China

Ex-Post Evaluation of Japanese ODA Loan Project

Heilongjiang Province, Heihe-Beian Highway Construction Project

External Evaluator: Kenji Momota, IC Net Limited

1. Project Description

Project Site
(see Figure 1 for more details)

Trucks on the road reconstructed by the project

1.1 Background

Heilongjiang Province, the center of economy and industry in the northeast area of China, was growing in importance as a production base of oil, grain merchandise and forest resources, etc. With its 19 cities and counties adjacent to Russia along about 3,000 km of border, this province played an important role as a base of the border trade as well.

Heihe City[1], located in the northeast area of Heilongjiang, was one of the districts rich in natural resources in this province. Trade with Russia had been increasing year after year. Economic vitalization was advancing with seven economic development zones and resources development economic zones now located between Heihe City and Beian City about 240 km to the south.

There had been a growing demand for trunk road connecting Heihe via Beian with the capital city Harbin[2], due to the aforementioned economic development zones. On this route, however, a section of Heihe - Beian (approx.240 km) had been left as an unpaved gravel road. The traffic of dump trucks had been heavy here, and accidents had been liable to happen during the cold snowing season, thus the road had often been closed to traffic. Under these circumstances, paving reconstruction had been urgent task to secure

[1] Heihe City is the main city of Heihe district having six cities (including Beian City) and counties under its control. Its total population was about 1.68 million in 1999.
[2] The official name is "National Route G202"connecting Heihe with Dalian.

access to Heihe City through the four seasons.

1.2 Project Outline

The objective of this project is to secure stable accesses to Heihe and other target areas including impoverished local districts by constructing 240km of new national road from Heihe to Beian, and thereby contribute to the promotion of the Heihe - Russia border trade and the development and progress of the local economy.

Approved Amount/ Disbursed Amount	12,608 million yen / 12,187 million yen
Exchange of Notes Date / Loan Agreement Signing Date	March, 2001 / March, 2001
Terms and Conditions	Main: Interest rate: 1.8% Repayment Period: 30 years (Grace Period: 10 years) General Untied Consulting Service: Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Bilateral Tied
Borrower/ Executing Agency	People's Republic of China / Heilongjiang Province Hei-Bei Highway Construction Co., Ltd
Final Disbursement Date	July, 2006
Main Contractor (Over 1 billion yen)	China Railway First Group Corp., Ltd.(China), Heihe Municipal Road & Bridge Company (China)
Main Consultant (Over 100 million yen)	None
Feasibility Studies, etc.（if any）	Heilongjiang Department of Road Inspection and Design (1998)
Related Projects（if any）	None

*While the project was underway, the name of the executing agency was changed from Heilongjiang Province Hei-Bei Highway Construction Co., Ltd. to Heida Road Administration Office due to organizational reform.

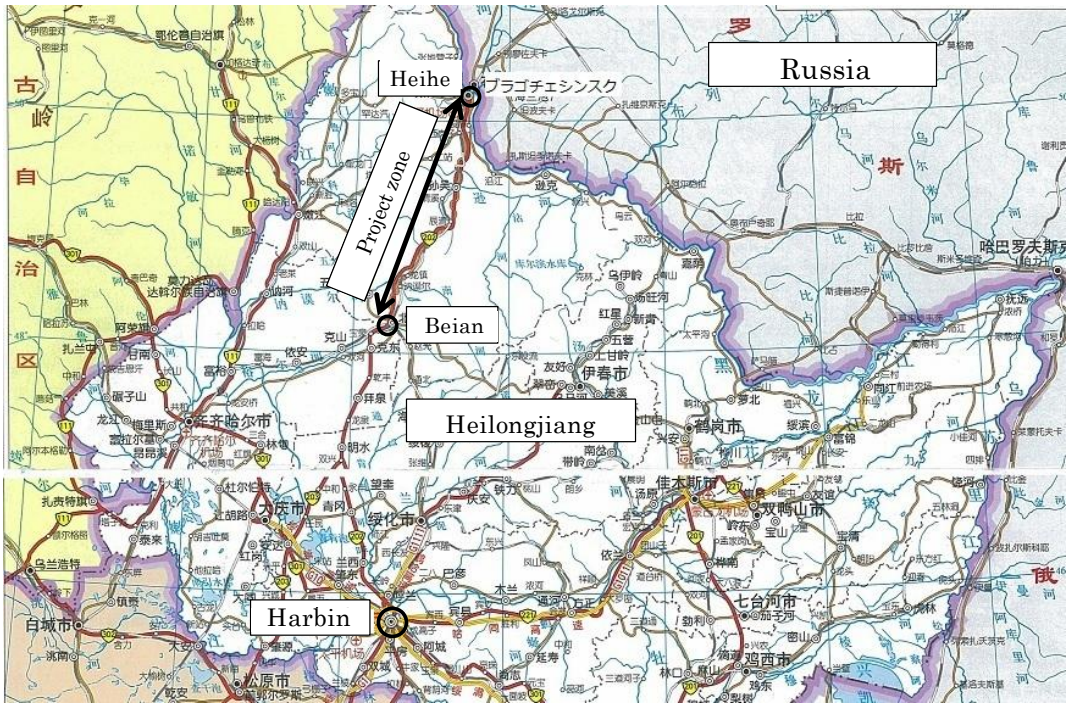

Figure.1 Project Site

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenji Momota, IC Net Limited

2.2 Duration of Evaluation Study

An Ex-Post Evaluation was conducted over the following duration:

