

Collection of summaries of WAVE studies and research

(Fiscal 2003)

October 2004

Waterfront Vitalization and Environment Research Center

Major studies conducted by WAVE are described below.

I Studies and research projects concerning port policy, planning and information

(Studies on port policy)

Improvement of physical distribution efficiency

Study	Fiscal year when study was conducted	Study outline
<p>Nationwide study of transport of imported and exported containers (Budget and Accounts Division, Land, Infrastructure and Transport Minister's Secretariat)</p>	<p>2003</p>	<p>The transport of containers for foreign trade has been undergoing quantitative and qualitative changes according to the industrial structure or socioeconomic conditions. Improving container transport systems is extremely important to Japan as foreign trade has been accelerating the economic growth of the country and serving as a backbone of the livelihood of the people. The facts about the flow of containers for foreign trade should be grasped in greater detail.</p> <p>In this study, against the above background, the flow of containers for export and import was investigated simultaneously throughout the country. Similar investigations were also conducted in 1970, 1972, 1974, 1978, 1985, 1989, 1993 and 1998.</p>
<p>Study for promoting the use of wide-area container management systems (Tohoku Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, aimed at enhancing container transport through the ports under the control of the Tohoku Regional Development Bureau, examinations were made of how to reinforce the wide-area container management website and how to operate the website in the future with a view to encouraging the use of ports under the control of the bureau.</p> <p>This study focused on the functional refinement of the "experimental website for Tohoku wide-area container management system" built in fiscal 2002.</p>

<p>Study on the physical distribution of finished vehicles through the ports under the control of the bureau (Tohoku Regional Development Bureau)</p>	<p>2003</p>	<p>Automobile manufacturers have recently been increasing distribution efficiency to enhance their cost competitiveness. Ports should therefore be improved on a timely basis to meet such move toward cost reduction and the manufacturers should be encourage to make more use of ports.</p> <p>Flow of used cars has been increasing over a wide area with the maturing of used car markets, and the automobile recycling law has been enforced. The ports in the Tohoku area should therefore be improved to strategically handle used cars.</p> <p>This study was conducted against the above background to grasp the conditions of transport of entire cars (new and used motor vehicles transported for sale, repair or disposal) in the Tohoku area. Studies were made to adequately review physical distribution for cost reduction.</p>
<p>Study for physical distribution infrastructure development and regional coordination in the Hokuriku area (Hokuriku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted following another study of last fiscal year concerning the regional coordination for international distribution of containers. Studies were made this fiscal year as to how to coordinate among the regions throughout the Tohoku area for domestic physical distribution. Methods for infrastructure development and regional coordination that are important to the enhancement of the convenience of domestic distribution were reviewed.</p>

<p>Study for increasing physical distribution efficiency to reduce distribution costs (Hokuriku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted using the budget for promoting regional revitalization for fiscal 2003. The objectives were to examine the methods for reducing the cost of international physical distribution in the areas under the direct control of the Hokuriku Regional Development Bureau through cooperative efforts of the stakeholders in the Hokuriku and Shinetsu areas, and to reduce the physical distribution cost throughout the country by disseminating information on cooperative methods nationwide for respective regions to actively use and implement them.</p> <p>Statistics on international containers such as those obtained in the nationwide study of transport of imported and exported containers were organized. Cargo owners and physical distributors were requested to respond to questionnaires and interviewed to identify the conditions of international physical distribution and the obstacles to cost reduction. This study revealed that the ports on the Pacific coast in particular were used for handling imported cargoes and that using the ports in the Hokuriku and Shinetsu areas could reduce the total transport cost by approximately 26%. Then, an action program was reviewed to encourage the use of local ports.</p>
<p>Study for building a system of transport of used materials and waste in the Chugoku area (Chugoku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted according to the Basic Law on Establishing a Recycling-Based Society promulgated in fiscal 2000 to identify the approach to the transport of used materials and waste in the Chugoku area, and reviewed the need of building a system of transport of used materials and waste and the role that the system should play.</p>

Efficient port improvement, use and management

Study	Fiscal year when study was conducted	Study outline
Study for restoring passenger terminals (Shikoku Regional Development Bureau)	2003	This study aimed at seeking methods for restoring passenger terminals left idle due to the restructuring or discontinuation of ferry or passenger liner services in recent years. Data were collected mainly on the inner ports under the control of the Shikoku Regional Development Bureau including Tokushima-Komatsushima Port and case study analysis was made to compile a collection of examples of restoration of ports with similar problems.

Long-term vision and regional development

Study	Fiscal year when study was conducted	Study outline
<p>Long-term port improvement plans in Akita prefecture (Tohoku Regional Development Bureau)</p>	<p>2003</p>	<p>The ports in Akita have been serving various purposes as the land-sea node for transporting goods and people in and outside the country, as the places of production activities of industries leading the regional economy, as the places of employment and as the bases for communication between people and the sea.</p> <p>The circumstances of Japan have been changing greatly as seen in the globalization of economy and society, digitization, tight public finance due to population decline, diversification of people's values and emergence of global environmental problems.</p> <p>The "Vision for the ports of Akita" is a basis for the implementation of the "Vision for the ports in the Tohoku area" (developed by the Ministry of Land, Infrastructure and Transport in 2002), and also takes the "Akita 21 comprehensive plan" (developed by the Akita prefectural government in 2000) into consideration. The "Vision for the ports of Akita" intends to present a basic policy concerning the roles of five ports in Akita, namely Akita, Funakawa, Noshiro, Toga and Honjo Ports, in the transport of goods and people and the uses of the respective ports.</p> <p>A working group for developing the vision for the ports of Akita (secretariat in Akita Port Office, Tohoku Regional Development Bureau, Ministry of Land, Infrastructure and Transport and the Construction and Transport Division, Akita prefectural government) played a central role in defining the "Vision for the ports of Akita" by inviting the views of academic experts, business people and port users in the meetings of intellectuals or in regional forums.</p>

Urban development centering on the port and private involvement

Study	Fiscal year when study was conducted	Study outline
<p>Study for planning port improvement using the attraction of the Seto Inland Sea (Kagawa prefectural government)</p>	<p>2003</p>	<p>This study focused on the role of ports as "space for regional exchange" in addition to distribution or industrial roles. The objective was to develop a port vision contributing to the revitalization of coastal areas in Kagawa prefecture through the use of the attraction of the Seto Inland Sea.</p> <p>In last fiscal year, the conditions of the ports in Kagawa prefecture were analyzed and questionnaires were distributed to local residents concerning the use of ports. In this fiscal year, improvement plans (draft) were developed for the ports designated as <i>Umi-no-Eki</i> (seaside rest areas), nodes in a cruising network. Based on the above result, "Vision for the ports of Kagawa" was developed with the basic idea of developing ports for exchange to provide access to the nature and culture of the Seto Inland Sea.</p> <p>This study identified the port improvement policy of Kagawa Prefecture for the next decade. Ten pilot projects were proposed to achieve basic goal 1, "port development for promoting urban development centering on the port", a key objective of the vision.</p>

