outline
<p>Freight transport survey in unit-load terminals for domestic trade (Ports and Harbors Bureau)</p>	<p>2000</p>	<p>In order to urgently handle environmental problems globally and to further increase the efficiency of domestic physical distribution, immediate actions have recently been required for modal shift from automobiles to vessels.</p> <p>The acceleration of deregulation with the revision of the Maritime Transportation Law and other laws has been driving the reorganization of navigation channels for long-distance ferries and other types of vessels.</p> <p>Unit-load terminals at ports, which are nodal points of land and sea distribution, are required to meet the above demand and appropriately respond to changes in coastal shipping. Cargo transport, which is the basis of planning and revitalizing unit-load terminals, however, cannot be fully grasped based solely on the existing statistical data.</p> <p>In this study, shipping agent officials were interviewed and questionnaires were sent to them to identify the present conditions of cargo transport by roll-on roll-off ships, coastwise containers and ferries.</p>

## Studies for developing a long-term vision for wide-area blocks

Study	Fiscal year when study was conducted	Study outline
<p>Study for developing a vision for ports in the for Hokuriku region in the new century (Hokuriku Regional Development Bureau)</p>	<p>2000</p>	<p>Areas along the coast of Sea of Japan have been undergoing substantial changes with the growth of east Asian economies, mainly those on the Chinese coast. These areas are also beginning to show the possibility of making a steady great step forward to independent lively places (National Land Axis along the Sea of Japan) using their unique history and culture.</p> <p>In this study, changes in socioeconomic conditions surrounding the Sea of Japan were identified, present and future cargo transport was predicted and the direction of port improvement was reviewed. The objective was to integrate measures for the development of areas along the coast of the Sea of Japan into the "Regional vision for the Sea of Japan".</p>

<p>Study for developing a long-term vision for Tohoku coastal areas (Tohoku Regional Development Bureau)</p>	<p>2000</p>	<p>The "long-term vision for Tohoku coastal areas" developed in fiscal 1995 aims at developing a rich and lively Tohoku region by reconsidering conventional dependence on the Tokyo area and revitalizing international exchange based on regions. The local economy has, however, stagnated and the approach to social infrastructure development has been undergoing changes. Conditions surrounding ports have also been changing. Business reorganization has been occurring and more cargoes have been transported in containers.</p> <p>A new Comprehensive National Development Plan and the fifth Tohoku Development Promotion Plan were established in 1998 and 1999, respectively. Compatibility is now required between the long-term vision and these plans.</p> <p>Against such a background, the present long-term vision needs to be reviewed. In this study, data were collected to understand the latest conditions and the existing investigation results were analyzed to make a follow-up study of the present long-term vision.</p>
--	-------------	---

<p>Study for renovating metropolitan areas in the Kinki region (Kinki Regional Development Bureau)</p>	<p>1999          )          2000</p>	<p>In the Kyoto, Osaka and Kobe areas, metropolitan areas in the Kinki region, various problems have been occurring such as hollowing-out of urban areas, tilted urban structure due to the increase of distance between home and office, worsening waste disposal problems and the increase of unused land due to changes in industrial structure. In order to solve these problems to revitalize cities, renovating the metropolitan areas is required.</p> <p>In this study, functions required in the Osaka Bay area were examined for reorganizing the area continuously from a long-term viewpoint to trigger the metropolitan renewal in the Kinki region.</p> <p>In this fiscal year, a coastal area reorganization plan was reviewed, case studies were made and reorganization measures were examined, according to the basic renewal policy that was defined the last fiscal year.</p>
--	--	---

<p>Study for taking regional revitalization measures using a maritime exchange zone (Kinki Regional Development Bureau)</p>	<p>2000</p>	<p>Coastal areas including fishing villages have been endowed with natural beauty and maintained diverse types of culture, tradition and scenery. On the other hand, the areas have failed to enjoy the same level of convenience as urban areas because of topographical restrictions. Regional social functions have been deteriorating with the progress of depopulation, aging of society and declining birth rate.</p> <p>Regional revitalization requires inter-regional cooperation in a wide-area exchange zone and self help with regions assuming responsibility and making choices on their own.</p> <p>In this study, examinations were made of regional revitalization measures using rich fisheries and marine resources in coastal areas, methods of inter-regional cooperation in physical distribution and tourism in the "marine exchange zone", development of new industries using marine resources and methods of information dissemination via port facilities.</p>
---	-------------	---

