China

Dalian Port Dayao Bay First Phase Construction Project

External Evaluator: Chiaki Nakamura (Global Link Management Ltd.)

Field Survey: October 2005

1. Project Profile and Japan's ODA Loan

Map of project area

Dalian Port Dayao Bay

1.1 Background

Positioned near the Russian and Mongolian borders whilst still being within China, the three north-eastern provinces of Liaoning, Jilin, and Heilongjiang, along with part of Inner Mongolia, cover a wide expanse of some 789,000km^2 – corresponding to a surface area approximately double that of Japan – and with a population of around 100 million, comprise an area rich in natural resources, with a developing heavy industry sector. Agriculture also flourishes there, and the area produces grain products such as corn and soy beans. Dalian, located at the southern tip of Liaoning Province, is a large metropolis, covering an area of 12,574km^2—almost on a par with that of Iwate Prefecture—and boasts a population of approximately 5.9 million, almost the same as that of Hokkaido. Due to such economic importance, Dalian has been selected as a sub-provincial city, with autonomy equal to that of a province.

As the gateway to Dalian City and the three north-eastern provinces which form its hinterland, Dalian Port is the largest commercial port in the north-eastern region, and not only does it serve as a hub linking rail and water-borne transportation, in terms of China as a whole it occupies a position among the country's top international trade ports in terms of handling volume. Furthermore, Dayao Bay, which is the target of this project, is one of the eight port zones[1] into which Dalian Port can be divided, and is directly adjacent to the Dalian Economic and Technology Development Zone[2].

Out of the phase one construction of ten berths[3] at Dayao Bay, financed through a World

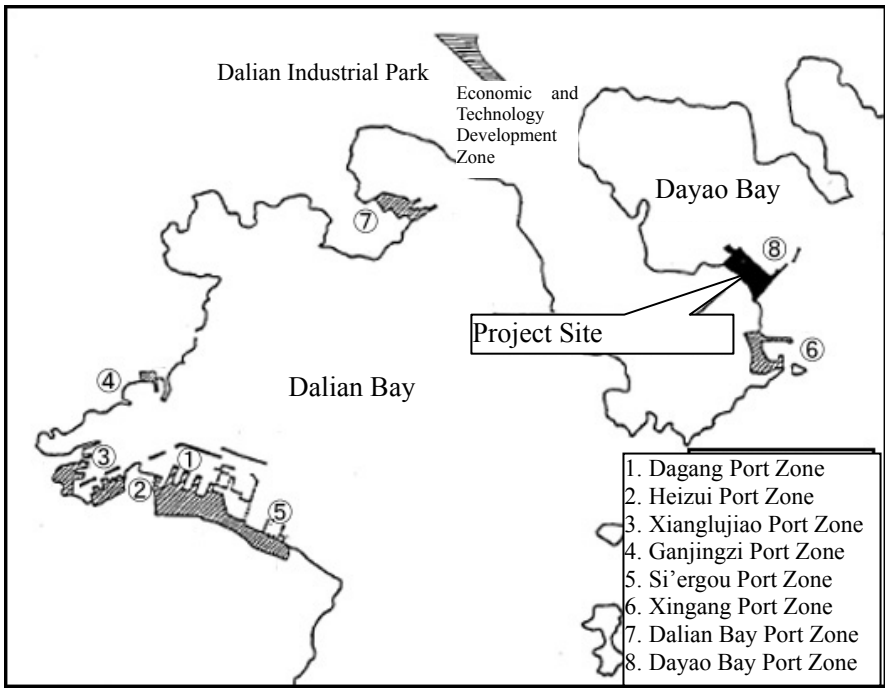
[1] Dagang Port Zone, Si'ergou Port Zone, Heizui Port Zone, Xianglujiao Port Zone, Ganjingzi Port Zone, Dalian Bay Port Zone, Xingang Port Zone, Dayao Bay Port Zone (Source: Chinese Ports Overview, 5th Edition, The Association for the Promotion of International Trade, Japan)

[2] Dalian is designated as one of the 14 Coastal Open Cities established by the State Council in September 1984, and in October of the same year, a decision was passed making it an Economic and Technology Development Zone. By the end of 2000, 1,384 companies (of which over 400 were from Hong Kong, 357 from Japan, over 150 from the United States, and over 90 from S. Korea) had set up business there.