Other

Study	Fiscal year when study was conducted	Study outline
<p>Study for promoting tourism in ports (Budget and Accounts Division, Land, Infrastructure and Transport Minister's Secretariat)</p>	<p>2003</p>	<p>This study aimed at collecting data on the examples of promotion of tourism in ports and obtaining basic data and knowledge about tourism promotion measures to be taken in the future. Tourism will be promoted in ports in coordination with the move of the central government for building a tourist country, the "visit Japan" campaign being executed by the Ministry of Land, Infrastructure and Transport, and the efforts to create space for tourism and exchange.</p> <p>In the study, data were analyzed on the promotion of cruising and industrial tourism, an emerging type of tourism, referred to at the Northeast Asia Port Authority Directors' Conference held in 2004 through 2006.</p>
<p>Study on hands-on learning in ports in Tokyo Bay (Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>This study examined the ways for children to prepare textbooks on their own for the comprehensive studies of ports during the "hours for comprehensive studies" recommended according to the new official guidelines for schoolteaching. Children used to receive numerous pamphlets when they had a tour of a port. In the future, materials will be prepared to enable children to learn about ports or waterfront areas using a personal computer under certain themes, and to confirm what they have learned during the field tour. This study aimed at developing a "system useful for preliminary studies" to achieve the above goal, identifying the effects of the system and helping increase the understanding of ports and enlightening children on ports.</p>

<p>Study for improving a historic port in Naha (Naha Port and Airport Construction Office, Okinawa General Bureau)</p>	<p>2003</p>	<p>This study checked the possibility of improving Naha Port using the historic heritage in the Naha pier area as part of the creation of bustling space for exchange. The objective was to contribute to the development of a historic port improvement plan that was scheduled for the next fiscal year.</p> <p>In the study, the historic value of the Naha pier area was identified. The possibility of improving a historic port in the area was reviewed based on the public views and requirements for the improvement. Then, problems involved in implementing the plan and corrective measures required were identified.</p> <p>As a result of the study, it was found that the Naha pier area with <i>Miegusuku</i> and <i>Omonogusuku</i>, port monuments of the medieval age, was of particularly high historic value. It was also noted that a historic port could be developed using the heritage, achieving coordination with the redevelopment of the Naha pier area specified in the Naha Port improvement plan, and that signs should be installed to present the historic heritage of the area and historic port environment creation projects should be implemented.</p>
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Planning and investigation projects
 Creation of comprehensive port space

Study	Fiscal year when study was conducted	Study outline
Study for establishing a major wide-area disaster prevention base in Kawasaki Port (Keihin Port Office, Kanto Regional Development Bureau)	2003	In order to establish a major wide-area disaster prevention base in Kawasaki Port, a committee composed of academic experts and officials of the central government and municipalities held meetings three times to identify basic conditions, defined basic ideas during a disaster and under normal conditions, and developed a basic design. A disaster prevention forum was held to help the public have better understanding of the project.

<p>Study for coastal area improvement in Beppu Port for fiscal 2003 (Beppu Port Office, Kyushu Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted based on the results of coastal area improvement in Beppu Port (in the Mochigahama, Shoningahama and Kitahama areas) that had been carried out up to the last fiscal year by the public involvement method. A detailed improvement plan was also developed and landscaping measures were reviewed for the Mochigahama area.</p> <p>A landscape study team was formed to develop an improvement plan paying attention to the use of the port and landscaping. Views were exchanged with a separately established technical study team to ensure technical compatibility in terms of the shape and location of facilities and cross sectional structure. At the workshops held simultaneously with the above measures involving the local residents, agreement was reached to build consensus.</p> <p>As a result of this study, outlines of plans were defined for constructing coastal facilities in the Mochigahama area in a project under the direct control of the bureau and for protecting the environment (greening the ports) by the Oita prefectural government. In the process, experts participating in the landscape study team gave plain explanations to increase public understanding at workshops, playing an important role in mutual understanding between local residents and the administration and in consensus building.</p>
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<p>Study for developing a train/tram-based transport system in waterfront areas for fiscal 2003 (Niigata Port and Airport Construction Office, Hokuriku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted to identify the policy for introducing a tram-based transport system in Niigata City that had been gathering attention in the areas under the direct control of the Hokuriku Regional Development Bureau. Problems to be involved in the implementation of the system were grasped.</p> <p>Expectations for and problems with the tram-based transport system were identified through interviews with administrative and business people and questionnaire surveys. Check was made of a plan to introduce a tram-based transport system in Niigata. Space where the system would be installed, the influences of different levels of services to be provided and system operation plans were reviewed. LRT (light rail transit) was assumed because its serviceability was confirmed in a study of the previous fiscal year. Cost performance was estimated although roughly. The superiority of the system was confirmed. Proposals were made as to how to provide explanations about systems implementation. Future actions were defined based on the above results.</p>
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Improvement, management and operation methods

Study	Fiscal year when study was conducted	Study outline
<p>Study on the economic ripple effects produced by Sakata Port (Sakata Port Office, Tohoku Regional Development Bureau)</p>	<p>2003</p>	<p>This study aimed at identifying the role of Sakata Port in regional economy, quantitatively estimating the effects of port development and identifying the degree of contribution of the port to regional economy and employment.</p> <p>To meet the objectives, methods for estimating the effect of port development on the regional economy, and the present conditions of Sakata Port and the economy of Yamagata prefecture were first analyzed. Then, questionnaires were distributed to the industries dependent on or related to Sakata Port to analyze the use of and trend in the port. Based on the survey results, the quantitative effects of the port on the regional economy were estimated. Recycling business operators were interviewed to analyze the present and future effects of the improvement of Sakata Port as a recycling port on the regional economy.</p> <p>As a result, it was found that Sakata Port produced an annual economic effect worth 83.8 billion yen on the regional economy and that the development of the recycling port was expected to produce an annual economic effect worth 860 million yen.</p>