## Studies concerning the use and management of ports

Study	Fiscal year when study was conducted	Study outline
Building of port EDI systems	1996 ~	<p>The "outline of comprehensive physical distribution measures" adopted at a cabinet meeting in April 1997 stipulates that "EDI (electronic data exchange) systems should be developed for administrative procedures for applications and approvals of import and export permits according to the foreign exchange law, and for entries to or departures from major and international ports and quarantine at ports, for integration with existing customs clearance processing systems with a view to realizing paperless port administration and providing one-stop services to users".</p> <p>Accordingly, Ports and Harbors Bureau, Ministry of Transport and Maritime Safety Agency developed a basic policy in fiscal 1997 for using EDI systems for administrative procedures related to entries to or departures from ports. WAVE developed systems in fiscal 1998 based on the basic policy and started systems operation on a trial basis in October 1999.</p> <p>In fiscal 2000, WAVE continued system tests. WAVE operated systems on a trial basis for reporting the use of berthing facilities and for making applications for dangerous cargoes, which were developed in fiscal 1999. Systems were also developed for cooperation with SeaNACCS. Coordinations were made and data were collected for handling UN/EDIFACT messages because systems had to be developed based on international standards.</p>

<p>Study concerning the computerization at container terminals (Keihin Port Construction Office)</p>	<p>2000</p>	<p>In the age of megacompetition, global deregulation and free competition have recently been accelerated. As relationships among countries are becoming closer rapidly owing to the introduction of innovative telecommunications technology, the efficiency of international physical distribution using containers must be improved. Under the circumstances, international ports in Japan need to meet various requirements such as the reduction of waiting time at terminal gate. Concerted public and private efforts are urgently required to increase the efficiency of terminal operation and international competitiveness.</p> <p>In this study, present problems with terminal operation and management were identified, and measures for increasing transport efficiency mainly through digitization and requirements for project implementation were organized. Ways of using information technology for enhancing procedures for container-based imports and exports and for transport terminal operation were reviewed.</p>
--	-------------	--

<p>Basic study for using telecommunications technology in ports (Chubu Regional Development Bureau)</p>	<p>2000</p>	<p>Ports have steadily been digitized. Port procedures are followed electronically and trades between operators are handled by EDI systems.</p> <p>Yokkaichi and Shimizu Ports have been constructing large container terminals. Studies should be made of future ports using next-generation information technology. In the process, developments in information technology and plans for systems development in areas surrounding these ports should be taken into consideration.</p> <p>In this study, how telecommunications technology should be used at ports were examined. The direction of information-oriented ports in Ise and Suruga Bays was assessed in terms of efficiency of cargo transport, labor saving and safety. Future of ports was identified in Yokkaichi and Shimizu Ports as models.</p>
---	-------------	---

<p>Study on the digitization of overseas ports (Ports and Harbors Bureau)</p>	<p>2000</p>	<p>More procedures at ports have recently been taken electronically and work at terminals digitized and automated to meet increasing demand for higher efficiency of global transport, owing to rapid advancement and diffusion of information technology. Information systems have been introduced for port procedures and terminal operation and management also in Japan. Further digitization is required to improve competitiveness on the global market.</p> <p>This study aimed at identifying systems for reinforcing port procedures and work at terminals and the conditions and institutions required for systems development. The present and future of digitized and automation systems in other countries were grasped, and their applicability to Japanese ports evaluated.</p>
---	-------------	--

## Other basic studies

Study	Fiscal year when study was conducted	Study outline
<p>Study concerning the supply of natural gas energy to container terminals (Tokyo Gas Co., Ltd.)</p>	<p>2000</p>	<p>In this study, which focused on environmental protection and energy saving, (i) the possibility of adoption of natural gas engines was examined (ii) the effect of natural gas co-generation systems (CGS) was assessed, and (iii) the applicability of natural gas energy to roll-on roll-off ships at the berth was evaluated.</p> <p>Results are described below.</p> <p>(i) Installing natural gas engines in loading equipment and a tractor unit was expected to considerably improve the environment.</p> <p>(ii) The estimation of the effect of installing natural gas CGS showed reduction of cost below the present unit cost of power purchase.</p> <p>(iii) Applying natural gas CGS to roll-on roll-off ships was found to greatly improve the environment. Technical and economic problems were also identified including the need to control boiler water.</p>