[3] Berth: the place at a quayside or dock where a vessel is berthed. Alternatively, a unit for counting such places.

Bank loan, the previous stage of four berths (handling capacity: 2.6 million tons per year) were constructed in 1988, and these began operations in July 1993. However, as of 1994 (the year of appraisal), the volume of handled cargo had reached the limit of the 45.76 million tons per year handling capacity of Dalian Port as a whole, including these four newly built berths, and the average number of days that vessels spent berthed[4] had reached 6.8. Moreover, with the volume of handled cargo being forecast at the time of appraisal to grow to 71.2 million tons in 1997, rising to 85.6 million tons in 2000, there was a pressing need for the construction of new berths at the port.

Fig. 1 Project Site Map



1.2 Objective

To improve convenience and safety while responding to rapidly increasing cargo handling demands, through the improvement and expansion of Dalian Port Dayao Bay facilities, thereby contributing to the economic development of the region.

1.3 Borrower/Executing Agency

Ministry of Foreign Trade and Economic Cooperation of the People's Republic of China /Ministry of Communications[5]

1.4 Outline of Loan Agreement

[4] Average number of days that vessels spend berthed: Indicates the total of the average number of days that cargo handling operations were actually carried out, plus the average number of days spent waiting.

[5] From 1999 onwards, the borrower of ODA loans to China changed to the Government of the People's Republic of China (Ministry of Finance)

Loan Amount/ Disbursed Amount	6,655 million yen/4,308 million yen
Exchange of Notes Loan Agreement	January 1995 January 1995
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 2.6% 30 years 10 years General untied
Final Disbursement Date	February 2000
Main Loan Agreement	Local companies, etc.
Consultant Agreement	—
Feasibility Study (F/S) etc.	1988: Japan International Cooperation Agency 1996: Chinese Government Ministry of Communications Water Transportation Planning and Design Institute

2. Evaluation Result

2.1 Relevance

2.1.1 Relevance of the plan at the time of appraisal

Through the construction of a specialized marine terminal, specializing particularly in the use of coal, containers, ferries etc, at a hub port[6] that is a major Shanghai transportation route, China's Eighth Five-Year Plan identified the strengthening of transportation capabilities as a major issue. In addition, according to the Chinese Coastal Ports Container Shipment Systems Plan, Dalian Port was regarded, along with Tianjin Port and Qingdao Port, as an important container shipment port in Northern China, and served a role as a container shipment and cargo transfer port for that region. However, the handling of container cargo at Dalian Port was split up between container berths that were converted general cargo berths in Dalian Bay (former port zone), and Dayao Bay container berths (new port zone), handling capacity was inferior to demand, cargo handling was inefficient, and it was not possible to respond fully to the needs of large ships due to the shallow water. Therefore, as a response to the rapid growth in cargo demand of Dalian Port, which acts as an external contact point to the wider world for China's northeastern region, and due to its position as a nationally important project outlined in the Eighth Five-Year Plan, this project was deemed to be highly relevant at the time of appraisal.

[6] A project conceived by China's Ministry of Communications. Shanghai and Dalian have been established as hubs (ports which are able to act as centers in regions which are geographically predominant) of international transportation)

2.1.2 Relevance of the plan at the time of evaluation

At the time of evaluation too, the Tenth Five-Year Plan (2001-2005) mentioned the development of shipping routes at major ports etc., along with the strengthening of both large-size container shipment systems at major coastal hub ports, as well as general cargo shipment functions. Moreover, with the State Council in October 2003 revealing its policy to "turn Dalian into an important international hub port in the northeast Asian region," the importance of Dalian in the international distribution network is growing.

In order to build the foundations for Dalian to become a hub port in northeast Asia, the Liaoning Province Tenth Five-Year Plan (2001-2005), and the Dalian City National Socio-Economic Development Tenth Five-Year Plan (2001-2005) highlight moving forward with construction, focusing specifically on Phase Two construction of Dalian Port's crude oil and ore berths, as well as Dayao Bay's container berths. Centering around Dalian Port, the Plans also highlight allocation of functions of the Port, to be developed cooperatively by Dandong, Yingkou, Jinzhou and Huludao (Hulu Island). As the project is consistent with these plans, it continues to remain a high priority.

