China

"Shijiu Port Second Phase Construction Project (1) (2)"

Project Summary

Borrower	Ministry of Foreign Trade and Economic Cooperation, People's Republic of China	
Executing Agency	Ministry of Communications, People's Republic of China	
	1	2
Exchange of Notes	September 1991	October 1992
Date of Loan Agreement	October 1991	October 1992
Date of Loan Expiry	November 1996	November 1997
Loan Amount	¥2,506 million	¥3,583 million
Disbursement Amount	¥2,063 million	¥3,068 million
Procurement Conditions	General Untied	General Untied
Loan Conditions		
Interest Rate	2.6%	2.6%
Repayment Period	30 years (10 years for grace period)	30 years (10 years for grace period)

<Reference>

(1) Currency: Yuan (Y)

(2) Exchange Rate and Consumer Price Index (CPI)

Year		1990	1991	1992	1993	1994	1995	1996	1997	1998
Rate	Yuan/US$	5.2	5.4	5.8	5.8	8.4	8.3	8.3	8.3	8.3
	Yen/US$	144.8	134.7	126.7	111.2	102.2	94.1	108.8	121.0	130.9
	Yen/Yuan	27.85	24.94	21.84	19.17	12.17	11.34	13.11	14.58	15.77
CPI (1990=100)		100.0	103.5	110.0	126.1	156.6	183.1	198.3	203.8	202.2