<p>Study for using RDF (refuse derived fuel) in wider areas (Ports and Harbors Bureau)</p>	<p>1999 } 2000</p>	<p>The fiscal 2000 study focused on RDF power generation projects based on the basic policy for wide-area RDF use that was developed in fiscal 1999. The effectiveness and future direction of wide-area RDF systems crossing prefectural borders were evaluated and measures for implementation were examined.</p> <p>Case studies were made in study areas selected as models to evaluate increases in cost effectiveness, effective use of energy and environmental benefits. Hardware and software problems involved in the introduction of RDF systems and corrective actions required were organized. An image of wide-area RDF project was presented, and future direction and considerations were organized. Cooperation with coastal industrial areas and recycling industries were taken into consideration.</p>
--	----------------------------	--

## Studies for creating comprehensive port space

Study	Fiscal year when study was conducted	Study outline
<p>Study for developing land use plans on Mizushima Port Tamashima Harbor Island (Okayama prefectural government)</p>	<p>2000</p>	<p>Land is being developed at the site for Mizushima Port Tamashima Harbor Island, which is scheduled to be completed in fiscal 2006. Prior to land allotment for port use in fiscal 2000, this study was conducted. Assessment was made of plans for total land use as comprehensive port space centering around the container terminal for domestic and overseas trade.</p> <p>Demand for port transport facilities that supplement the container terminal and for private facilities such as production facilities and facilities for creating exciting port areas were estimated. Then, a long-term vision for the Tamashima artificial island, and plans for appropriately zoning the port and urban development sites behind the container terminal, and plans for facilities location and land use were developed.</p>
<p>Feasibility study for Kitakyushu Port Sunatsu area waterfront reorganization (Kyushu Regional Development Bureau)</p>	<p>2000</p>	<p>The Kitakyushu Port Sunatsu area is adjacent to JR Kokura Station at the center of Kitakyushu City. In the area, large unused land will be made available in waterfront areas with the closure or relocation of plants and the facilities of Japan Freight Railway Company due to recent changes in socioeconomic conditions and in industrial structure. Creating an excellent port space open to the public integrating the waterfront and urban areas is likely to become possible.</p> <p>In this study, Sunatsu area redevelopment plans were reviewed that would maintain compatibility with comprehensive plans for using Kitakyushu Port and serve in cooperation with existing facilities and urban areas.</p>

<p>Komatsushima Port civil engineering research (Tokushima prefectural government)</p>	<p>1999 } 2000</p>	<p>The Komatsushima-Wakayama ferry route gave way to the Tokushima-Wakayama route in April 1999 with the opening of the Akashi Kaikyo Bridge although the old route operated by Nankai Ferry Co., Ltd. had to play a central role in regional revitalization.</p> <p>In this study, policy and plans for port improvement at regional initiative were developed to revitalize the Honko area. A new approach to port improvement was taken mainly through workshops with public participation and coordination among industrial, governmental and academic organizations.</p> <p>Port improvement plans were prepare last fiscal year. In this fiscal year, public needs for the use of the terminal building were examined in detail, and images of use and improvement were specifically created. Flea markets, lectures and other events were also held.</p>
--	----------------------------	---

<p>Study for reorganizing physical distribution in Kitakyushu Port Tanoura area (Kitakyushu municipal government)</p>	<p>2000</p>	<p>In the Tanoura area, the first container terminal in western Japan was constructed in late 1960s. The area has long played an important role in physical distribution through Kitakyushu Port. Declining demand for construction and deterioration of facilities have, however, resulted in recent reduction of cargoes handled. More private land has been left unused and the container terminal has been functioning only poorly.</p> <p>Against such a background, reorganization plans were developed to provide new physical distribution functions to the Tanoura area by using high distribution potential available in the area, the effects of revision of the Ports and Harbors Law and deregulation, and the benefits of new port improvement methods including private finance initiative.</p> <p>Analysis was made of the possibility of constructing bases for undersea cable maintenance ships, Tachiura yard supplementary to the container terminal, fruit and vegetables import bases, used vehicle export bases and imported sand bases. Facilities allocation plans and project implementation measures were developed.</p>
---	-------------	---