2.2 Efficiency

2.2.1 Output

(1) Plan at the time of appraisal

At the time of this project's 1994 appraisal, although the aim was to centralize container cargo by handling it at Dayao Bay in order to improve Dalian Port shipment capability, it was not possible to implement the large-scale construction work associated with container berth construction, due principally to a shortage of local currency. Therefore, as the next best measure, the plan was to add a multi-purpose berth to the project, and handle container cargo there for which there was no capacity at existing container berths.

(2) Revised plan, and reasons for the changes

Following project appraisal, in an attempt to make the handling of container cargo more efficient, the Port of Dalian Authority explored ways to construct a large-scale container terminal in the Dalian Port Dayao Bay port zone, and in January 1996, an agreement was reached to build container berths (with an annual handling capacity of 4.5 million tons), under a joint venture with the Singapore Port Authority[7].

As a result, in 1996 a reappraisal was carried out, and a revised plan was formulated in which the multi-purpose berth and chemical fertilizer berth, which were originally to be constructed with the aid of ODA loans, would now be constructed in the former port under a self-financing arrangement, without making use of ODA loans. However, it was decided that

[7] Completed in August 2000

ODA loans would continue to be used for the general cargo berth, steel berth, and shared facilities (see Table 1 for an overview of the project plan at the time of appraisal, and the revised plan at the time of reappraisal).

Table 1 Overview of the Project Plan at the Time of Appraisal, and the Revised Plan at the Time of Reappraisal

Plan at time of appraisal (1994)	Revised plan (at time of 1996 reappraisal)	
1) Multi-purpose berth (50,000DWT[8] grade) X 1	→ Container berth (multi-purpose berth to be built at former port)	Not eligible for ODA loans
2) Multi-purpose berth (25,000DWT grade) X 1	→ Container berth (as above)	
3) Chemical fertilizer berth (50,000DWT grade) X 1	→ Container berth (chemical fertilizer berth to be built at former port)	
4) Steel berth (15,000DWT grade) X 1	→ Changes to position, size, and number of berths within Dayao Bay (existing equipment will be used for civil engineering work, with only cargo handling machinery being eligible for ODA loans. Following the revision, there will be two berths, of 20,000DWT grade size)	Eligible for ODA loans
5) General cargo berths (10,000DWT grade) X 2	→ Same as plan at time of appraisal	
Shared facilities	→ Targets for boosting capability (tug boats, railroad engines, etc)	

(3) Actual performance

In addition to the civil engineering work required to construct the two general cargo berths, the project content relating to this project also included improvements and so forth to cargo handling machinery, and the project was implemented almost exactly as per the Plan formulated at the time of the reappraisal. Although there were some changes to the project content relating to cargo handling machinery and port management equipment etc., there were no effects on handling capacity.

Fig. 2 Port Service Equipment

[8] DWT (Dead Weight Tonnage): The maximum carrying capacity of a vessel when loaded with cargo, expressed in the number of tons

Furthermore, when it came to port service equipment, utilities, environmental protection equipment, and port management equipment, due to changes in the exchange rate, rather than procure imported goods, domestically produced equipment was purchased with the port's own funds, and this resulted in cost savings.

2.2.2 Project period

Although in the original plan formulated at the time of reappraisal, the project was due to run from January 1995 to December 1999 (60 months), the actual period was from January 1995 until December 2002 (96 months), representing a 60% extension compared to the plan. In terms of major factors behind the delays, one could cite 1) delays in construction work due to changes in the designs of breakwaters; 2) delays in the construction of berths which had become eligible for ODA loans as a result of the plan revised at the time of reappraisal; and 3) extensions to the period for drainage works, due to additional flood drainage ditch works.

2.2.3 Project cost

At 12,452 million yen (of which the ODA loan portion made up 4,308 million yen), project costs have come in at approximately 89% of the original projected amount at the time of reappraisal (13,937 million yen, of which the ODA loan portion made up 6,655 million yen). This is attributable to cost reductions achieved through the domestic procurement of breakwaters[9] and the aforementioned environmental protection equipment, as well as port management equipment.