<p>Study on the measures for countering global warming at container terminals (Tokyo Port Office, Kanto Regional Development Bureau; Bureau of Port and Harbor, Tokyo Metropolitan Government; and Tokyo Port Terminal Corporation)</p>	<p>2003</p>	<p>Global warming has been regarded as "one of the most critical environmental issues affecting the base of human existence because of its serious effects on the natural ecosystem and the human being. The issue should be actively handled through international cooperation.</p> <p>In Japan, measures to counter global warming were outlined in March 2002. To control global warming, "all the players such as the national and local governments, businesses and the people should make utmost efforts in their respective positions." Efforts are also required at ports.</p> <p>Joint research efforts by the Ministry of Land, Infrastructure and Transport; the Bureau of Port and Harbor of the Tokyo Metropolitan Government; and Tokyo Port Terminal Corporation intended to help the businesses involved in the operation of container terminals take measures to control global warming. The energy use mechanism was identified in container terminals where the level of consumption of energy was highest in the port, and comprehensive measures to counter global warming in container terminals were examined and a menu of actions was presented.</p>
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<p>Cost benefit analysis in Susaki, Murotsu and Kamikawaguchi Ports (Kochi Port and Airport Construction Office, Shikoku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted to make contributions to cost performance evaluation of projects for improving breakwaters in the (a) mouth of Susaki Port, (b) Murotsu Port Murotsu area and (c) Kamikawaguchi Port Kamikawaguchi area.</p> <p>The respective ports and projects were first outlined to confirm the roles and characteristics of the projects. Then, cost performance was analyzed and the effects on the regional economy were grasped based on the interview results or other data. Information on the efforts to reduce project costs and the local requirements were also organized.</p> <p>As a result, the benefit/cost ratio was found to be more than 1.5 in all of the three projects. Implementing the improvement plan was therefore considered desirable.</p>
<p>Basic study concerning the operation of container terminals (Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>Public container terminals have been operated jointly by multiple terminal operators using terminals. Integrated efficient operation is now possible in designated structural reform areas. Against such a background, this study aimed at reviewing the conventional method for operating public container terminals and thereby examining the future direction of terminal operation.</p> <p>The present ways of operation of container terminals at four ports in Tokyo Bay were identified and the modes of operation at domestic and overseas container terminals were categorized into several patterns. Then, the future direction of public container terminal operation and promotion of terminal use was defined and measures for encouraging the use of terminals were proposed.</p>

Long-term plans and development measures

Study	Fiscal year when study was conducted	Study outline
<p>Study on plans to use Hitachinaka Port (Kashima Port and Airport Construction Office, Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, the present conditions of roll-on roll-off and ferry routes to Hokkaido, which were considered highly likely to encourage the use of Hitachinaka Port and the possibility of promotion of use of the port, were examined.</p> <p>Information on the recent changes in condition due to the imposition of new restrictions were organized, and the conditions of physical distribution between Hokkaido and Kanto areas were grasped based on the results of national freight transportation surveys, port statistical surveys and field surveys. Problems were identified concerning the present conditions and future potential through interviews of those concerned. Based on the data obtained, problems involved in the promotion of use of Hitachinaka Port and corrective measures were examined.</p> <p>This study confirmed that Hitachinaka Port could play an important role in physical distribution along the routes between Kanto and Hokkaido areas and that the volume of cargoes was expected to increase. It was suggested that measures should be taken in cooperation with the ports in Hokkaido for increasing the capacity of roll-on roll-off and ferry routes, modifying the time schedule and increasing loading efficiency at the port.</p>

<p>Study for promoting cruising in Naha Port (Development Construction Department, Okinawa General Office)</p>	<p>2003</p>	<p>The Okinawa development plan, aiming at the use of the beautiful sea of Okinawa as a tourist resource, recommends "integrated and focused development of public tourist facilities to handle international cruise ships in order to build an international ocean resort." In this study, the present conditions and problems of the facilities at the Naha Port passenger pier were identified and the requirements of passengers and shipping lines were grasped. The objective was to propose a basic improvement policy for promoting cruising.</p> <p>In the study, the present conditions of cruise and tourism using Naha Port and the requirements of passengers and shipping lines were obtained through interviews and questionnaire surveys. Based on the data obtained, structural and procedural measures to promote cruising through Naha Port were examined. A basic port improvement plan was developed based on the results of evaluation by a committee.</p> <p>As end products, five ideas for improving the facilities of the passenger pier in Naha Port and specific plans corresponding to the ideas were defined for promoting cruising. Then, a facilities improvement plan was developed.</p>
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Port city planning and public involvement

Study	Fiscal year when study was conducted	Study outline
<p>Study for port city planning in Kuwana Port (Yokkaichi Port Office, Chubu Regional Development Bureau)</p>	<p>2003</p>	<p>This study reviewed a city port development plan for Kuwana Port (a local port under the control of Mie prefectural government) Akasuka area to obtain basic data such as the concept of the plan and a menu of actions. Fishery operators, and members of civic groups involved in "port city planning", "tourism" and "education" such as residents' associations and elementary schools were interviewed to identify the requirements for port city planning. Then, a rough port city development plan was prepared.</p> <p>As a result of the interviews and surveys, it was found that port assets such as the fishery at Kuwana Port and the history and culture of the Akasuka area with a fishermen's town had been unknown to the people living in the city center and hinterland. The area was not familiar to the residents. It was considered necessary to make the Akasuka area widely known to the public. In the Kuwana port city planning, therefore, a menu of port city development measures was proposed that emphasized the physical link with the city center and the enlightenment on the history and culture of the Akasuka area.</p>

Other

Study	Fiscal year when study was conducted	Study outline
<p>Development of virtual reality systems in Naha Port for fiscal 2003 (Naha Port and Airport Construction Office, Okinawa General Bureau)</p>	<p>2003</p>	<p>This task aimed at developing three-dimensional data and a virtual reality (VR) application program to examine what facilities should be installed during the improvement of Naha Port and what impact the improvement would have on the environment. Another objective was to develop computer graphics animation programs based on the VR data for disseminating information at briefing sessions in the regions concerned or via the Internet.</p> <p>In the first phase of the task, the required level of data precision was identified, and additions and revisions were made to the data prepared in fiscal 2001 and 2002 on the conditions and plan at the time, to develop the latest plans for the Urasoe and Shinko pier areas using three-dimensional data. The three-dimensional data were used to build VR application systems for use at study forums or for presentation.</p> <p>In the second phase, computer graphics animation programs were produced based on the VR data for disseminating information at briefing sessions in the regions concerned or via the Internet.</p>

Information research projects
Port EDI

Study	Fiscal year when study was conducted	Study outline
<p>Management and operation of port EDI systems (Budget and Accounts Division, Land, Infrastructure and Transport Minister's Secretariat; Maritime Safety Agency; and National Institute for Land and Infrastructure Management)</p>	<p>2003</p>	<p>WAVE started developing the port EDI systems according to the "basic policy for using EDI for administrative procedures" defined by the Ports and Harbors Bureau of the Ministry of Land, Infrastructure and Transport and the Maritime Safety Agency based on an "outline of policies for general distributors" that was finalized at a cabinet meeting in April 1997. WAVE started systems operation on a trial basis in October 1999.</p> <p>With the revision of the Port and Harbor Law in 2003, installing and managing port EDI systems were defined as a task of the central government on June 1. Then, full-scale systems operation was started. A one-stop-service system went into service on July 23 that made possible interconnection with systems of other agencies e.g. Sea-NACCS/crew landing permit system. The maintenance of one-stop-service system equipment became necessary. The operation and management of quarantine application were also additionally required. Service was commenced on March 29, 2004 for "filing and payment of tonnage dues", one of the NACCS applications. Thus, the one-stop-service system was further enhanced for greater user convenience.</p>