## Physical distribution infrastructure studies

Study	Fiscal year when study was conducted	Study outline
<p>Feasibility study concerning the construction of an access road to Kure Port Aga <i>Marinopolis</i> (Hiroshima Port and Airport Construction Office)</p>	<p>2000</p>	<p>The Aga <i>Marinopolis</i> area in Kure, Hiroshima Prefecture has been developed as a node of wide-area physical distribution based on the intermodal transport in the Hiroshima-chuo <i>Technopolis</i> zone.</p> <p>In the area, however, an existing road (Kure circular route) in the hinterland that provides a link with National Highway 185, an artery, is narrow and consists of a series of sharp curves. Thus, the area has difficulty in serving as a distribution node. Development of a transport network is required for connecting the Aga <i>Marinopolis</i> area with the hinterland.</p> <p>In this study, cost-benefit analysis was made to verify the effects of a portside road (bridge), which will play an important role in providing smooth traffic for physical distribution and enhancing access in waterfront transport.</p>
<p>Study for increasing the efficiency of physical distribution through Nagoya Port and study for evaluating the effects of improvement of the Nabeta berth (Nagoya Port and Airport Construction Office)</p>	<p>2000</p>	<p>An international container terminal is being constructed in the Nabeta berth in Nagoya Port to handle increasing container cargoes for overseas trade. Ocean recreation facilities will also be developed for dockworkers and the general public.</p> <p>To ensure smooth automobile traffic from the Nabeta berth under the circumstances, plans were developed for efficiently improving the access road to the Nabeta berth and cost-benefit analysis was made to assess project efficiency.</p>

## Studies for developing a long-term vision and regional development measures

Study	Fiscal year when study was conducted	Study outline
<p>Study for promoting the use of national port facilities at Sakata Port (Sakata Port Construction Office)</p>	<p>2000</p>	<p>Businesses and municipalities have recently been making various efforts to build resource recycling society.</p> <p>Under such conditions, this study was conducted to identify the conditions for locating environmentally friendly industries and to seek possibilities for locating such industries in Sakata Port with a view to encouraging the use of port facilities owned by the national government. Idle land remains in Sakata Port after the withdrawal of plants and the municipal government has been actively locating business facilities.</p> <p>As a result of the study, public response to the location of environmentally friendly industries in Sakata Port was revealed. People were much worried about the construction of a waste disposal plant. Land has not been well used, which is reflected in the results of surveys of demand for land. Local autonomous bodies and businesses are, however, actively locating their facilities. Then, requirements for locating environmentally friendly industries in the waterfront area were assessed, and the characteristics and problems of the hinterland of Sakata Port were organized. As a result, the possibility of locating such industries was suggested.</p>

<p>Feasibility study for Fushiki-Toyama Port (Toyama area) (Fushiki-Toyama Port Construction Office, Toyama prefectural government and Toyama municipal government)</p>	<p>2000</p>	<p>In order to examine the measures to develop the outer port in the Toyama area using the favorable conditions of the region while the volume of cargoes handled has been decreasing, opinions were collected through working level meetings and interviews to define future ports and regional development.</p> <p>As a result, increasing the cargoes handled and preventing liquefaction in the area where oil tanks were located were considered necessary. Plans were developed at the meetings to install facilities in the related areas as well as develop the outer port. The plans mainly covered the attraction of roll-on roll-off ships, port enhancement as a place for holding events, land use at harbor entrance, and provision of water-bus services to make an effective use of the canal.</p>
<p>Basic study for revitalizing port and city at Kashima and Hitachinaka Ports (Kashima Port and Airport Construction Office)</p>	<p>2000</p>	<p>In this study, the direction of measures for ports and cities to coordinate and to jointly develop organic and lively ports and cities, and for regions to use various functions of ports was examined based on the opinions of intellectuals in the region aired at meetings and the opinions of experts given at lectures.</p> <p>As a result, three key projects were proposed in the distribution and industrial fields in Kashima Port. In the fields of environment, excitement, exchange and coordination, two key projects were proposed. In Hitachinaka Port, five key projects were proposed in relation to distribution, excitement, nature and exchange.</p>