Although there were delays in the implementation period of this project, due to output being almost exactly as planned at the time of reappraisal, and project costs being kept within the initial projected figure, one can say from the above that generally speaking, there have been no problems with efficiency relating to the implementation of the project overall.

2.3 Effectiveness

2.3.1 Increases in cargo volume, and easing of congestion

Table 2 shows the cargo handling volumes of Dalian Port and Dayao Bay. In 2003, when work on the project was completed, Dayao Bay's cargo handling volume reached 112% of the planned figure of 13 million tons per year. Moreover, Dayao Bay's cargo handling volume for 2004 showed a year-on-year increase of 21%. With Dalian Port's 300,000 ton crude oil import berth (completed 2004), and its 200,000 ton import steel berth (completed 2004), in addition to the progress being made with Dayao Bay's Phase Two construction work, the cargo handling volumes of Dalian Port as a whole, and of Dayao Bay, are expected to increase.

[9] Although the changes made to the design of the breakwaters to protect against larger waves than those in the original designs led to an increase in ordinary project costs, as a result of being procured domestically they helped to reduce costs.

Table 2. Shifts in Cargo Handling Volume (10,000 tons/year)

	Handling forecast	Actual performance		
	2000	2000	2003 (work completed)	2004
A. Dalian Port as a whole	8,560	7,373.6	8,732.5	10,065.2
B. Dayao Bay	1,300	990.8	1,459.2	1,777.8

Source: Dalian Port Group Corporation (predictions of handling volume are those made at the time of reappraisal)

Table 3 shows a breakdown of the cargo handling volume of Dayao Bay as a whole. As can be seen from this table, the main factor behind the substantial rise in cargo handling volume from 2003 onwards lies in the increase in container cargo handling volume. Grain products and steel are handled at Dalian Port's former port zone.

Table 3. Breakdown of Cargo Handling Volume of Dayao Bay as a Whole

	Forecast volume (2000)		2003 (work completed)		2004	
	(10,000 tons/year)	(%)	(10,000 tons/year)	(%)	(10,000 tons/year)	(%)
Grain products	300	23.1	189.5	13.0	171.3	9.6
Steel	120	9.2	14.8	1.0	16.2	0.9
General cargo	80	6.2	77.9	5.3	82.8	4.7
Containers etc.	800	61.5	1,177.0	80.7	1,507.5	84.8
Total	1,300	100.0	1,459.2	100.0	1,777.8	100.0

Source: Dalian Port Group Corporation (volume forecasts are those made at the time of reappraisal)

Furthermore, as a result of the increases in cargo handling capacity due to the project, the average number of days that vessels spend berthed at Dayao Bay has dropped, and congestion at the port has been eased. Therefore, the project is seen to have amply shown results such as these (see Table 4).

Table 4. Average Number of Days that Vessels Spent Berthed at Dayaowan

	2002	2003	2004
Ships carrying general cargo/food	2.18	1.74	0.89
Container ships	1.59	0.91	1.73
Total	1.89	1.33	1.31

Source: Dalian Port Group Corporation

However, although until 1985 Dalian Port was a port boasting the number one position in China's northeastern region in terms of handling volume, and the number two port in China as a whole, in 2004 those positions had fallen to number three in northeast China, and number eight in China overall. In terms of factors to explain the low rate of increase in Dalian Port's cargo handling volume compared to other ports, the fact that its port usage charges are rather high, at about 10% more than other ports, is thought to be one factor (based on results from the beneficiary survey).

2.3.2 Convenience, safety, and quality of service of port facilities

In order to ascertain the convenience, safety and so forth of the port facilities that have been developed through this project, in this study a beneficiary survey was carried out on eleven shipping companies, of which four were Japanese. Below are the beneficiary survey results from this study.

Beneficiary survey results

Convenience and safety of port facilities

When asked about the convenience, safety, and quality of service of the port facilities resulting from this project, seven of the eleven companies responded that there had been an improvement. In contrast, six companies—corresponding to half the total—expressed dissatisfaction with the use of the facilities. When it came to the quality of service, although there were some who said there had been an improvement compared to the period prior to project implementation, the view was also expressed that, compared to other ports in China, there was a need to further improve services such as main line discount charges, to simplify customs procedures (such as the introduction of an EDI system[10], and improvements to customs systems), and to improve the commodity inspection system[11].