(3) Fiscal Year: January ~ December

【Abbreviations】

F/S : Feasibility Study

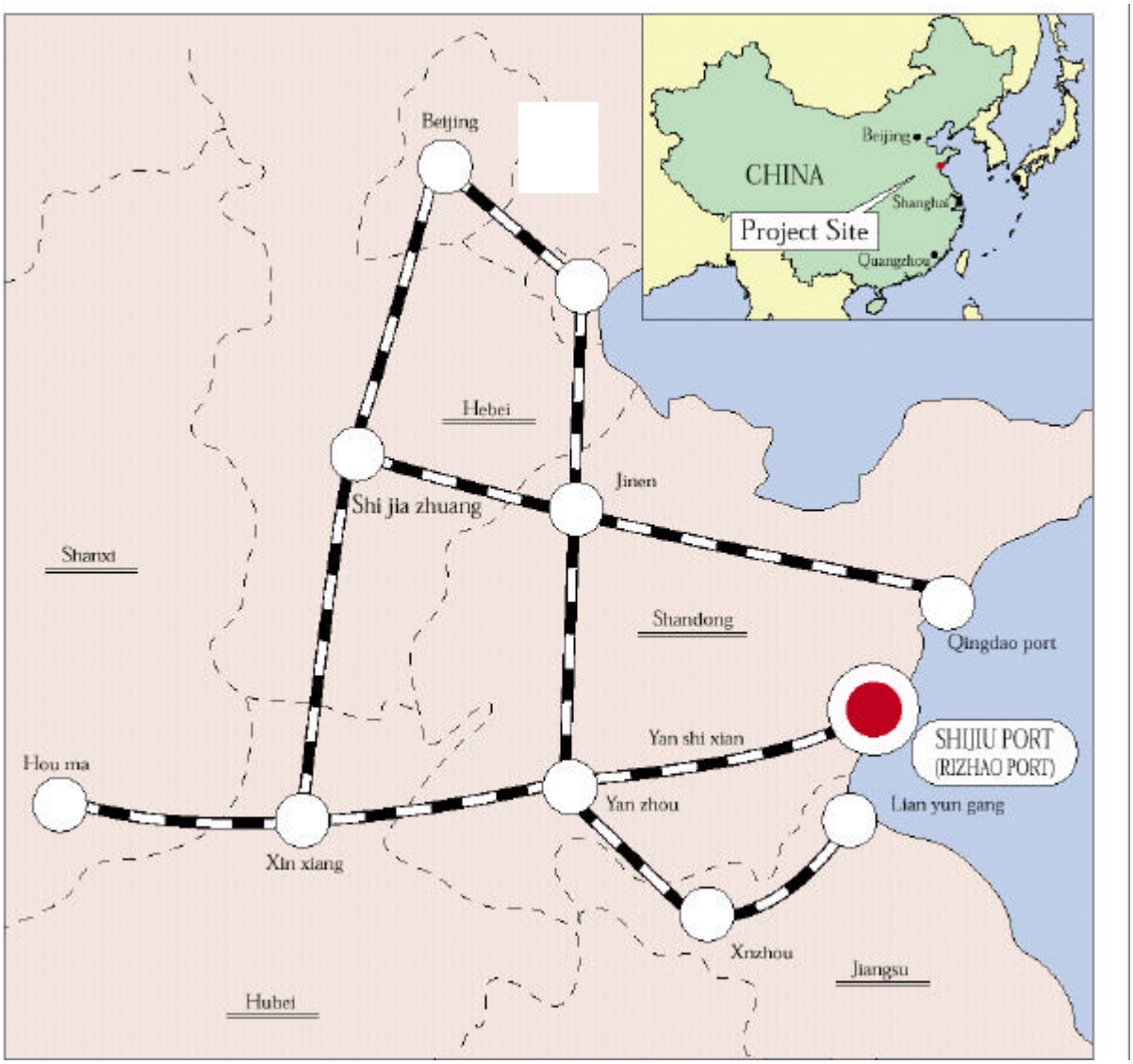
O&M : Operation and Maintenance

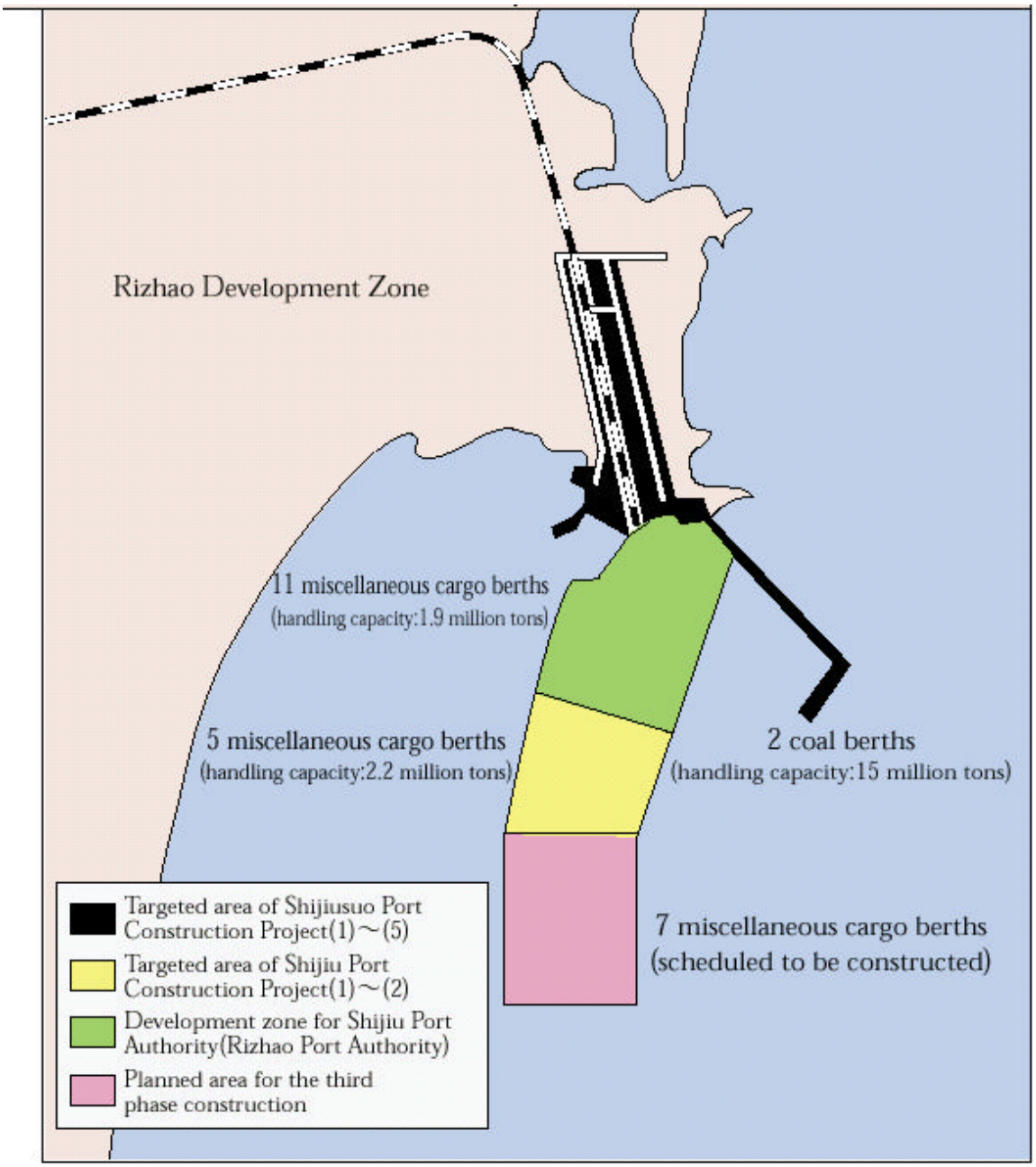
PCR : Project Completion Report

1. Project Summary and Comparison of Original Plan and Actual

1.1 Project Location

The site of the project is Shijiu Port in Rizhao, Shandong Province (see map). In May 1995 the name of the port was changed from Shijiu Port (previously Shijiusuo Port) to Rizhao Port.




Rizhao Development Zone
11 miscellaneous cargo berths
(handling capacity:1.9 million tons)
5 miscellaneous cargo berths
(handling capacity:2.2 million tons)
2 coal berths
(handling capacity:15 million tons)
7 miscellaneous cargo berths
(scheduled to be constructed)
Targeted area of Shijiusuo Port Construction Project(1)～(5)
Targeted area of Shijiu Port Construction Project(1)～(2)
Development zone for Shijiu Port Authority(Rizhao Port Authority)
Planned area for the third phase construction

1.2 Project Summary and ODA Loan Portion

This project aimed to meet the increasing demand for miscellaneous cargo handling from the hinterlands (Shandong, Henan and Shanxi provinces) of Shijiu Port in Rizhao municipal government, Shandong province, to promote effective use of the railway between Yanzhou and Shijiu Port (constructed with an ODA loan under the "Yanzhou – Shijiu Port Railway Construction Project (I) ~ (V)"), and to enable the smooth economic development of the port's hinterlands. To achieve those ends, five miscellaneous cargo berths with an annual miscellaneous cargo handling capacity of 2.2 million tons were constructed at Shijiu Port, which previously handled mainly coal (its annual handling capacities were 15 million tons of coal and 0.2 million tons of miscellaneous cargo).

The JBIC loan covered the entire foreign currency portion required for procurement of the equipment, materials and services required for the implementation of the project. The loan agreement was concluded in two parts in FY 1991 and FY 1992.

1.3 Background

1.3.1 Background

Considering the economics of transport costs and other factors, the hinterlands to this project can be considered to include the Lunan region of Shandong province, the Yubei region of Henan province and the Jinnan region of Shanxi province. These areas have achieved rapid economic growth since 1980. In 1987 they had a population of 60.14 million, and their gross agricultural and industrial products were higher than the national average.

Shandong province, in which the project location lies, has been pursuing an aggressive industrial policy under the openness policy. In 1970 the province achieved self sufficiency in grain and it went on, under agricultural production policies, to become one of China's leading producers of grains and cash crops. In 1990 the province's agricultural production value was 33.55 million tons (total agricultural production value was 64.75 billion Yuan), the second largest in the country, of which 0.98 million tons was raw cotton and 2.12 million tons was crops for oil pressing. Both these harvests were the largest in the nation.

The province also has abundant mineral resources, including coal centered on the Yanzhou coalfield in the Southwest (fifth largest in China, with a 5.5% share of total reserves) and crude oil in the Shengli oilfield around the lower reaches of the Huang He (second with a 24.3% share). Industrial production is remarkable, and in 1990 its total value was 219.77 billion Yuan, second only to Jiangsu province. Its main industries are cement (second, 9.3%), chemical fertilizer (second, 8.0%) and paper and pulp (first, 7.6%).

Census figures for the region in 1987 are shown in Table 1, while Table 2 shows movements in the values of agricultural and industrial production (1986~1989).

Table 1 Population Statistics in 1987

(Unit: million people)

Province	Municipal Government	Population
Shandong Province (Lunan area)	Taian, Jining etc.	32.36
Henan Province (Yubei area)	Anyang, Xinxiang, Hebi etc.	15.98
Shanxi Profince (Jinnan area)	Changzhi, Jincheng etc.	11.80
Total	—	60.14

(Source) National Population Statistical Materials 1987

Table 2 Movements in the Values of Agricultural and Industrial Production

(Unit: 100 million Yuan)

Calendar Year	Nation-wide	Preceding year (%)	Shandong	Preceding year (%)	Henan	Preceding year (%)	Shanxi	Preceding year (%)
1986	15,207	-	1,143.0	-	737.5	-	320.6	-
1987	18,489	21.6	1,446.1	26.5	918.3	24.5	365.7	14.1
1988	24,089	30.3	1,949.8	34.8	1,150.6	25.3	436.7	19.4
1989	28,552	18.5	2,469.2	26.6	1,403.5	22.0	592.5	35.7

(Source) China Statistical Yearbook 1987 ~ 1990

1.3.2 Necessity of the Project

In 1973 it became even more urgent for China to improve its port facilities to encourage the development and export of coal. At the start of 1974 a coalfield development plan was adopted, which centered on the Yanzhou region, and the related Chinese agencies began making studies of geographical conditions such as water depths and ground conditions. In 1979 the conclusion was reached that Shijiu Port would be the best for the loading and shipping of coal.

After that, JBIC responded to a Chinese petition for "Shijiusuo Port Construction Projects (I)~(V)" and "Yanzhou - Shijiusuo Railway Construction Project (I)~(V)" by disbursing ODA loans totaling ¥42.945 billion (between 1980 and 1983) and ¥39.710 billion (between 1980 and 1983) respectively. The Chinese executing agency completed the construction works (which consisted of two 0.1 million ton coal berths, with an annual handling capacity of 15 million tons, and a 309km single-track, non-electrified railway line) in 1985.