<p>Study for improving ports to contribute to regional development in Okinawa Prefecture (Okinawa General Bureau)</p>	<p>2000</p>	<p>For considering future regional development, coordination among ministries is essential in relation to public works projects. Ports can be improved effectively and efficiently through coordination between port development plans and such projects as the construction of Michi-no-Eki (roadside rest areas) and wind power generation.</p> <p>In this study, the present coordination with hinterland was examined and identified in major ports. The Port of Kinwan was designated as a model port and opinions and requests were collected from autonomous bodies, shipowners, freighters and residents. Case studies were conducted in relation to port improvement plans that took both user needs and other projects into consideration. Port improvement plans were developed that would be compatible with other projects.</p>
<p>Study for reviewing Nagoya Port waterfront space reorganization (Chubu Regional Development Bureau)</p>	<p>2000</p>	<p>It has recently been hoped that ports will be open to the public, renew or revitalize existing industries and actively provide waterfront space for emerging industries. Ports are expected to play a greater role in characteristic regional development.</p> <p>In this study, measures for using and reorganizing waterfront areas in Nagoya Port were examined. Present conditions and problems to be expected were identified to create space friendly to people and nature, space for inviting diverse industries to enhance regional vitality and a hub of regional development using waterfront resources. Then, basic future direction was defined.</p>

<p>Basic study concerning Onahama Port improvement policy (Onahama Port Construction Office)</p>	<p>2000</p>	<p>Onahama and Soma Ports are surrounded by regional hub ports such as Shiogama, Niigata and Hitachinaka. In this study, such geographical conditions were considered and an examination was made of the roles that Onahama and Soma Ports should play in the future.</p> <p>The functions of the major ports surrounding the two ports, and the present flow of maritime cargoes in southern Tohoku and northern Kanto areas were identified. Changes in physical distribution systems owing to future development of road transport network were estimated, and the functions that the two ports are expected to perform in the future were analyzed. As a result, it was found that more bulk cargoes should be handled.</p>
<p>Development of a vision for improving Ito Port and coastal environment (Ito municipal government)</p>	<p>1999 } 2000</p>	<p>It is hoped that a coastal environment attractive to the public and tourists will be developed in Ito Port and coastal areas.</p> <p>In the fiscal 1999 studies, the future direction of use of space in Ito Port was defined. In the fiscal 2000 studies, basic examinations were made of implementation measures in relation to nine items specified in the studies of the previous year including the "cargo handling in the Izu area", "possibility of opening ferry routes", "coexistence of fisheries and tourism" and "landscaping of the Orange Beach". Modal shift from passenger and cargo vehicles to ships were considered to alleviate traffic congestion and increase the efficiency of distribution. Short- and long-term proposals were made.</p>

## Ports, Harbors and Marine Environment Research Institute

### Exchange network project

Study	Fiscal year when study was conducted	Study outline
<p>Proposal of a new coastline planning method</p> <p>Study group concerning the technology for restoring and creating beautiful sea areas and coastlines in harmony with the environment</p> <p>(Voluntary project)</p>		<p>The coastline is an ecotone (transitional area) where sea water meets land water, a continuous space requiring delicate ecological balance. Urban coasts and sea areas, and surrounding areas are expected to serve various purposes such as physical distribution and waste disposal.</p> <p>The objective of this study was to present a new civil engineering concept for restoring and creating beautiful sea areas and coastlines, realizing harmony between safety, disaster prevention, development and use; and preservation of natural environment, home to species of plants and animals. These two categories have been discussed separately along the coastline and considered to be in conflict with each other. "Eco civil engineering" was proposed as a means of planning the technology for restoring and creating beautiful sea areas and coastlines where the protection of ecosystem along the coast is in good harmony with the preservation of environment that human beings demand. Case studies were also made to assess the development of artificial shores, tide land and wetland and the forestation and use of the hinterland of Tokyo Bay.</p>