2.3.3 Re-calculation of Financial Internal Rate of Return (FIRR)

Taking construction costs, labor costs, operation and maintenance costs, and upgrade/conversion costs as the project costs, with income from cargo handling etc. resulting from the project as the benefit, and project life as being 30 years from the start of operations, the financial internal rate of return at the time of reappraisal was calculated to be 5.7%. In this evaluation, the FIRR was re-calculated using the same conditions, producing a new figure of 2.6%. The reason for the new figure dropping below that calculated at the time of reappraisal lies in increases in upgrade/conversion costs arising from converting container berths, as well as increased welfare costs arising from reductions of over 4,000 to the workforce.

2.4 Impact

2. 4.1 Economic development of Dalian City, and the Dalian Port hinterland

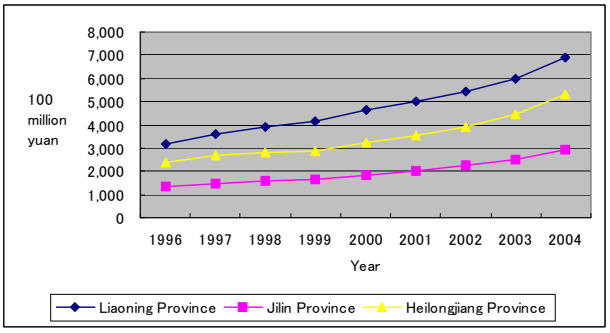
Figures 3 and 4 show the economic development status of the three north-eastern provinces which form Dalian Port's hinterland. The economies of the three north-eastern provinces which form Dalian Port's hinterland appear to be relatively lagging behind in terms of the

[10] Port EDI (Electronic Data Interchange) system: an electronic application system making use of the Internet to carry out various port facilities procedures.

[11] Based on the beneficiary survey, it is thought that Dalian Port's rents and main line discount charges are around 10% higher than those of other ports.

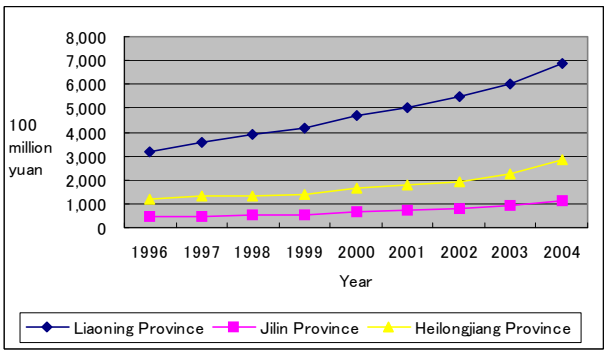
development of China's market economy since the 1990s onwards. However, with the effect of the State Council's North-East Region Promotion Policy in 2003, gross regional domestic product (GRDP) of the three northeastern provinces in FY2004 reached 1,513,390 million yuan. This represented a 16.8% rise in the rate of increase compared to the previous year, and was 2.8 points higher than the national GDP rate of increase. Furthermore, secondary industries showed a 14.5% growth rate, thereby surpassing the national rate of increase by 3.4 points. Economic development in the three northeastern provinces is expected to continue in the years to come.

Fig. 3 GRDP of the 3 Northeastern Provinces (100 million yuan)



Source: Liaoning Province, Jilin Province, and Heilongjian Province statistical yearbooks

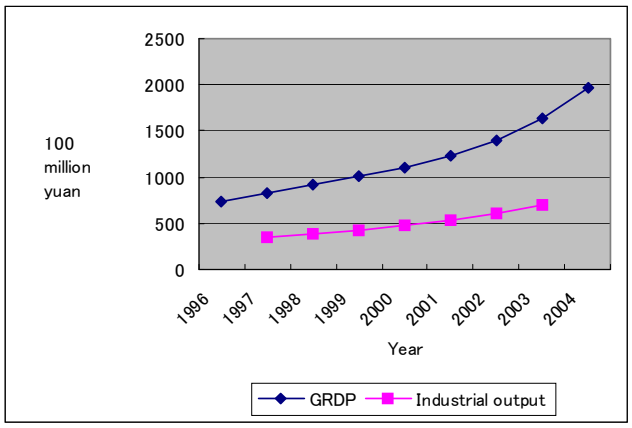
Fig. 4 Industrial GDP of the Three Northeastern Provinces (100 million yuan)