However, the slump in worldwide demand for coal and other factors caused the volume of coal handled to stagnate, and the volume in 1990 was a low 8.69 million tons.

Conversely, the volume of miscellaneous cargo passing through Shijiu Port was increasing every year after it opened due to the rapid economic growth in the hinterlands. In 1990 the volume of miscellaneous cargo was approximately 0.56 million tons with the use of timber berths (around double the figure for the preceding year). The F/S for this project predicted that demand for miscellaneous cargo handling (particularly steel materials, iron ore and cement) at Shijiu Port would go on increasing strongly after 1990 and reach 2.45 million tons in 1995. This forecast was based on two considerations. One was the expected shift in the shipping of raw materials and manufactured goods from the steel works, fertilizer industry and mines in the hinterland to Shijiu Port from neighboring Qingdao and Lianyungang ports due to construction of related transport facilities (Yanzhou -Shijiusuo Railway

Construction Project (I)~(V)). The other was the planned construction of a number of large factories (cement, pulp, glass etc.). Table 3 shows the predicted and actual movements in miscellaneous cargo handling volumes at Shijiu Port.

Table 3 Predicted and Actual Movements in Miscellaneous Cargo Handling Volumes

(Unit: 1,000 tons)

Calendar Year	Foreign/ domestic trade breakdown		Import/ export breakdown		Total
	Foreign	Domestic	Export	Import	
1986	22	19	11	31	42
1987	59	72	74	57	131
1988	143	81	89	135	224
1989	134	144	59	219	278
1990	371	189	308	252	560
1995 (predicted)	2,020	430	1,200	1,250	2,450

(Source) JICA F/S

1.3.3 History

This project was implemented as the second phase project of "Shijiusou Port Construction Project (I) ~ (V)". History of the project is as follows.

January 1991 : Request of the Project (I) by Chinese government (1991 ODA loan candidate project)

Feb.~Mar. 1991 : JBIC Pre-study Mission

March 1991 : Completion of F/S of the project by JICA

May 1991 : 1991 intergovernmental council

Jun.~Jul. 1991 : JBIC Appraisal Mission

August 1991 : Pledge

September 1991 : Exchange of Notes

October 1991 : Loan Agreement Signing of the Project (I)

January 1992 : Request of the Project (II) by Chinese government (1992 ODA loan candidate project)

March 1992 : 1992 intergovernmental council

Apr.~May 1992 : JBIC Appraisal Mission

June 1992 : Pledge

October 1992 : Exchange of Notes

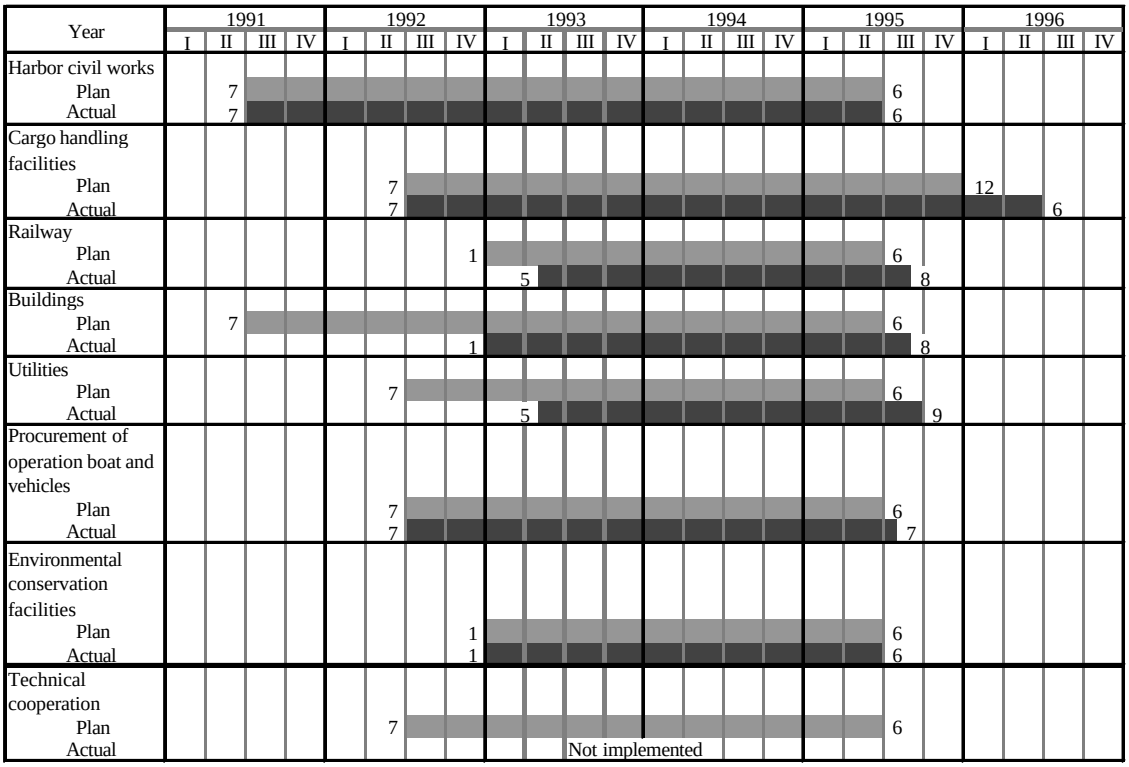
October 1992 : Loan Agreement Signing of the Project (II)

1.4 Comparison of Original Plan and Actual

(i) Project Content

Project Content	Plan	Actual
Harbor civil works	Miscellaneous cargo berth×5	Same as left
Cargo handling facilities	Multi-purpose crane× **1** etc.	Same as left
Railway	Port railway signal facility× **1**	Same as left
Buildings	Lounge, dining hall, control room etc.	Same as left
Utilities	Water supply and drainage facilities, thermal supply facilities etc.	Same as left
Procurement of operation boat and vehicles	Tugboat×2, Middle-sized bus×5 etc.	Same as left
Environmental conservation facilities	Environmental measuring equipment×1	Same as left
Technical cooperation	Dispatch of study and training groups	Not implemented
Product inspection facilities	Product inspection equipment×1	Same as left
Others	Navigation auxiliary facility etc.	Same as left

(ii) Implementation Schedule



(iii) Project Cost

Item	① Plan (Appraisal FY1992)		② Actual		Difference (②－①)	
	Foreign currency (¥ million)	Local currency (10,000 yuan)	Foreign currency (¥ million)	Local currency (10,000 yuan)	Foreign currency (¥ million)	Local currency (10,000 yuan)
Harbor civil works	729	13,830	885	14,178	+156	+348
Cargo handling facilities	2,322	353	1,956	364	▲359	+11
Railway	130	346	120	370	▲10	+24
Buildings	247	2,235	315	3,489	+68	+1,254
Utilities	826	1,150	605	1,566	▲221	+416
Procurement of operation boat and vehicles	784	0	744	0	▲40	0
Environmental conservation facilities	26	111	182	265	+156	+154
Technical cooperation	90	20	0	0	▲90	▲20
Product inspection facilities	275	500	300	500	+25	0
Others	69	3,047	24	3,688	▲45	+641
Price escalation	205	1,508	0	1,508	▲205	0
Total	5,703	23,100	5,131	25,928	▲572	+2,828
Contingency	386	958	-	-	-	-
Grand total	6,089	24,058	-	-	-	-
Total project cost (million yen)	11,718		9,850		▲1,868	