<p>Study group for creating amenity in urban waterfront areas (Voluntary project)</p>		<p>The study group provides and exchanges information through public and private coordination that is required for creating, developing and using waterfront areas to meet the requirements of changing life-styles of urban dwellers. It also analyzes problems and corrective measures for accelerating project implementation, makes recommendations for developing and using waterfront areas, and conducts joint researches to implement specific projects.</p> <p>An analysis was made of the life-style of urban dwellers and their needs for waterfront, and of the meaning, role and future of waterfront in urban areas. Measures for creating amenity in urban waterfront areas were examined and organized. Case studies were made in the Chiba Port Katsunan area to improve the use of coastlines and enhance accessibility to water. Specific measures were related to bottom materials, environment and the control of abandoned boats. The results of the studies were presented to the Chiba prefectural and Funabashi municipal governments.</p>
---	--	---

<p>Study group concerning the possibility of adopting private finance initiative in eco-port development in waterfront areas (Voluntary project)</p>	<p>1998 } 2000</p>	<p>Eco-ports are now being developed to provide harmony between the port and the natural environment or ecosystem. Waste disposal, ultimate disposal in particular, is becoming a serious issue. To achieve zero emission, "production of eco-cement from municipal waste incineration ash" was selected as a theme. Problems involved in future project implementation were identified by organizing the characteristics of eco-cement technology and conducting feasibility studies of project implementation in waterfront areas (in Yokohama City) based on private finance initiative. It was revealed that eco-cement could help protect the environment, reduce required landfill space and contribute to recycling, that private finance initiative, although many problems had yet to be solved before project implementation, had numerous benefits, and that project feasibility was very high in urban waterfront areas.</p>
--	----------------------------	--

Study concerning the environment, measures to accelerate environmental creation and methods for planning environmental creation

Study	Fiscal year when study was conducted	Study outline
Study for developing port environment improvement plans (Port and Harbors Bureau)	2000	<p>In order to promote comprehensive and systematic port improvement projects, examinations were made of the methods for presenting the effects of port improvement projects to the public, developing parameters of goals and effects and providing numerical representation of goals and effects.</p> <p>Value was numerically represented for marine environment including tide land and seaweed beds, waste disposal sites on the ocean, green space in ports and coastlines providing access to water. Plain specific parameters were proposed accordingly.</p>
Study on endocrine disrupting chemicals (EDC) in ports (Port and Harbors Bureau or other organization)	1999 } 2000	<p>Nationwide distribution of concentrations of EDC contained in bottom materials in port areas was investigated in fiscal 1999. In fiscal 2000, horizontal distribution of concentrations of major EDC and vertical distribution of concentrations of dioxins by age of deposition were obtained in seven ports in Japan.</p> <p>Horizontal distributions showed high concentration in the back of the port and at the mouth of the river in each port.</p> <p>Vertical distribution of concentrations of dioxins varied according to the age of deposition. Deposition started approximately in 1960. Concentration was high in surface layers at some points or concentration was high in certain years after 1960 at other points.</p>

<p>Study for collecting the latest data on green space in ports (Kanto Regional Development Bureau)</p>	<p>2000</p>	<p>In fiscal 1996, data were collected on the area of green space, length of coastlines providing access to water, facilities improvements, relationships with city and port planning, management conditions and use conditions in green space at ports in Japan. The data were updated and the trend was analyzed.</p> <p>In the period between fiscal 1996 and 2000, for example, the length of coastlines providing access to water increased at a higher rate than the length of coastlines developed in green space in ports, which was more outstanding in ports with a metropolitan area in the hinterland.</p>
<p>Study for adopting LCA method in port improvement (Shimonoseki Research and Engineering Office for Port and Airport)</p>	<p>1996 ) 2000</p>	<p>Port improvement methods friendly to the environment have been reviewed focusing on environmental loads since the introduction of the life-cycle assessment (LCA) method in fiscal 1996.</p> <p>In this study, the results of past studies were organized comprehensively and check was made of the issues identified (e.g. addition of work types for assessment, establishment of new life-cycle inventory (LCI) units and review of LCI units based on the updated statistical data). Then, LCA analysis programs were updated. Updated programs were used in case studies to propose port improvement methods friendly to the environment that incorporated design considerations for minimizing environmental loads.</p>