<p>Study for developing a one-stop-service system (Budget and Accounts Division, Land, Infrastructure and Transport Minister's Secretariat; and Maritime Safety Agency)</p>	<p>2003</p>	<p>Studies were made to incorporate into the one-stop-service system the application processes not yet digitized and the notification procedure that was made mandatory with the enforcement of a revised SOLAS Convention (International Convention for Safety of Life at Sea) and the revision of laws concerning stranded ships left on the shore. Preliminary and detailed designs were developed.</p> <p>Preliminary design The flow of system steps and information were organized. Functional requirements and how the system would be used were determined from a system user's viewpoint.</p> <p>Detailed design Program configuration was defined to achieve the functional requirements identified in preliminary design.</p>
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Investigations into port information

Study	Fiscal year when study was conducted	Study outline
<p>Study for defining the specifications for an information platform for port-based physical distribution (to be subjected to verification tests) (Tokyo metropolitan government; Yokohama, Kobe, Fukuoka, Kitakyushu, Osaka and Yokkaichi municipal governments; and Nagoya Port Authority)</p>	2003	<p>This study was conducted to examine the specifications for the information platform for port-based physical distribution as a basis for sharing port-based physical distribution information exchanged among the operators concerned, in order to digitize and increase the efficiency of port-based physical distribution. Terminal operators, marine cargo distributors, customs brokers and land transport companies have been separately trying to digitize and increase the efficiency of port-based physical distribution.</p> <p>In this study, information on how containers were carried into and out of ports was organized based on the results of questionnaire surveys and existing materials. Review sessions were held for defining the specifications for an information platform for port-based physical distribution (to be subjected to verification tests) with the participation of the members of shipping lines and port administrators as well as the stakeholders mentioned above. Thus, the specifications for the information platform for port-based physical distribution were determined while listening to the views of the stakeholders.</p> <p>In this study, standard application processes and data items to be shared that were required for social experiment were identified when transporting containers with cargoes out of the port and transporting empty containers into the port at the time of import, and when transporting empty containers out of the port and transporting containers with cargoes into the port at the time of export.</p>

II Study and research projects concerning the port environment and environmental ISO

Environment-related projects Research on environmental policy

Study	Fiscal year when study was conducted	Study outline
Study concerning the nature-based experience on beaches (Kanto Regional Development Bureau)	2003	<p>Programs were examined for equipping field instructors with the capability of offering to the public opportunities for experiencing the nature in the sea areas and on the beaches with a view to obtaining better understanding of the public about marine nature restoration projects.</p> <p>Check was made of (i) details of nature-oriented experience and the (ii) programs for developing instructors.</p>
Study for disseminating environmental information (Yokohama Research and Engineering Office for Port and Airport)	2003	<p>For achieving a sound hydrologic cycle, it is important to centrally control and disseminate information on environmental data collected and where they exist.</p> <p>In this study, the policy was defined for effectively using the Tokyo Bay Environmental Information Center that started operation in June 2003 as a basis for sharing environmental information with the general public. Comments were obtained from intellectuals and stakeholders at committee meetings and review sessions on the methods of providing, standardizing and using environmental information.</p>

<p>Study concerning the method for monitoring the Sea of Japan (Hokuriku Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, verification was made of the contents of the Hokuriku Regional Development Bureau draft environmental data book edited by the port and airport department concerning the natural environment and social conditions in the areas under the control of the Bureau. Then, the final version of data book was prepared. A Hokuriku Regional Development Bureau environmental website edited by the port and airport department was developed to disclose information on the natural environment and social conditions in the areas under the control of the Bureau. Part of information was disclosed. At the time of disclosure, the composition of the environmental website was reviewed. Data in the environmental data book were provided at the website. A review was also made of the methods for updating environmental information provided at the environmental website and of the management system.</p>
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<p>Study for implementing the second-phase project for Tokyo Bay waterfront road (Tokyo Port Office, Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, a review was made of public awareness programs through comprehensive studies about environmental education in order to obtain public understanding of the second-phase project for Tokyo Bay waterfront road being carried out by the Tokyo Port Office of the Kanto Regional development Bureau.</p> <p>Educational materials were developed about the environment for high school students in cooperation with non-profit organization members, academic experts and school officials.</p> <p>The materials were examined at study meetings attended by the stakeholders after the organization of information on the existing materials used during the hours for comprehensive studies and on the problems specified by teaching staff.</p> <p>The materials were used in classes to increase accuracy.</p>
<p>Study for reviewing the methods for comprehensively create or restore the environment in Ise Bay (Chubu Regional Development Bureau)</p>	<p>2003</p>	<p>This study, conducted based on the past environmental improvement activities in Ise Bay, aimed at examining methods for comprehensively create or restore the environment in Ise Bay by diverse stakeholders such as the administration, operators, researchers, and representatives of civic groups and non-profit organizations; seeking specific measures effective for improving the environment in the sea areas of Ise Bay through nature restoration or other measures; and developing a "draft plan to create or restore the environment in Ise Bay.</p>

<p>Study concerning port improvement methods friendly to coral reefs (Development Construction Department, Okinawa General Bureau)</p>	<p>2003</p>	<p>Environmental considerations have recently been required when developing social infrastructure systems. Port facilities should also be constructed with due considerations of the surrounding ecosystem.</p> <p>The Development Construction Department of the Okinawa General Bureau of the Cabinet Office has been improving the key ports in Okinawa prefecture while preserving the natural environment since the reversion of Okinawa to the sovereignty of Japan. Coral has naturally been embedded in breakwaters, wharves and bulkheads. As a result of port improvement, large quantities of coral have emerged in places where no coral used to grow. This suggests the possibility of port improvement friendly to the ecosystem nurturing coral.</p> <p>This study aimed at helping improve ports friendly to coral reefs. Research and study results concerning coral obtained by the Okinawa General Bureau and domestic research institutes were organized. Views of intellectuals were obtained at review meetings to examine the environmental protection policy at Naha, Hirara and Ishigaki Ports. Presentation materials were prepared about the environmentally friendly measures taken by the Okinawa General Bureau for submission to the 10th International Coral Reef Symposium to be held in fiscal 2004.</p>
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<p>Study for building a regional cooperation network (Hakata Port and Airport Construction Office, Kyushu Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted as part of the "nature-oriented experience and environmental education in waterfront areas" at which the Ports and Harbors Bureau of the Ministry of Land, Infrastructure and Transport was working to identify the policy for building a network for cooperation with the non-profit organizations and civic groups working in the coastal areas in Fukuoka prefecture under the control of the Hakata Port and Airport Construction Office of the Kyushu Regional Development Bureau.</p> <p>In the study, details of nature-oriented experience that could be obtained in the area under the control of the Bureau were investigated using existing literature. Based on the results of the investigations, details of activities were reviewed on the assumption of cooperation with non-profit organizations and civic groups. Case study methods were used to identify the requirements and problems in relation to nature-oriented experience. Case study methods were applied to snorkeling that elementary school children were enjoying in Fukuoka prefecture, through cooperation among the central government, local municipalities, non-profit organizations and civic groups. The results were highly rated.</p> <p>Then, proposals were made for future environmental education in coastal areas.</p>
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<p>Study concerning the methods for promoting the use of Shimoda Port (Shimizu Port Office, Chubu Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, methods were examined for building a setup for cooperation between the central government and port administrators, and regional organizations such as autonomous bodies, related organizations and non-profit organizations, which was considered necessary for ensuring the transparency of public utility projects including port improvement, for encouraging the involvement of diverse regional organizations, and for building a consensus.</p> <p>In the study, case study analysis was made for examining the methods of cooperation with stakeholders working in coastal areas including the ports in the Shimoda area under the control of the Shimizu Port Office of the Chubu Regional Development Bureau.</p> <p>As a result of the study made through cooperation among the stakeholders, the residents who participated in the study made favorable comments. Information on the results and problems was organized and proposals were made for reflection of the results in specific measures.</p>
<p>Study on the environment in sea areas in the Sea of Ariake and the Sea of Yatsushiro (Kumamoto Port and Airport Construction Office, Kyushu Regional Development Bureau)</p>	<p>2003</p>	<p>The basic policy based on the "special measure law concerning the restoration of the Sea of Ariake and the Sea of Yatsushiro" stipulates that marine environment improvement ships should be deployed that are capable of collecting garbage and investigating the environment. The Ministry of Land, Infrastructure and Transport placed "<i>Kaiki</i>", a marine environment improvement ship, into service at the end of fiscal 2003. In this study, a plan was developed for regular environmental study that would be conducted from fiscal 2004. The objective was to collect valuable data to supplement a joint study conducted by other organizations taking the merits and demerits of the ships into full consideration. In fiscal 2004, the data will be disclosed in a database.</p>