Source: Liaoning Province, Jilin Province, and Heilongjian Province statistical yearbooks

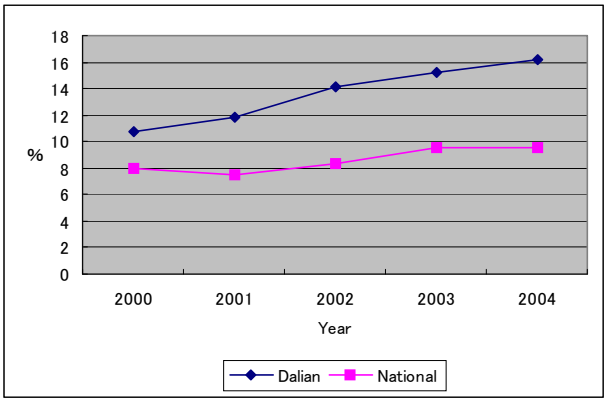
Tables 5 and 6 show the economic development status of Dalian City. Since the 1990s, the Dalian economy has continued to maintain growth at a comparatively rapid pace, and its GRDP growth rate for FY2004 exceeded the national average by 6.7 points. Following completion of the project, due to the entry of foreign companies and so forth, dramatic development has been achieved in the target region and its environs.

Table 5. Dalian City's GRDP, and Industrial GDP



Source: Dalian City statistical yearbook

Fig. 6 GRDP Growth Rate (%)



Source: Dalian City statistical yearbook, China statistical yearbook

Due to the fact that this project constitutes just one part of the Dalian Port First Phase Construction Project, it is difficult to gauge the impact of just this project in isolation, with regard to the economic development of Dalian City and the Dalian Port hinterland. Having said that, however, there were responses from several shipping companies in the beneficiary survey to the effect that cargo handling volumes had substantially increased following project completion, and it is thought that the development of Dalian Port as a whole, including this project, has played a major role in the economic development of the three northeastern provinces which form Dalian Port's hinterland, as well as Dalian City.

Moreover, Dalian's importance in the international distribution network, too, has grown dramatically following the adoption of ODA loans, and since 2004, the improvement of service functions and port infrastructure construction have been accelerating, based on its strategic positioning in building itself up an as important international distribution hub in Asia.

2.4.1 Environmental impact

During the construction period of the project, in order to minimize the impact of dredged sand spreading to fish farms, water quality was monitored (items checked included suspended matter, types of oil, chemical oxygen demand (COD), inorganic nitrogen, inorganic phosphorous, etc.), and changes to the marine environment were ascertained. Based on the results of the monitoring, the spread of pollution was reduced by either bringing construction to a halt, or by making adjustments to the intensity of construction work and the technology used. Furthermore, even after completion of the project, upon a request to the Dalian City Environmental Monitoring Center, environmental monitoring of air and water quality, noise, and water pollution are carried out regularly. Monitoring levels of air quality, water quality (wastewater, sea water), and port noise all meet national standards, and no environmental problems have been indicated.

The items covered in the environmental study carried out in Dalian Port Dayao Bay are as shown in Table 5.

Table 5. Dayao Bay Environmental Study Items

Study item			Value	National standard		Study frequency
Air quality		TSP (mg/m^3)	0.183	Environmental air quality standards (GB3095-1996) Within two kinds of standard[12]		Not fixed
		SO_2 (mg/m^3)	0.032			
		NOx (mg/m^3)	0.074			
Water quality	Sewage (wastewater)	COD (mg/l)	58.6	Within two kinds of general sewage standard		Once a month
		SS (mg/l)	49.5			
		BOD_5 (mg/l)	7.83			
		pH	6.62			
		Ammonia (mg/l)	1.58			
		Oil (mg/l)	0.8			
	Sea water quality	COD (mg/l)		Within four kinds of national sea water quality standard		Twice a year
		SS (mg/l)	4.0			
		Sulfide (mg/l)	0.002			
		pH	8.06			
		Inorganic nitrogen (mg/l)	0.132			
		Oil (mg/l)	0.04			
		Active salt (mg/l)	0.014			
		DO (mg/l)	8.64			
		LAS (mg/l)	0.02			
Noise	Construction site noise	dB	59.5	Daytime	Construction company construction	Not fixed
			55.1	Night-time		
	Source of	dB	72.0	Daytime		