## Study on environmental creation technology

Study	Fiscal year when study was conducted	Study outline
Study on the technology for improving marine environment (Yokohama Research and Engineering Office for Port and Airport)	2000	In order to obtain basic data for creating environmentally sound ports through the improvement of water quality and bottom materials, existing technologies, technological problems and corrective measures, and technological applications were organized. Based on the studies, feasible environmentally sound port facilities were proposed in Ofunato, Kamaishi and Kuji Ports.
Study for selecting right locations for developing seaweed beds (Yokohama Research and Engineering Office for Port and Airport)	2000	Examinations were made of the environment for seaweed growth, methods for selecting right locations where seaweed beds should be developed and methods for developing seaweed beds. Based on the results, methods were proposed for selecting right locations using personal computers. Seaweed bed development technology was proposed for the Port of Onahama.
Ecological study at the breakwater in Kashima Port (Kashima Port and Airport Construction Office)	2000	Field studies were made to assess the effects of eco-port leading projects (e.g. installation of foot protection concrete blocks to provide for the growth of octopuses) in Kashima Port. As a result, it was found that various species used the facilities of Kashima Port. The spawning period of octopuses was almost identified (late September through early October). Existing knowledge was organized and the future direction of the development of an environmentally sound port was presented for the Port of Kashima.

<p>Study for revitalizing tide land (Yokohama Research and Engineering Office for Port and Airport)</p>	<p>2000</p>	<p>The Gamo tide land forms a rich and diverse natural environment and is an important stop for migratory birds. There are, however, various problems such as the pollution of the bottom on the far side, deterioration of bottom biota, poor water exchange at the time of closing of river mouth and the reduction of depth of the tide land due to sand inflow.</p> <p>In this study, improvement goals were defined for protecting and revitalizing the Gamo tide land. Technologies for achieving the goals were examined. Improvement technologies were proposed such as dredging, sand covering and the making of water routes.</p>
<p>Study on the bottom material in Mikawa Bay (Mikawa Port Construction Office)</p>	<p>1997 } 2000</p>	<p>In fiscal 1997 through 1998, examinations were made of measures for environmental improvement or creation in Mikawa Bay using high quality sand produced by the development of the Nakayama Suido passage. Some areas (where dredged materials would be used) were given priority in environmental improvement or creation. In fiscal 1999, analysis was made of topographic changes in the tide land and shallow sand beach formed using the dredged materials. Results of monitoring surveys on the effects of the project were also analyzed. As a result, it was found that the project helped restore biota.</p> <p>In this fiscal year, a tide land ecosystem model was applied. Confirmed was a purification mechanism based on the movement of aquatic organic materials to the bottom sediment owing to the filtration and feeding by suspension feeders.</p>

<p>Study for constructing environmentally friendly bulkheads in Tsu-Matsuzaka Port (Yokkaichi Port Construction Office)</p>	<p>2000</p>	<p>The basic direction of environmentally friendly coastal improvement was studied at the Port of Tsu-Matsuzaka. Case studies were made of existing facilities in the Mikumo and other areas to build environmentally friendly bulkhead structures. Basic directions of improvement were presented for the Tsu through Karasu areas where beaches would be preserved and for the Mikumo through Matsuzaka areas where environmentally friendly functions would be added to existing bulkheads.</p>
---	-------------	--