<p>Construction of Osaka Port environmental database (Kobe Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>The objectives of this work were to collect and centrally control the data possessed by the Kinki Regional Development Bureau of the Ministry of Land, Infrastructure and Transport, autonomous bodies around Osaka Bay and other government agencies and build a database for sharing the information to help prepare data for various plans; and to review the data on the environment in Osaka Bay for dissemination to the public and help the public understand port environmental measures.</p> <p>A review had been made for building an Osaka Bay environmental database since fiscal 2001 at study meetings of academic experts. Up to fiscal 2002, the contents of the database had been examined and the basic part of the database had been built. In fiscal 2003, efforts will be continued to build and review the database. The results of work for the past three years were disclosed to the general public at the website in April 2004.</p>
<p>Study for reviewing marine environment improvement in the Sea of Yatsushiro (Kumamoto Port and Airport Construction Office, Kyushu Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, data were collected on the present conditions of sea areas in the Sea of Yatsushiro, and effective environmental improvement measures were examined.</p> <p>As a result, inflow load was found in the north zone of the Sea of Yatsushiro and the load of fish farms in the south zone.</p>

<p>Study on the nature restoration methods in Okinawa (Development Construction Department, Okinawa General Office)</p>	<p>2003</p>	<p>The objective of this study was to collect basic data for "full-scale implementation of nature restoration through the participation of diverse players", a basic policy. The basic policy was presented in the need of "nature restoration" in the "New National Strategy for Biological Diversity" defined at the Council of Ministers for Global Environment Conservation on March 27, 2002, the "law for promoting nature restoration" established in December 2002 and the "basic policy for nature restoration" defined at a cabinet meeting in April 2003.</p> <p>The need of nature restoration in the coastal areas in Okinawa, the nature restoration method in the port area and the areas requiring nature restoration were identified. Methods were also reviewed for nature restoration including the cooperation with environmental groups, and nature restoration projects plans (draft) were proposed.</p>
<p>Basic study for nature restoration through cooperation between the public and the administration (Nagoya Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>This study aimed at identifying the requirements for the cooperation among the residents, civic groups and the administration in the sea areas in Ise Bay and Mikawa Bay, and at obtaining basic data for defining the roles of the stakeholders.</p> <p>In order to protect or restore nature in Ise Bay and Mikawa Bay, it is necessary to share the history of nature conservation, protection and restoration in the sea areas and exchange views among the residents, civic groups and the administration. In this study, lectures and citizens' meetings were held to share information, exchange views and collect data.</p>

<p>Study for reviewing the environmental learning through the access to the natural environment of the Seto Inland Sea for fiscal 2003 (Ube Port Office, Chugoku Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted to collect and analyze the basic data required for understanding the present environment in the Set Inland Sea to implement effective environmental restoration projects in the sea areas of the Set Inland Sea around Yamaguchi prefecture, and to examine how to proceed with environmental teaching in the Set Inland Sea.</p> <p>Data were collected and organized on the natural sea areas in the Seto Inland Sea and the present conditions were analyzed by sea area based on the data. Examples of environmental learning covering rivers as well as sea were collected. Approaches to environmental restoration were analyzed. Guidance and advice were obtained in operating committees, and draft curriculums were developed for environmental learning through the access to the natural environment of the Seto Inland Sea.</p> <p>This is a two-year study. The draft curriculums developed in this study will be applied in fiscal 2004 on a trial basis. The problems that will be identified will be solved before finalizing the curriculums. At the end of the study for fiscal 2004, more practical and highly applicable curriculums will have been completed.</p>
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<p>Study concerning the environmental protection in the ports of Okinawa (General Affairs Department, Okinawa General Bureau)</p>	<p>2003</p>	<p>The ports of Okinawa have conventionally been required to serve as physical distribution hubs when planning port improvement. In this study, the natural environment left in the port area and surrounding sea areas was examined to enhance living conditions by actively protecting and using the valuable natural environment through the provision to local residents and tourists of places for access with nature through nature-oriented experience and eco-tours.</p> <p>First, the natural environment and regional characteristics of Okinawa were identified. Advanced examples of nature-oriented experience and eco-tours were collected and organized. A plan applicable in the port area and in surrounding sea areas was proposed and case study analysis was made. The results and problems were extracted and the measures to use the results were proposed.</p>
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<p>Study on public-involvement-type environmental measures (Naha Port and Airport Construction Office, Okinawa General Bureau)</p>	<p>2003</p>	<p>Port improvement requires environmental considerations as in the case of land reclamation from the sea. Growing environmental awareness in recent years has been resulting in consensus building among local residents taking much time and thus making smooth facilities improvement difficult. In Okinawa in particular, people have been feeling a greater interest in the environment because few natural environments similar to the one in Okinawa are found in other areas of the country owing to the local subtropical climate.</p> <p>In other business fields than ports, environmental considerations have also been required. In river administration in particular, environmental issues have been matters of greater concern than for ports because of great environmental impact as in the case of a dam. In river administration, therefore, environmental efforts have been made earlier than in other public utility projects. As a result, more detailed examinations have been made of the building of relationships with local residents and non-profit organizations and of the creation of environmentally friendly projects.</p> <p>In this study, investigations were made about the environmental measures taken in river administration in order to help apply similar measures in port administration. Examined were the history of environmental protection and the present systems including those for maintaining the relationship with non-profit organizations.</p>
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<p>Study concerning the support in comprehensive learning in Sakata Port (Sakata Port Office, Tohoku Regional Development Bureau)</p>	<p>2003</p>	<p>A review was made of the "sea, play and learning" program in Sakata Port. The study aimed at examining the methods of support in comprehensive learning concerning the environment to obtain general public's understanding of the improvement of Sakata Port, providing opportunities for comprehensive learning to raise the awareness of children, the basis for the country's future, about the sea and ports and promoting exchange among children through nature-oriented experience on beaches.</p>
<p>Study on the fishing park supporter system (Kinki Regional Development Bureau)</p>	<p>2003</p>	<p>This study aimed at making a versatile review of management of facilities including fishing parks through the cooperation among the citizens, experts and the administration based on the relationship between the people and the sea (beach) and the public needs of fishing, and at identifying the need and problems of the creation of a new system.</p>