[12] Based on China's environmental impact evaluation techniques. For example, "within two kinds of air quality standard" refers to a mid-level standard that applies to China's air quality, and indicates a daily average of 0.15mg/m^3 for SO_2, and a daily average of 0.08mg/m^3 for NO_2

	noise		70.4	Night-time	site noise standards (GB12348-90) Within three kinds of standard	

Source: Dalian Port Group Corporation

2.4.2 Impact relating to resident relocation

Dalian Port Dayao Bay First Phase Construction Project compensation (payment of compensation money) for fishermen residing in the surrounding coastal area had all been settled by the time of construction (June 1994) of the previous stage of four berths, financed by a World Bank loan. Monitoring of the impact on their fishing area (fish farms) during the construction period was also carried out.

Moreover, the relocation of residents arising from railroad construction within the port has been completed with the agreement of those residents concerned. For appropriation of land, compensation was paid based on a standard of 25,000 yuan per mu[13], whereas the amount paid for appropriation of sea areas was approximately 18,000 yuan per mu.

As an assistance measure to help with recovery of earnings, 2,862 people were in the First Phase construction, and those residents who had been relocated due to railroad construction were employed at municipal companies within the development area.

Regarding the total number of households that were relocated, and the number of households that were compensated, detailed figures are not known as it has not been possible to gather information due to the privatisation of the executing agencies. However, according to information obtained via inquiries made to the executing agency, resident relocation was carried out in accordance with Chinese regulations, such as land laws, forestry laws, and sea laws, and there have been no reports of problems arising with regard to resident relocation.

2.5 Sustainability

2.5.1 Executing agencies

2.5.1.1 Structure

At the time of appraisal, the executing agency for this project was the Ministry of Communications, with specific implementation being the responsibility of the Port of Dalian Authority Construction Command Department, while operation and maintenance were undertaken by Dalian Port Dayao Bay Port Corporation.

Based on reforms to the structure of the country's ports, in July 2003, after the project had been implemented, the Dalian Port Group Corporation split off from the Dalian Municipal

[13] 1mu = 99.2m^2

Port Authority as an independent company. Currently, under the guidance and supervision of the Dalian Municipal Port Authority, operations and maintenance are carried out by the Dalian Port Grains Company, which is under the control of the Dalian Port Group Corporation. With the Dalian Port Group Corporation having 12,000 employees (as of October 2005), and the staff of the Dalian Port Grains Company numbering 268, the average length of employment is 16 years (FY2004). Following the Dalian Port Group Corporation's split from the Dalian Municipal Port Authority, there have been no major changes to implementation structure, and the Corporation is on an even keel.

2.5.1.2 Technical capacity

Once a year, the Dalian Port Group Corporation, which is the division responsible for specific implementation, carries out regular training, such as electrical machinery repair training for machinery repair employees, and training in operating machinery designed for loading and unloading food cargo for those who operate machinery. Furthermore, maintenance of machinery is carried out as laid down in the operational management manual. Therefore, there are no technical problems with the operation and maintenance of port machinery or facilities.

2.5.1.3 Financial status

Table 6 shows the major financial indicators for the Dalian Port Group Corporation. The causes for the drop in the net income to sales ratio are: 1) increases in construction costs arising from converting container berths; 2) increases in various costs associated with modernization of the port; and 3) increases in various expenses associated with reducing employee numbers by over 4,000. However, both liquidity ratio and capital adequacy ratio are at a favorable level, and there are no sustainability problems in terms of finances.