2. Analysis and Evaluation

2.1 Evaluation on Project Implementation

2.1.1 Project Scope

The contents of the project included the harbor civil works required for the construction of the five miscellaneous cargo berths and the preparation of the facilities for cargo handling etc. These works were completed largely as planned, but the study group and the training group were not dispatched as planned under the technical cooperation portion of the project. The groups were to have received O&M training concerning port facilities, container berths, and miscellaneous cargo handling facilities. However, the relevant training was conducted overseas with contractors in Hong Kong, Singapore and elsewhere. As a result, the O&M scheme was established at an early stage, and the training portion of the project was not carried out. According to the Rizhao Port Authority, the organization in charge of O&M of the facilities, the necessary skills were acquired smoothly through contractor training, leaving little need for technical cooperation according to the terms of the contract, which was therefore abandoned. As the skills required for operation of the project have been transferred as planned, we do not regard the fact that the study and training groups were not dispatched under the ODA loan as a problem. Table 4 compares the plan and actual of this project.

Table 4 Comparison of Project Plan and Actual

Project contents	Plan	Actual
Harbor civil works	①15,000t class berth×3 (1 berth can handle containers) ②10,000t class berth×2	Same as left
Cargo handling facilities	①Multi-purpose crane× 1 ②Portal crane×5 ③Single baquet loader×2 ④Forklift×32 ⑤Tractor×22 ⑥Trailer×42	Same as left
Railway	Port railway signal facility× 1	Same as left
Buildings	①Lounge ②Dining hall ③Control room etc.	Same as left
Utilities	①Water supply and drainage facilities ②Thermal supply facilities ③Communication facilities ④Electric facilities ⑤Fire fighting facilities	Same as left
Procurement of operation boat and vehicles	①Tugboat×2 ②Middle-sized bus×5 ③Track×7 ④Production leading car×2 ⑤Fire engine×1, Fire fighting leading car×1 ⑥Water supply & sprinkler×2 etc.	Same as left
Environmental conservation facilities	Environmental measuring equipment×1	Same as left

Technical cooperation	①Dispatch of study groups (1 week) ②Dispatch of training groups (1 month) (①Port facilities ②Container berth ③O&M training concerning miscellaneous cargo facilities)	Not implemented
Product inspection facilities	Product inspection equipment ×1	Same as left
Others	①Navigation auxiliary facility ②Maintenance facilities ③Others (lodgings for civil works etc.)	Same as left

(Source) PCR, Rizhao Port Authority materials

2.1.2 Implementation Schedule

The implementation schedule for this project extended from July 1991 to December 1995. Procurement procedures were delayed by prolonged contract negotiations between the China National Technical Import and Export Corporation and the contractor for the procurement of the multi-purpose crane, causing a delay of six months. As a result the cargo handling facilities were not completed until June 1996. Other works were carried out largely as planned. Table 5 compares the planned and actual implementation schedule.

Most of the berths went into operation as planned from January 1996, so the delay in completion of the handling facilities does not appear to have had a major impact on the implementation of the project, and there were no major problems in the implementation schedule.

Table 5 Comparison of Original Plan and Actual for Implementation Schedule

	Plan Start ~ Completion (Construction period)	Actual Start ~ Completion (Construction period)	Difference At the time of completion (Construction period)
Harbor civil works	Jul. 1991 ～ Jun. 1995 (48 months)	Jul. 1991 ～ Jun. 1995 (48 months)	None (None)
Cargo handling facilities	Jul. 1992 ～ Dec. 1995 (42 months)	Jul. 1992 ～ Jun. 1996 (48 months)	+6 months (+6 months)
Railway	Jan. 1993 ～ Jun. 1995 (30 months)	May 1993 ～ Aug. 1995 (28 months)	+2 months (−2 months)
Buildings	Jul. 1991 ～ Jun. 1995 (48 months)	Jan. 1993 ～ Aug. 1995 (32 months)	+2 months (−16 months)
Utilities	Jul. 1992 ～ Jun. 1995 (36 months)	May 1993 ～ Sep. 1995 (29 months)	+3 months (−7 months)
Procurement of operation boat and vehicles	Jul. 1992 ～ Jun. 1995 (36 months)	Jul. 1992 ～ Jul. 1995 (37 months)	+1 month (+1 month)
Environmental conservation facilities	Jan. 1993 ～ Jun. 1995 (30 months)	Jan. 1993 ～ Jun. 1995 (30 months)	None (None)
Technical cooperation	Jul. 1992 ～ Jun. 1995 (36 months)	Not implemented	

(Source) PCR

2.1.3 Project Cost

The funds required for this project were estimated at a total of ¥11.718 billion, of which the foreign currency portion was ¥6.089 billion and the local currency portion was 2.41 million Yuan. The JBIC loan covered the entire foreign currency portion.

Table 6 Comparison of Original Plan and Actual for Project Cost

Items	①Plan (appraisal)		②Actual		Difference (②－①)	
	Foreign currency (¥ million)	Local currency (10,000 yuan)	Foreign currency (¥ million)	Local currency (10,000 yuan)	Foreign currency (¥ million)	Local currency (10,000 yuan)
Harbor civil works	729	13,830	885	14,178	+156	+348
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Contingency	386	958	-	-	-	-
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Total project cost (million yen)	11,718		9,850		▲1,868	

(Source) JBIC materials, Rizhao Port Authority materials.

(Notes) 1. The JBIC loan covered the entire foreign currency portion.

2. Exchange rates: Planned Y1 = ¥23.4 (1992)
Actual Y1 = ¥18.2 (weighted average between 1992 and 1996).

A small cost underrun occurred in the foreign currency portion due to the action of competitive principles in the international competitive tender for the procurement of equipment and materials. The cost overrun in the local currency portion was due to increased personnel costs within the construction costs. The excess cost was covered by funding from the Ministry of Communications and borrowing from the National Development Bank. The terms of the loan from the National Development Bank were 12.3% interest p.a. and a repayment period of 13 years (including a three year grace period).

The disparity between planned and actual total project costs was expanded by the rise of the Yen, but nevertheless the actual costs of both the foreign and local currency portions were largely as planned, and the expenditure of project costs was appropriate. Table 6 compares planned and actual costs for this project.