Environmental creation planning and technology (ecosystem)

Study	Fiscal year when study was conducted	Study outline
<p>Verification tests for seaweed bed construction in Omaezaki Port in fiscal 2003 (Shimizu Port Office, Chubu Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted to monitor the seaweeds growing in the retarding section of the environmentally friendly breakwater in the west of Omaezaki Port and embed parents, and to verify the effectiveness of environmentally friendly breakwaters for creating seaweed beds.</p> <p>The ultimate goals of building seaweed beds using environmentally friendly breakwaters are to release zoospores from the seaweeds that grow in the retarding section and to create new seaweed beds around the breakwater. In this fiscal year, numerous parents were implanted in the retarding section and the conditions of seaweed bed created in a slit-type caisson were examined. The effectiveness of environmentally friendly breakwaters for releasing zoospores was verified. Problems and methods of verification of effectiveness of the breakwaters were identified.</p>

<p>Study concerning the methods of nature restoration in Ise Bay and Mikawa Bay (Nagoya Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>In order to find the direction of methods for quantitatively evaluating the effectiveness of various nature restoration technologies applicable to Ise Bay and Mikawa Bay, examinations were made of the methods of an experiment for verifying effectiveness evaluation methods and of the methods of evaluation when implementing projects. A basic study was conducted for developing basic rules related to the coordination and cooperation between the administration and non-profit organizations in nature restoration projects.</p> <p>The study was conducted under four themes.</p> <ul style="list-style-type: none"> (i) Tideland development using dredged materials (ii) Technology for creating seaweed beds (iii) Technology for improving bottom sediment (iv) Coordination between the administration and non-profit organizations <p>As a result of the study, plans for experiments for developing tideland and seaweed beds using dredged materials were proposed under themes (i) and (ii). An effective monitoring method was proposed in bottom sediment improvement projects under theme (iii). Proposals were also made for desirable coordination and cooperation between the administration and non-profit organizations and their roles under theme (iv).</p>
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<p>Study concerning the methods for controlling poor oxygen water mass in Ise Bay and Mikawa Bay (Nagoya Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>In this study, field investigations were conducted to grasp the conditions of poor oxygen water mass in Ise Bay and Mikawa Bay, and measures to control the occurrence of poor oxygen water mass were examined using quantitative data.</p> <p>As a result of the study, the process from the occurrence through the disappearance of poor oxygen water mass could be confirmed based on the field data. Information on the characteristics of poor oxygen water mass in Ise Bay and Mikawa Bay was organized. Based on the study results, water quality monitoring plans, methods of providing data and measures to control the occurrence were proposed.</p>
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<p>Study on the environmental characteristics of muddy tideland (Shimonoseki Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>In order to establish technology for developing muddy tideland effectively using dredged materials (supplement the marine nature restoration handbook) and to protect or restore muddy tideland in the Sea of Ariake and the Sea of Yatsushiro, it was decided to start a technical review and conduct field surveys and testing in fiscal 2003.</p> <p>In fiscal 2003, knowledge about the muddy tideland in the Sea of Ariake and the Sea of Yatsushiro (e.g. conditions for tideland development, basic conditions for the growth of animals and plants, functions of the tideland and methods of evaluating the functions) was organized using the existing materials. The conditions for grasping the environmental problems and functions of muddy tideland were identified. The field surveys and testing were conducted by the Kumamoto Research and Engineering Office for Port and Airport. The results of the field surveys and testing were reflected in technical review.</p> <p>As a result of the study, problems of the muddy tideland in the Sea of Ariake and the Sea of Yatsushiro were identified. Study items were proposed that were required for identifying the functions of tideland that could not be grasped based on the existing materials.</p>
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<p>Improvement of coastal environment in a public port (development of methods for developing eelgrass beds) (Kurashiki Regional Development Bureau, Okayama prefectural government)</p>	<p>2003</p>	<p>A committee for developing an eco-coast along Kojima Port (Karakoto area) held review meetings in fiscal 1998 and developed a plan to apply area protection measures through beach nourishment to improve the seacoast for disaster prevention, environmental conservation and effective use, and to restore (transfer) the eelgrass beds that would be lost by beach nourishment in (to) nourished beaches.</p> <p>At the site, a pilot transferal area was specified in fiscal 1999. A pilot transferal and a pilot seeding area were established in fiscal 2001. A medium-size pilot project site was established in fiscal 2001 and 2002. Monitoring has been continued in the meantime.</p> <p>In this fiscal year, how the eelgrass bed was being restored in the pilot transferal areas was monitored. Methods for restoring eelgrass beds in the areas were examined and the restored eelgrass beds were subjected to adaptive management.</p> <p>The knowledge already available and the results of monitoring in this fiscal year showed that the restoration of eelgrass beds in the areas was effective, that transplanting suckers by fixing the underground stem was effective, that seeding on artificially-made rough beaches using mats was efficient and that restoring eelgrass beds in the zigzag or square format was effective.</p>
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<p>Study concerning marine nature restoration (Kobe Research and Engineering Office for Port and Airport)</p>	<p>2003</p>	<p>A law concerning the promotion of nature restoration has been enforced and urban renewal projects and other moves are now being made toward nature restoration. In order to use as basic data for reviewing nature restoration in Osaka Bay, data were collected on the steps taken by the administration, research institutes, and general public and non-profit organizations and on the problems involved.</p> <p>The collected data were used when holding lectures concerning related activities to foster public awareness of the need of nature restoration in Osaka Bay.</p> <p>The study revealed that the administration, research institutes, the general public and non-profit organizations have been taking various measures to restore nature in Osaka Bay. The lectures helped increase public interest in nature restoration in Osaka Bay and thus proved to be an effective means of public enlightenment.</p>
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Environmental creation planning and technology (waste, recycling and hazardous materials)

Study	Fiscal year when study was conducted	Study outline
Development of bottom sediment purification plans in a pollution control project in Tagonoura Port (Tagonoura Port Authority, Shizuoka prefectural government)	2003	<p>The following studies were made of the plans for improving the bottom sediment in Tagonoura Port that had a dioxin concentration higher than the environmental quality standards.</p> <ul style="list-style-type: none"> -A verification test was conducted for a method of dredging dioxin-polluted bottom sediment (preventing pollution) to evaluate the effects of the pollution prevention measures. -Laboratory tests confirmed that an equation representing the correlation between turbidity and dioxin concentration could be predicted through preliminary check of the relationship between turbidity and suspended solid and of silty clay content of bottom sediment. A monitoring plan was developed. -Following the guidelines of the central government, the quantity of polluted earth was calculated based on the results of investigations of dioxin in bottom sediment in fiscal 2002 and 2003. The border between the ground and sediment stratum was defined as the boundary of the polluted area. Intermediate and final treatment methods were reviewed according to the guidelines of the central government with due attention to the characteristics of Tagonoura Port.