Table 6. Dalian Port Group Corporation Major Financial Indicators

	FY2002	FY2003	FY2004
Net profit to sales ratio	3.23%	2.96%	2.91%
Total capital turnover ratio	61.35%	47.52%	56.63%
Liquidity ratio	100.13%	125.08%	127.92%
Capital adequacy ratio	57.71%	49.40%	39.35%

Source: Dalian Port Group Corporation

2.5.2 Maintenance

Having made checks for this evaluation, the situation regarding maintenance of facilities and machinery improved in this project is a favorable one, and no problems have arisen.

2.5.3 Links with subsequent projects following improvements to Dayao Bay

Having made this project's Dayao Bay First Phase Project the catalyst for future ones, and with the source of funding being other than ODA loans, Dayao Bay Second Phase construction is already underway, and Third Phase construction is planned for the future (see Table 7).

Both Dayao Bay Second Phase and Third Phase construction will be to build container berths, and amongst the machinery and facilities developed under this project, the plan is to use tractors and

Table 7. Overview of Dayao Bay First Phase & Second Phase Projects

	Construction scale	Start of construction work	Due to be completed
Project Phase Two	6 berths	2002	2007
Project Phase Three	6 berths	2005	2010

Source: Dalian Port Group Corporation

railroad engines.

In addition, with Dayao Bay being a project of national importance, the plan is to build an international, large-scale deepwater transit port. The long-term concept is to build 80 to 90 berths, including container berths, and as a result, container handling capacity is expected to reach[14] 10 million TEU[15].

3. Feedback

3.1 Lessons learned

None

3.2 Recommendations

As described earlier in the "Effectiveness" section, the volumes of handled cargo at Dalian Port and Dayao Bay have been increasing year by year. Having said that, not only have the volumes of handled cargo at other major ports in China's north-eastern region also been increasing year by year, but in recent years, Dalian Port's ranking in terms of volume of handled cargo in China's north-eastern region has been on a downward trend. In order to maintain a high level of effectiveness, it will be necessary not only to strengthen infrastructure development, but also promote efficient port management, improve the quality of services, such as reducing port usage charges etc., make efforts to simplify port procedures such as customs procedures, and move over to an EDI system.

[14] Source: The Overseas Coastal Area Development Institute of Japan, 2004

[15] TEU (Twenty-foot Equivalent Unit): a unit used for converting the number of containers equivalent to the number of containers measuring 20 feet.

Comparison of Original and Actual Scope

Item	Plan (at time of reappraisal)	Actual
(1) Output		
1) Civil engineering work	A) Mooring facilities (overall length 360m) general cargo berths (10,000 DWT X 2) B) Breakwaters (overall length 690m) C) Yard (84,900m^2)	As planned (in Dec. 2004, the use of the general cargo berths was changed to that of container berths)
2) Cargo handling machinery	Portal cranes/tower Cranes/forklift Trucks/tractors/trailers etc. for steel and general cargo berths	Portal cranes/tower Cranes/forklift Trucks/tractors/trailers/bulldozers etc. for steel and general cargo berths
3) Port railroad	Overall length 21.64km	As planned
4) Port service equipment	3 tug-boats, 1 transport/repair boat, 4 railroad locomotives, fire engine, communication equipment etc.	Fire engine not yet purchased
5) Utilities	Electrical supply, lighting, water supply and drainage facilities etc.	With the exception of the lighting system, all purchased with the port's own funds
6) Environmental protection equipment	Environmental monitoring apparatus, planting etc.	With the exception of the environmental monitoring apparatus, all purchased with the port's own funds
7) Port management equipment	Computers, monitoring TV	OA system not yet purchased
8) Commodity inspection equipment		As planned
9) Technical	Port Authority staff to visit	Not yet implemented

cooperation	overseas port facilities	
(2) Project period Construction work/machinery, setting up of equipment Trial operation/ acceptance Time of completion	January 1993–December 1999 January 1999–March 1999 End of December 1999	January 1993–Nov. 2002 October 1999–Dec. 1999 End of December 2002
(3) Project cost Foreign currency Local currency Total ODA Loan Portion Conversion rate	6,655 million yen 7,282 million yen (606.83 million yuan) 13,937 million yen 6,655 million yen 1 yuan = 12 yen (as of June 1996)	4,308 million yen 8,144 million yen (590.14 million yuan) 12,452 million yen 4,308 million yen 1 yuan = 13.8 yen (1996 – 2004 average)