2.1.4 Implementation Scheme

(1) Executing Agency

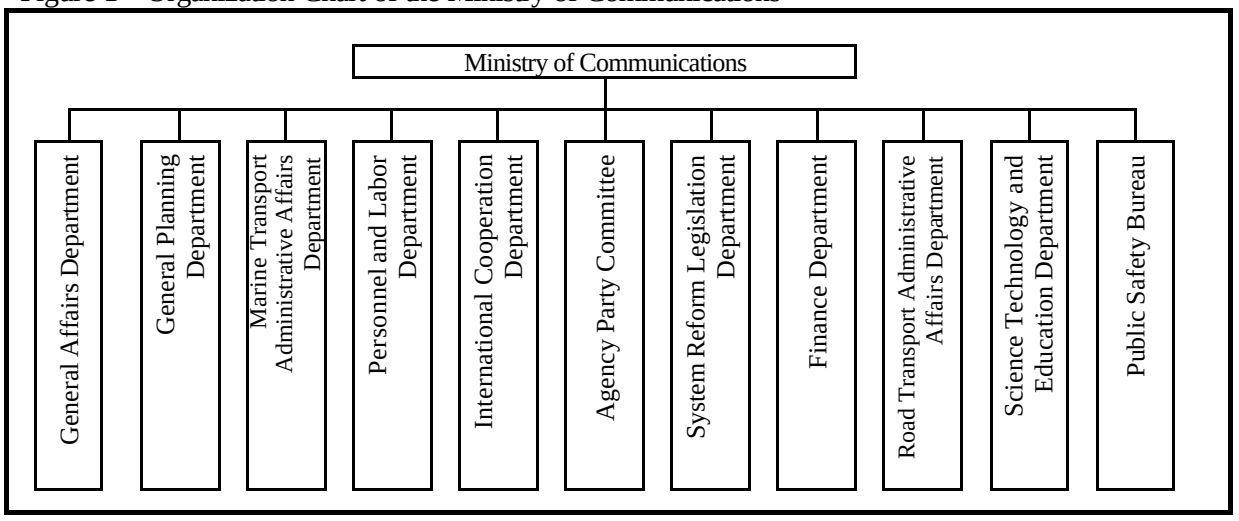
The Ministry of Communications was the executing agency for this project. The Ministry has already planned and implemented a number of ODA projects, including the Qinhuangdao Port Cand D Berths Construction Project, the Lianyungang Port Expansion Project, and the Qingdao Port Expansion Project. Therefore its implementation capability was adequate for this project. At present the Ministry comprises 302 staff. Of those, 32 are employed in the General Planning Department, which handles investment and finance planning for transport administration. Another 12 are employed in the International Cooperation Department, which handles cooperation with other countries in matters of transport policy.

The procurement of equipment and materials under the foreign currency portion (the portion covered by the ODA loan) was arranged by competitive international tender through the China National Technology Import and Export Corporation and proceeded largely as planned. The procurement procedures for the cargo handling equipment (one multi-purpose crane) caused a delay of six months in the construction process. The delay was caused by the time required to reach a contractual agreement with the contractor and does not appear to have had a major impact on the implementation of the Project.

Under the implementation scheme, the Ministry of Communications left construction monitoring to the Shijiu Port Authority, which employed contractors to carry out the construction works. The procurement of equipment and materials was handled by the China National Technology Import and Export Corporation. This method of subcontracting the supply of equipment and materials is standard practice in ODA loan projects to China, and it functioned effectively to achieve its objectives.

Figure 1 is an organization chart for the Ministry of Communications.

Figure 1 Organization Chart of the Ministry of Communications



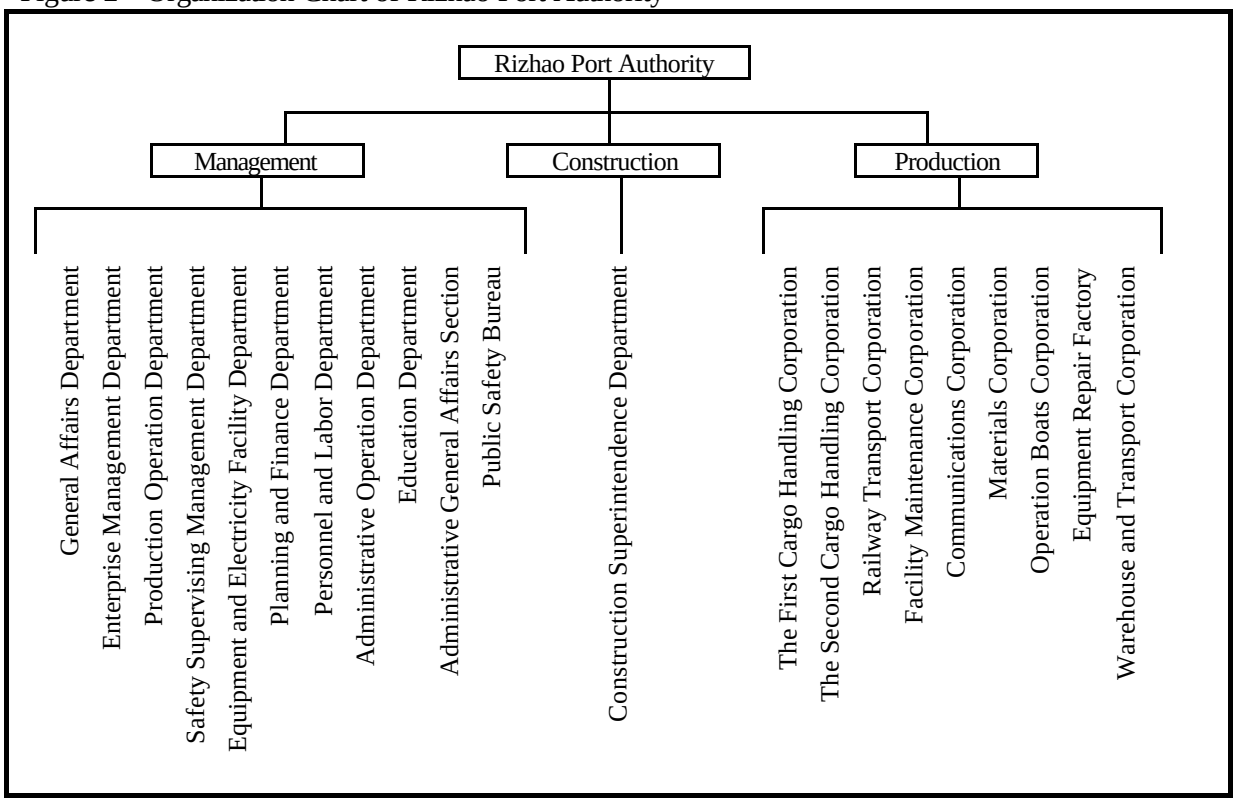
(Source) Rizhao Port Authority materials

The construction supervision for this project was handled by the Shijiu Port Authority Construction Superintendence Department (now the Rizhao Port Authority Construction Superintendence

Department). The Department had experience from the execution of "Shijiusuo Port Construction Project (I)~(V)" and the construction works made smooth progress. The 5,820 staff of the Rizhao Port Authority currently includes around 100 concerned with management, around 100 concerned with construction and around 5,620 for production.

Figure 2 is an organization chart for the Rizhao Port Authority.

Figure 2 Organization Chart of Rizhao Port Authority



(Source) Rizhao Port Authority materials

(2) Consultant

No consultants were employed for this project because the executing agency was adequately experienced. Any skill shortcomings which arose due to the absence of consultants were to be made up by technical transfer through technical assistance (in the form of the dispatch of study and training teams). However, the relevant skills were successfully transferred by contractors, and the technical transfer portion of the project was abandoned.

(3) Contractor

The contractors listed below were selected for this project and carried out the construction works, which proceeded according to plan. There were no problems with contractor performance.

Table 7 shows the works implemented by each contractor.