<p>Study for leaching tests on dioxin level of bottom sediment in ports (Port and Airport Research Institute)</p>	<p>2003</p>	<p>The environmental quality standards stipulate that bottom sediments should contain less than 150 pg-TEQ/g of dioxin. Verification was made of the relationship between dioxin content and leaching in the bottom sediment with the dioxin level exceeding the environmental quality standards. The results of the study were intended for use in selecting disposal sites and in smoothly implementing projects.</p> <p>The results of the studies conducted by local municipalities in five ports with the dioxin concentration level higher than the environmental quality standards were used to compare dioxin content and leaching and to examine the methods for measuring dioxin leaching. Correlation was found between dioxin content and leaching in a given single port but no correlation was found based on the results in all the ports. It was verified that using seawater as the solvent resulted in the reduction of leaching and in the reduction of the risk of leaching in the case of coastal landfilling. Article 5 Section 2 Clause 4 of the enforcement order of the Seawater Protection Law was revised. It was additionally stipulated that the bottom sediment to be dumped in the coastal landfill should contain dioxin leaching of less than 10 pg-TEQ/l". (The revised clause has been in effect since October 2003.) Then, the relationship between dioxin content and leaching was verified in the bottom sediment with the dioxin content exceeding the environmental quality standards.</p> <p>Using pure water as the liquid for detecting the leaching level was expected to produce a different level of leaching from that in coastal landfill where bottom sediments were dumped in seawater. The same sample was therefore analyzed both in pure water and seawater. The filter paper had a pore diameter (diameter of the particle to be retained) of</p>
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	<p>1.0 μm. The ratio of dioxin in a fine particle with a diameter of less than 1.0μm was identified.</p> <p>As a result, correlation was found between dioxin content and leaching. The ratio between content and leaching varied according to the isomer composition of dioxin. In the case where a coastal landfill is to be used for final treatment of bottom sediment, content and leaching should be analyzed at a sufficient number of locations considering the isomer composition of dioxin, and the distribution of concentrations of leaching dioxin should be estimated based on the concentration of dioxin contained.</p> <p>The concentration of leaching dioxin was higher when pure water was used as the solvent than when seawater was used. It was therefore revealed that the measurements in leaching tests specified in the notification of the Ministry of Environment were on the safe side in coastal landfill. Full attention should be paid to the filtering process in the leaching test (e.g. selection of filter paper and clogging of the filter).</p>
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<p>Fiscal 2003 study on the structural criteria of waste disposal bulkheads in other countries (National Institute for Land and Infrastructure Management)</p>	<p>2003</p>	<p>In this study, ISO (International Standardization Organization) standards and standards of major countries of the seismic design methods for waste disposal bulkheads were examined. Data were collected and organized, and a comparison was made with the present design standards of Japan.</p> <p>Design methods for civil engineering structures should satisfy international standards including the ISO standards according to government procurement codes or the Agreement on Technical Barriers to Trade (TBT). For seismic design of controlled waste disposal bulkheads, ensuring the compatibility with changing international regulations including ISO standards is essential. Investigating overseas examples based on the developments in the world is necessary to ensure that Japan's design methods of coastal waste disposal landfill comply with international standards. In this study, therefore, the present conditions of the ISO standards for the design of coastal waste disposal landfill were investigated. Information was also collected and organized on the design standards for coastal waste disposal landfill in major countries. Then, a comparison was made with the present design standards of Japan.</p>
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<p>Fiscal 2003 study for controlling dioxin in bottom sediment in ports (Kinki Regional Development Bureau)</p>	<p>2003</p>	<p>In this study, a simple method for measuring dioxin concentration in bottom sediment was examined as a means of quickly and economically grasping the area and quantities of earth polluted by bottom sediment dioxin in ports. Methods were also checked for monitoring water quality at the spillway when controlling pollution in ports.</p> <p>Three off-the-shelf measurement methods were selected to check the serviceability as a simple method for measuring bottom sediment dioxin as compared with standard methods. The selected methods were found to be short of absolute measurement to verify the satisfaction of the environmental quality standard. They, however, had a great potential in grasping the relative distribution of concentrations in the study area quickly at low cost as long as the dioxin-induced pollution was caused by nearly one and the same factor.</p> <p>Based on the results of investigations that the Osaka prefectural government conducted at coastal waste disposal landfill, proposals were made for the methods and standards of monitoring water quality at spillways using turbidity as an indicator of dioxin, and for the actions to be taken at the time of spillway overflow. Monitoring water quality at spillways will be required when taking dioxin control measures in ports.</p>
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Environmental creation planning and technology (other)

Study	Fiscal year when study was conducted	Study outline
<p>Fiscal 2003 study concerning vegetation technologies in New Kitakyushu Airport (Kitakyushu Port and Airport Construction Office, Kyushu Regional Development Bureau)</p>	<p>2003</p>	<p>This study was conducted to obtain basic data for examining construction plans for vegetation in the landing area of New Kitakyushu Airport being constructed for service commencement in fiscal 2005. Vegetation technologies were actively adopted for minimizing maintenance cost, and optimal and efficient construction methods were examined taking into consideration the bedrock of rock and gravel and the environmental characteristics at the offshore location.</p> <p>In the study, basic vegetation plans and test plans were developed based on the basic study, and vegetation was carried out on a trial basis and follow-up studies were made. The "New Kitakyushu Airport vegetation technology review committee" staffed with four experts and a stakeholder was established for discussions and review.</p> <p>As a result of the study, it was confirmed that the immediate goal of constructing green space at the time of opening of the airport (early vegetation using the turf grass for cold regions) could be achieved where construction had to be carried out during the autumn for service commencement in next spring. It was suggested that treatment (mowing) and follow-up studies should be carried out in and after next spring to achieve the ultimate goal of developing green space using low prostrate turf grass.</p>

<p>Study on vegetation environment in Mabori area in Yokosuka (Keihin Port Office, Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>Examinations were made and plans developed for an environmental improvement project in the Mabori seashore area in coordination with a plan to develop highways in the shade in the Mabori seashore area along national highway 16 that the Yokohama National Highway Work Office of the Ministry of Land, Infrastructure and Transport will be implementing. The public involvement method was adopted and the views of local residents and highway users were taken into consideration.</p> <p>For project implementation, diverse methods were used to build a consensus. A review committee composed of academic experts, and the representatives of the administration and local community was established. To disseminate information to the public and encourage public involvement, open houses were held, a website was made accessible, questionnaires were distributed, and a virtual reality system was used to enable people to simulate the selection and arrangement of trees on the Internet.</p>
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Landscape and green space