## Studies and research for building resource recycling society

Study	Fiscal year when study was conducted	Study outline
<p>Study for reviewing technical problems involved in the development of waste disposal bulkheads (Ports and Harbors Bureau and Ports and Harbors Research Institute)</p>	<p>1999 } 2000</p>	<p>Ports and Harbors Bureau, Ministry of Transport organized a committee of intellectuals and prepared a manual in fiscal 2000 on the design, construction and management of controlled waste disposal bulkheads.</p> <p>In this study, conducted after the publication of the manual, technical problems involved in the design, construction and management of waste disposal bulkheads were identified through interviews with departments concerned of the national government and users including port administrators.</p> <p>As a result, further studies were found necessary about the service lives of facilities based on their characteristics from a design viewpoint. Studies were also considered essential as to underwater construction and repair of sheets of geomembrane from a viewpoint of construction and management.</p>
<p>Study on wide-area waste disposal projects (Kanto Regional Development Bureau)</p>	<p>1999 } 2000</p>	<p>A "draft plan for developing ultimate wide-area waste disposal plants in the Tokyo metropolitan area" was developed based on the present conditions of waste disposal in the area.</p> <p>The draft plan identified the basic concept of ocean waste disposal plant development, specified the types of waste that should be subjected to wide-area disposal, and defined the scope of the plan.</p> <p>The volume of domestic and industrial waste that should be subjected to wide-area ultimate disposal in Tokyo and three other prefectures in 2005 through 2028 was estimated to be 131.480 million m<sup>3</sup>..</p>

<p>Study for reviewing wide-area waste disposal bulkheads (Kanto Regional Development Bureau)</p>	<p>1999 } 2000</p>	<p>In order to select the sites of wide-area waste disposal bulkheads in the Tokyo metropolitan area, present conditions were examined and project and operation costs were estimated.</p> <p>(i) Maps were prepared concerning the natural environment, economic activities, land use conditions and transport network to select the sites of wide-area waste disposal plants.</p> <p>(ii) Costs of construction and operation were calculated and income and expenditure were assessed according to whether the project was operated by a public body, Phoenix Center, semi-public body or private body, and whether the disposal plant was located in or outside Tokyo Bay. As a result, it was found that higher costs would be required if the plant was installed outside Tokyo Bay and the project was operated by a semi-public or private organization.</p> <p>(iii) Influences of large ocean waste disposal plants on the environment were evaluated.</p>
<p>Study for reviewing the seepage control structure of controlled waste disposal bulkheads (Nagoya Research and Engineering Office for Port and Airport)</p>	<p>1999 } 2000</p>	<p>Sheets of geomembrane or steel sheet piles have conventionally been used to prevent seepage in controlled waste disposal bulkheads. In the future, impermeable materials are expected to be used in double sheet pile bulkheads or on the back of gravity-type bulkheads. These materials involve such problems as construction joints and changes in seepage control capacity due to shear deformations. In this study, therefore, the seepage control capacity of impermeable materials to be used in future waste disposal bulkheads was evaluated during or at the completion of construction.</p>

## Studies on port landscape and green space plans

Study	Fiscal year when study was conducted	Study outline
Study on historic port facilities (Ports and Harbors Bureau)	2000	<p>In order to develop pleasant port environment by using the facilities of historic and cultural value, conditions of historic facilities in ports were identified to provide basic data.</p> <p>Questionnaires were sent to port administrators and local autonomous bodies nationwide. As a result, it was revealed that approximately 900 historic facilities had been registered as cultural properties to recognize their historic value. As a means of preserving or using such properties, coordination with surrounding urban areas was reviewed and proposed.</p>
Study on Niihama Port historic landscape model (Shikoku Regional Development Bureau and Niihama Port Authority)	2000	<p>In order to actively develop pleasant and exciting port environment by preserving and using historic properties created during the period of modernization, the present conditions of Niihama Port and such monuments as the Besshi copper mine were grasped. Local needs were identified through free conversations with local residents or members of organizations working to revitalize local communities, and problems were organized.</p> <p>Based on the results, proposals were made as to the plans to improve the inner harbor areas using the historic properties of the Besshi copper mine and other historic properties developed in the modernization period, coordination with city centers revitalization measures separately under study and the building of a wide-area link with historic resources and tourist resources.</p>

## Research on and dissemination of environmental ISO certification

Study	Fiscal year when study was conducted	Study outline
<p>Study concerning the building of environmental management systems (Central Japan International Airport Co., Ltd.)</p>	<p>1999 ) 2000</p>	<p>An environmental management system was built for the airport construction contractor to continuously reduce environmental loads in coordination with local community focusing on the achievement of environmental protection goals. Environmental impact of activities and services of organizations was assessed, goals and action plans were developed and system documents including environmental protection manuals were prepared. Support was also provided in internal audit. Central Japan International Airport Co., Ltd. obtained ISO 14001 certification for the first time in Japan as an airport operator.</p>