Table 7 List of Works Implemented by Contractors

Contractor	Works Executed
The Ministry of Communications, the First Water Transport Bureau, the Second Corporation	Land reclamation, breakwater, berth, roads, cargo handling facilities
The Ministry of Communications, the First Water Transport Bureau, the Fourth Corporation	Soft foundation treatment, roads, utility facilities, environmental facilities
The Ministry of Communications, Communications Corporation	Procurement of operation boats and vehicles
Tianjin Transport Bureau, the Second Corporation	Dredging, land reclamation
Qingdao Port Navigation Corporation	Navigation auxiliary facilities
Shanghai Port Equipment Factory	Cargo handling facilities
Rizhao Port Equipment Repair Factory	Maintenance facilities
Rizhao Port Communications Corporation	Telecommunication facilities
Rizhao Railway Corporation	Port railway facilities
Rizhao Construction Corporation	Buildings
Rizhao Product Inspection Bureau	Product inspection facilities

(Source) Rizhao Port Authority materials

2.2 Evaluation on Operation and Maintenance

2.2.1 Operation and Maintenance Scheme

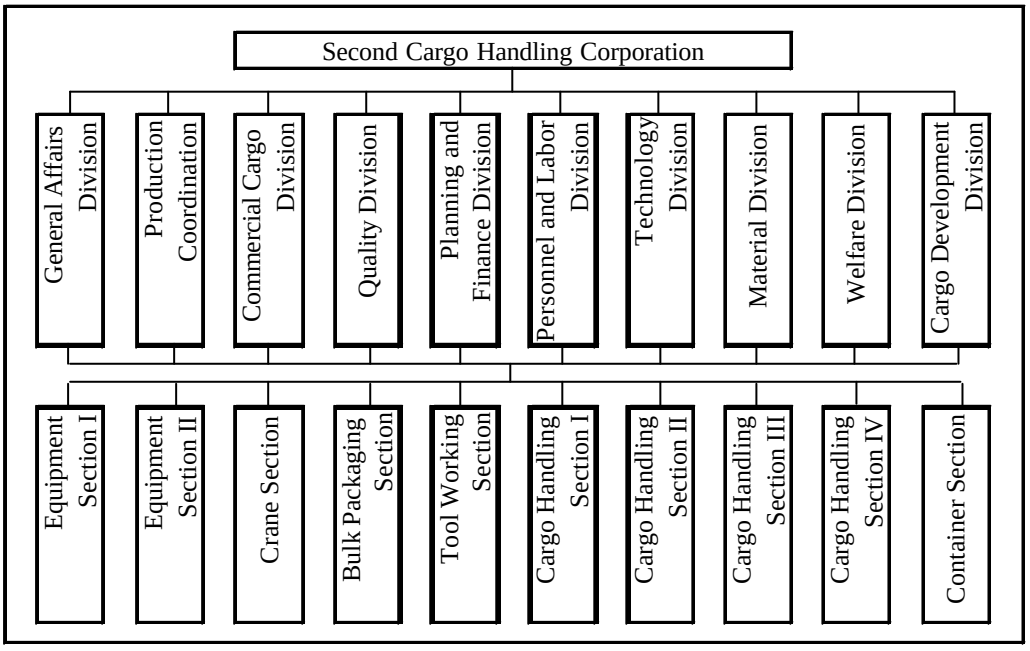
The operation and maintenance (O&M) after the completion of the project is the responsibility of the Second Cargo Handling Corporation of the Rizhao Port Authority. No changes from the original plan have been made.

The Corporation manages the facilities according to its procedure manual, running through a cycle of (i) inspection, (ii) operation, (iii) maintenance and (iv) record keeping. It also promotes the pooling of O&M-related information. By their efforts, it has been possible to adopt a facilities maintenance plan and make repairs at suitable times.

The materials needed for maintenance (such as spare parts for cargo handling facilities) are subject to a central management system which has been built around the Material Division. The system replenishes materials on the basis of amounts consumed to ensure that demand for maintenance equipment and materials is met efficiently.

The Corporation obtains an adequate budget for the O&M of this project, which it carries out smoothly through an extraordinarily good O&M scheme. It is also working (i) to improve the quality of its work and (ii) to cut costs. Figure 3 is an organization chart for the Second Cargo Handling Corporation.

Figure 3 Organization Chart of the Second Cargo Handling Corporation



(Source) Rizhao Port Authority materials

The workforce of the Corporation increased by approximately 74% between 1991 and 1998 due to the increase in miscellaneous cargo handling. The increase in technical staff is particularly marked, and the Corporation provides regular training to improve the level of cargo handling skills. The entire staff of the Rizhao Port Authority has approximately doubled since 1991. This project has certainly made a

contribution to the creation of employment opportunities in the surrounding area. At the same time, the average freight handling volume and average handling charge income per worker in the Second Cargo Handling Corporation rose sharply from 1,370 tons/person and 12,300 Yuan/person respectively in 1991 to 2,470 tons/person and 47,500 Yuan/person in 1998. Apparently the efficiency of the cargo handling operation is rising together with the size of the workforce.

Table 8 compares the workforce of the Second Cargo Handling Corporation.

Table 8 Comparison of the Workforce for the Second Cargo Handling Corporation

(Unit: persons)

		1991	1998
Management staff	Senior staff	6	83
	Other staff	86	23
Technical staff	Cargo handling technical staff	640	1,085
	Other technical staff	380	734
Security staff		14	30
Total		1,126	1,955
Total number of staff of Rizhao Port Authority		2,845	5,820

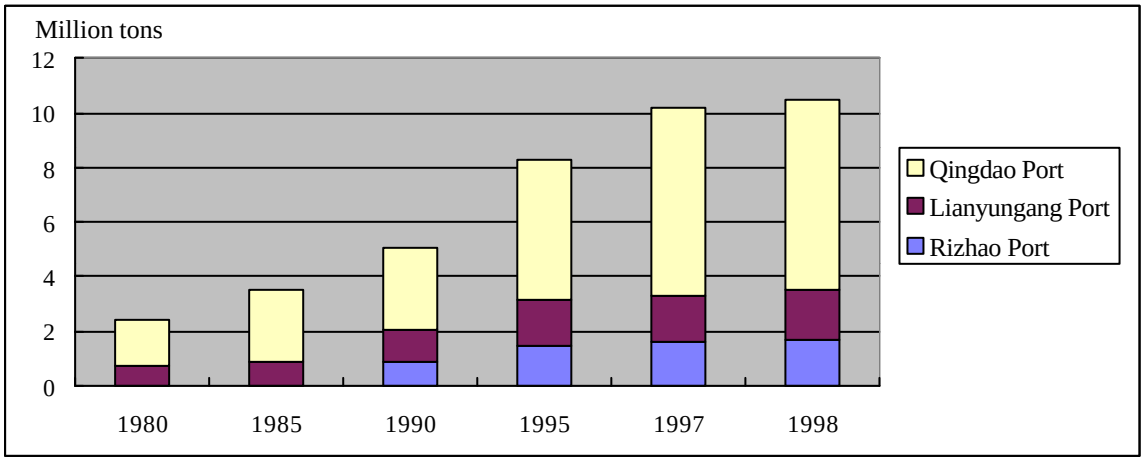
(Source) Rizhao Port Authority materials

2.2.2 Operation and Maintenance

The annual volume of freight handled by Rizhao Port is growing steadily. This growth stems from the increase of shipping demand in the hinterlands and the increase in materials shipped through Rizhao Port due to the greater convenience by improvement of related transport facilities. Cargo handling volumes at the neighboring ports of Qingdao and Lianyungang are also growing, and the total volume handled by the three ports exceeded 100 million tons in 1997.