Study	Fiscal year when study was conducted	Study outline
<p>Study for creating green space in the Sakai waterfront area of Osaka Bay (Kinki Regional Development Bureau and Osaka prefectural government)</p>	<p>2003</p>	<p>This study was conducted to prepare basic plans for developing a greening hub in the Sakai waterfront area of Osaka Bay (landfill in Sakai 7-3 district) designated as the site of "restoration of urban infrastructure in a metropolitan region" in an urban renewal project (specified in the third phase), and to identify the project implementation measures on the assumption of the involvement of the public and non-profit organizations.</p> <p>Basic plans and project implementation methods were examined based on the results of the fiscal 2002 study (identification of present conditions and problems at the site, and development of draft improvement concept and project scheme). Opportunities were created for the participation of stakeholders, and public relations activities were performed toward project implementation in fiscal 2004.</p> <p>In the study, a basic plan was developed that specified the improvement policy by zone, infrastructure system improvement plans and vegetation plans, and proposals were made about project implementation methods appropriate to the role of each participant and about the need of system improvement.</p>

<p>Basic study concerning the offshore gun batteries on a waterway at the mouth of Tokyo Bay (Tokyo Bay Waterway Office, Kanto Regional Development Bureau)</p>	<p>2003</p>	<p>The third offshore gun battery is now being removed at the mouth of Tokyo Bay. A symposium was held to have the general public recognize the history and technology of construction of gun batteries including the existing first and second batteries and to discuss how to use the remaining batteries. Slightly less than 800 citizens living mainly in Yokosuka City attended the symposium. Yo Tsumoto, a writer, and other academic experts provided lectures and participated in panel discussions. The percentage of people who responded to a questionnaire exceeded 40%. Ninety percent of respondents wanted to visit a gun battery and 80% preferred the preservation of batteries as a heritage or a tourist resource. Nearly the same percentages wanted to preserve the batteries "as they are" or "after restoration". Detailed discussions are required when taking actions in the future.</p>
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III Voluntary research projects

Study	Fiscal year when study was conducted	Study outline
System enhancement for education based on the website	2003	<p>This study was conducted to identify the significance of learning about ports during the "hours for comprehensive studies" recommended according to the new official guidelines for schoolteaching, and the considerations required during teaching.</p> <p>In the study, information on how comprehensive studies were being supported by the administration was organized, and the need and problems were identified through questionnaire surveys. A learning support system was developed to enable children to learn about ports or waterfront areas using a personal computer before actually making a tour of a port. The goal of the system was to equip children with the capability of finding themes and thinking about it on their own.</p> <p>A study forum was established to discuss the significance of comprehensive studies about ports and related considerations.</p>
Revision of port green space manual	2003	<p>With greater awareness of the environment in recent years, it is important, when implementing projects, to consider the preservation, restoration and creation of the environment, the prevention of global warming and the construction of recycling-based society.</p> <p>Against such a background, various laws related to the development of green space in ports have been established or revised since the publication of the "manual for vegetation design and construction in green space in ports" in 1999.</p> <p>The present manual is the only manual available on the improvement of green space in ports. Revision was proposed to reinforce the manual to adapt to the changing conditions surrounding ports.</p>

<p>Marine nature restoration handbook - plan, technology and implementation -</p>	<p>2003</p>	<p>Waterfront areas have recently been developed owing to economic development and efforts have been made to restore lost natural environment in the vicinity or in other locations. Restoration efforts have, however, frequently been made only on trial basis because of inadequate technical know-how available. It is therefore important to apply the experience and knowledge about preceding examples at the restoration site. Waterfront Vitalization and Environment Research Center (WAVE) has been publishing literature since 1998 ("manual on coexistence of ports and tideland", October 1998, "manual on the coexistence of port structures and seaweed", October 1998 and "manual on port improvement friendly to coral reeves", June 1999). WAVE has been providing materials to field engineers and administrators, and determined that collecting more practical knowledge would be required to support nature restoration efforts everywhere as a nature restoration promotion law was established in January 2003. Then, WAVE published four-volume "Marine nature restoration handbook - plan, technology and implementation -" by compiling the latest technological achievements and paying attention to new practices such as the cooperation among citizens, non-profit organizations, researchers, the administration and businesses.</p>
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<p>Technical research committee on the bases of seaweed growth</p>	<p>2003</p>	<p>Interest has been increasing in the preservation of sound global environment, transfer of rich environment to coming generations and the development of sustainable society in and out of Japan. Various efforts have been made energetically. In shallow sea areas, seaweed beds, tideland and sand beaches that had been reduced due to economic growth are now being restored or created in order to develop rich ecosystem and to create sound sea areas.</p> <p>Building recycling-based society further requires the development of recycling technologies and the use of recycled products. Steel slag has been used as materials for civil engineering work. Steel slag solidified with carbon dioxide has been developed by applying carbon dioxide to steel slag. In field tests, blocks made of solidified steel slag have proved to be more effective as seaweed growth bases than stone or concrete blocks conventionally used.</p> <p>The Waterfront Vitalization and Environment Research Center (WAVE) established a technical research committee on the bases of seaweed growth. WAVE compiled effective technologies for enabling seaweeds and coral to grow on the bases made of steel slag solidified with carbon, a recycled product, into the "manual for using steel slag solidified with carbon" in order to help develop marine development technologies friendly to the environment through the development of bases of seaweed and coral growth.</p>
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<p>Joint study on the impermeability of embedded steel-plate cellular bulkheads</p>	<p>2003</p>	<p>Recycling-based society has recently been built in Japan from a viewpoint of protecting living environment and making effective use of resources. Public awareness has been increasing and technologies have been advancing in relation to the safety of waste disposal facilities. The "ordinance concerning the technical criteria for general and industrial waste ultimate disposal facilities" was revised in June 1998 (ordinance issued jointly by the Prime Minister's Office and the Ministry of Health and Welfare on June 6, 1998). As a result, more strict requirements have been set for the structure and functions of waste disposal bulkheads. Embedded steel-plate cellular bulkheads are regarded to be structurally highly impermeable. The impermeability has, however, not been quantitatively confirmed. Then, the Waterfront Vitalization and Environment Research Center (WAVE) and the Embedded Steel-plate Cellular Structures Association conducted a joint research to verify the impermeability to apply embedded steel-plate cellular bulkheads to controlled waste disposal landfill. Based on the research results, information on the structure and use of steel-plate cellular bulkheads was organized, and the "guidelines for applying embedded steel-plate cellular bulkheads to controlled waste landfill" were published.</p>
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<p>Report on the joint research on a greening method with small environmental burden in waterfront areas</p>	<p>2003</p>	<p>In this research, fertilizer runoff tests and turf grass growth tests under salt stress were conducted to evaluate the applicability of environmentally friendly, low-environmental-burden greening methods. The greening method using organic materials made by fermenting the bark of Japanese cedar or Japanese cypress and fermented compost made of wheat, soybean or other type of corn is expected to contribute to long-term safety of waterfront vegetation, recycling of dredged material and cost reduction. The effectiveness of the greening method was verified in this research.</p>
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