Figure 4 shows movements in the cargo volumes handled by Rizhao and its neighboring ports.

Figure 4 Movements in Cargo Volumes Handled by Neighboring Ports



(Source) China Statistical Yearbook 1999

The volumes of freight handled at the five miscellaneous cargo berths built under this project have

grown steadily, in line with demand. In 1999 the berths exceeded the initially planned handling capacity of 2.2 million tons per year. They handle approximately 50% of the miscellaneous cargo passing through Rizhao port, which indicates that the execution of this project increased the port's miscellaneous cargo handling capacity. The Rizhao Port Authority is considering adding a further seven berths for miscellaneous cargo to meet demand.

Table 9 shows movements in the volumes of cargo passing through Rizhao Port, and Table 10 shows the handling volumes in 1999.

Table 9 Movements in the Volumes of Cargo at Rizhao Port

(Unit: 1,000 tons)

Calendar year	Construction berth of this project	Coal berth	Other miscellaneous cargo berth	Total
1992	0	10,471	1,549	12,020
1993	0	11,127	2,040	13,167
1994	0	11,915	2,370	14,285
1995	0	12,043	2,480	14,523
1996	1,862	12,281	1,611	15,754
1997	2,181	12,389	1,932	16,502
1998	1,789	12,414	3,037	17,240
1999	2,575	14,745	2,713	20,033

(Source) Rizhao Port Authority materials

Table 10 Handling Volume of Cargo at Rizhao Port

(Unit: 1,000 tons)

	Foreign trade	Domestic trade	Export	Import	Total
Coal	7,701	7,043	14,744	0	14,744
Cement	1,779	111	1,890	0	1,890
Iron ore	884	440	23	1,301	1,324
Crude oil	110	559	43	626	669
Chemical fertilizer	482	4	4	482	486
Foodstuff	121	16	121	16	137
Nonmetallic ore	47	86	125	8	133
Machinery	17	22	17	22	39
Steel materials	35	0	0	35	35
Timber	7	0	0	7	7
Others	323	246	369	200	569
Total	11,506	8,527	17,336	2,697	20,033

(Source) Rizhao Port Authority materials

The miscellaneous cargo berths are currently meeting demand from the steel and fertilizer industries in the hinterlands by mainly handling goods such as cement, iron ore and chemical fertilizer. The imported iron ore and steel materials are then shipped into the hinterlands along the Yanzhou – Shijiu

Port Railway (the Yanzhou-Shijiu Line), which was constructed with an ODA loan. These shipments make effective use of freight cars which have delivered coal to Rizhao Port and would otherwise return empty.

2.2.3 Financial Position

According to the profit-and-loss statements, the financial position of the Second Cargo Handling Corporation is favorable due to the steadily increasing volume of freight it handles. The decline in its net profits between 1996 and 1997 was due to the increase in costs associated with the completion of the five miscellaneous cargo berths. By 1998 the steady increase in freight volume covered the additional costs and pushed profits back to the pre-project level.

Although there is no problem with the current level of profits, there is the risk that profitability could deteriorate in the future due to rises in personnel and miscellaneous costs, because (i) the volume of freight now being handled is close to the limit of capacity, and (ii) the port's cargo handling fees are restricted. Increased management efficiency will be needed to counter these problems.

Table 11 shows the profit-and-loss statements for the Second Cargo Handling Corporation.

Table 11 Profit and Loss Statements for the Second Cargo Handling Corporation

(Unit: 1,000 yuan)

	1991	1992	1993	1994	1995	1996	1997	1998
Income	13,842	27,396	37,104	43,457	40,896	65,489	80,969	92,851
1) Cargo	13,149	26,573	33,929	36,275	34,604	55,391	64,890	62,498
2) Warehouse	604	823	1,507	2,649	3,116	5,578	7,139	6,912
3) Port maintenance	89	0	1,674	2,826	2,861	4,410	8,844	21,583
4) Others	0	0	-6	1,707	315	110	96	1,857
Expenses	9,219	12,949	21,014	28,977	30,563	61,273	75,918	78,628
1) Operation cost	8,754	11,471	16,744	21,595	29,461	57,620	68,930	69,314
2) Tax	457	897	1,192	1,583	1,272	2,280	2,826	3,155
3) Others	9	582	3,078	5,799	-169	1,373	4,163	6,159
Net profit	4,622	14,447	16,090	14,480	10,333	4,215	5,051	14,222

(Source) Rizhao Port Authority materials

2.2.4 Environmental impact

The Environmental Impact Assessment Report on this project was approved by the National Environmental Conservation Agency in 1988. The report anticipated environmental impact in the form of atmospheric, noise and water pollution and called for the executing agency to take remedial the measures, including the following, to minimize environmental impact:

[1] Installation of sprinklers to prevent the dispersal of airborne dust.

[2] Separate treatment of waste oil and waste water from vessels and vehicles.

[3] Provision of areas of greenery.

The Rizhao Port Authority Administrative Operation Department has set up a monitoring system for the environmental aspects of the implementation and O&M of the project implemented environmental survey regularly according to legal regulations of the Ministry of Communications. Environmental problems are recognized as a grave issue that Chinese government must tackle, and adequate expenditures, materia ls and equipment (including environmental measuring equipment procured using

the ODA loans) are being used. Although investigations should be made more frequently, we have been able to confirm that appropriate operation and monitoring are continuing.

Table 12 Environmental Survey Items at Rizhao Port

	Survey items	Value	National standards	Survey implementation frequency
Atmosphere	TSP (mg/m^3)	0.22	Within 2nd class standard (0.30)	Once for every three-month
	SO_2 (mg/m^3)	0.02 (Warm period) 0.08 (Cold period)	Within 1st class standard (0.05) Within 2nd class standard (0.15)	
	NO_X (mg/m^3)	0.04 (Cold period) 0.06 (Warm period)	Within 1st class standard (0.05) Within 2nd class standard (0.10)	
Water quality	COD (mg/l)	0.96	Within Type 1 standard (below 15)	Once for every six-month
	∑N(mg/l)	0.042		
	PO_4-P (mg/l)	0.0025	Within Type 1 standard (below 0.02)	
	Oil (mg/l)	0.0085	Within Type 1 standard (below 0.05)	
	PH	8.15	Within Type 1 standard (6.5~8.5)	
Noise	dB	69.3	Type 2 standard (60dB) Unachieved	Irregular

(Source) Rizhao Port Authority materials

Atmospheric, water and noise pollution are now being investigated, and all points measured other than noise clear the relevant national standards. Thus we can conclude that the project has not brought any severe environmental impact. According to the Rizhao Port Authority, there have been no noise-related complaints from local residents, but they are still considering measures to bring noise levels within national standards by installing the necessary anti-noise facilities. Apparently, there is no negative impact on nearby fisheries resources.

Therefore this project can be deemed to produce no severe environmental impact (including impacts not anticipated at the time of the appraisal). This project did not require the acquisition of land and the relocation of any residents because it was built on reclaimed land.

Table 12 above shows the environmental survey items conducted at Rizhao Port.

2.3 Project Effects and Impacts

2.3.1 Quantitative Effects

The EIRR (economic internal rate of return) and FIRR (financial internal rate of return) for the project were recalculated using the items of cost and benefit shown below.

EIRR	Project lifespan: 40 years Costs: [1] Construction costs, [2] personnel costs, [3] maintenance costs, [4] repair costs. Benefits: [1] Reduction of waiting time when vessels dock at the berths. [2] Saving of overland freight transport costs (road and rail). [3] Saving of time costs required for overland freight transport.
FIRR	Project lifespan: 40 years Costs: [1] Construction costs, [2] personnel costs, [3] maintenance costs, [4] repair costs. Benefits: [1] Cargo handling income, [2] warehousing income, [3] Harbor management income, [4] other income.

EIRR was recalculated with the same cost and benefit items that were used at the time of the appraisal, and there was no major change from the original figures. However, the recalculated figure for FIRR was approximately double the appraisal figure, because the volume of freight handled increased more than anticipated. Expenses increased as a result, but revenue from charges was much higher than predicted at the time of the appraisal. Thus this project can be deemed to have fully realized its economic effects.

Table 13 compares planned and actual figures for EIRR and FIRR.

Table 13 Comparison of Original Plan and Actual for EIRR and FIRR

	EIRR	FIRR
Calculated at the time of appraisal	10.1%	3.9%
Recalculated	9.9%	8.1%

(Source) JBIC materials, Rizhao Port Authority materials

2.3.2 Qualitative Effects

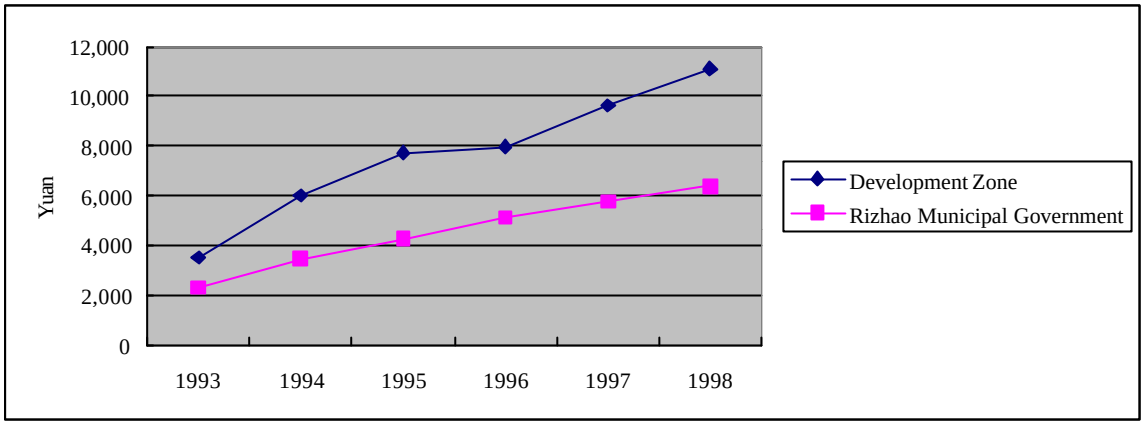
(1) Economic development in Rizhao (the Rizhao Development Zone) and its hinterlands

The economic impact of this project on Rizhao (the Rizhao Development Zone) consists of increased production, development of industrial structures and creation of employment opportunities. The economic impact on the hinterlands (Shandong, Henan and Shanxi provinces) consists of greater convenience due to this project and the construction of related transport facilities (see Figure 4 above for movements in volumes handled at neighboring ports).

The effect of this project on production can be gauged by comparing GDP per-capita for the Rizhao municipal government between 1993 and 1998, which approximately tripled over that period, indicating very rapid economic development. In particular, the Rizhao Development Zone ($30km^2$) close to Rizhao Port, has a good level of infrastructure, including the port facilities. A number of foreign companies from Republic of Korea, Taiwan and elsewhere have set up operations in the development zone, and there has been a large increase in production. Several companies are now planning to build cement factories, pulp factories and steel factories, which means further production growth can be expected.

Figure 5 shows the movements in GDP per-capita in Rizhao municipal government and in its development zone.

Figure 5 Movements in GDP Per-capita



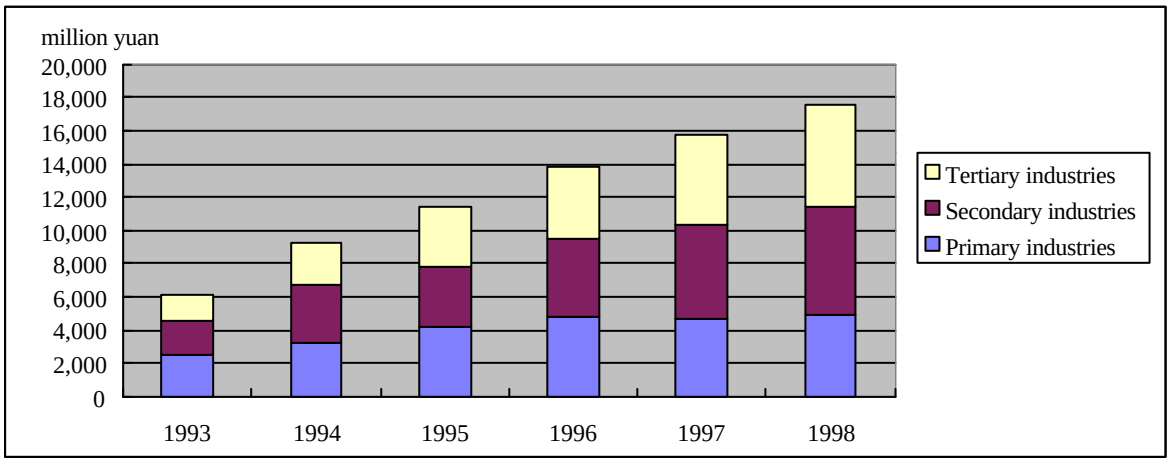
(Source) Rizhao Port Authority materials

Examining the movements in GDP per-capita separately for each industry in Rizhao municipal government, the weight of secondary and tertiary industries within GDP has been growing since 1996, when the project was completed. Therefore we can conclude that this project has encouraged a shift to a more advanced industrial structure. In the Rizhao Development Zone the construction of Rizhao port, the Yanzhou- Shijiu Line, an expressway and a thermal power station have created an attractive investment environment. If economic development continues, further advancement of the industrial structure can be expected which will increase the proportion of tertiary industries.

The workforce of the Rizhao Port Authority is far larger than it was in 1991, which indicates that the project has made a contribution to job creation in the surrounding area (see Table 8, comparison of workforce size).

Figure 6 shows movements in GDP in Rizhao municipal government.

Figure 6 Movements in the GDP in Rizhao Municipal Government



(Source) Rizhao Port Authority materials