Duration of the Study: October 2009 – June 2010

Duration of the Field Study: December 8 – 17, 2009 and April 20-24, 2010

2.3 Constraints during the Evaluation Study

Some documents prepared in the project planning stage could not be found as some members were reshuffled in the executing agency. Instead, therefore, in figuring out traffic forecast and EIRR (Economic Internal Rate of Return), existing data were used with assumptions were used.

3. Results of the Evaluation (Overall Rating: A)

3.1 Relevance (Rating: a)

3.1.1. Relevance with the Development Plan of China

(1) Development Policy at Appraisal

In the 9th 5-year plan (1996-2000), construction of a network of automobile dedicated roads represented by the "5-Vertical, 7-Horizontal Traverse Routes Plan" was planned to promote economic development in interior region. The development policy included construction of highways of high-grade specifications extending 20,000~25,000 km, construction of roads having access to large and middle cities, roads connecting ports with hinterland, roads for improving tourism, and roads running through slums, borderlands and mountainous areas.

(2) Development Policy at Ex-Post Evaluation

In the "Northeast Area Development Plan (2006)"[3] laid out by the Chinese Government on the basis of the 11th 5-year plan, two policies of "Harmonized Development of the Region" and "Change in Industrial Structure" were adopted. In line with these policies, plans for developing this local district and completing infrastructures of roads and railways were designed.

In the "Plan of National Expressways Network" made in 2004, development of the network commonly known as "7918" (7 metropolis radial routes, 9 north-south traverse routes, and 18 east-south traverse routes) was envisaged. Construction for improvement in the second traverse route (Huichun - Wulanhaote route), above all, is looked upon as important in promoting Sino-Russian border trade and improving access from the western part to the coastal areas. It is obvious that an improvement in the transportation infrastructure is regarded as one of the important tasks in economical development in the northeast district of China.

3.1.2 Relevance with the Development Needs in China

At the time when this project was in the planning stage, road maintenance in Heilongjiang was being conducted on the basis of "Heilongjiang 30-Year Route Network Plan, 1995". In those days, there still remained sections left in bad condition. The Heihe - Beian route taken up as this project was in great need of improvement, partly because cargo transportation in Heihe as the basis of border trade with Russia was on the increase and partly because there were seven "resources development economy zones,"

[3] This plan is positioned as a long-term local development plan in the northeast district centered in Heilongjiang up to 2020.

"agricultural economy zones" and other economy zones along this route. As the target roads remained unpaved and covered with gravel, traffic risk was high, resulting in accidents and damage to cargoes. Thus, improvement in the road conditions was required for better transportation.

Nowadays, its importance is more and more magnified. In the "Heilongjiang Core Routes Network Plan" enacted in January 2006, Heilongjiang Expressway Network was positioned as a partial route of the "7918" network (mentioned above) to be actualized in this province, and a plan to improve the "276" network (2 loop roads, 7 radial roads and 6 connection roads) was laid out. Harbin - Heihe route, as part of Jilin - Heihe Expressway[4], one component of the "276" network, is a key section for improvement. Since Heihe City relies mostly on land routes due to geographical factors, transportation by roads is indispensable in this city. The following table shows the present percentage of passengers vs. cargo by traffic route. The importance of road transportation is demonstrated by the fact that about 80 percent of passengers rely on it.

Table 1 Passengers vs. Cargo by Traffic Route in Heihe City (2008)

	Road	**Railway**	**Waterway**	**Airway**
Passengers	78.6%	19.3%	1.8%	0.3%
Cargo	49.8%	48.8%	2.0%	n.a

Source: F/S Report on Beian - Heihe Route Project of Jilin - Heihe Expressway

The Heihe - Beian route is to be upgraded into an expressway as part of the road network development plan of Heilongjiang Government. At the time of the Field Study (as of April 2010), additional construction of a median divider strip and widening construction of second-class roads[5] are being carried out (to be completed in 2011). The latter is to be fulfilled with one lane added on the left side, and ground work has already been started on certain sections.

According to the executing agency, the Heihe - Beian route can accommodate increasing traffic volume with the current width of road specifications (6,488 cars at its maximum per day on the average estimated at the time of planning). They said that this route is to be upgraded to an expressway as part of the development policies of the central government and Heilongjiang Government.

[4] Jilin - Heihe Expressway that is connected with Jilin-Shenyang Expressway at Jilin is positioned as the main route connecting three provinces in the northeast district.

[5] In parallel with upgrading to an expressway, the width of second-class roads (2 lanes) over the target section is to be enlarged.

Fig. 2 Construction of Median Divider Strip on First-class Road

Fig. 3 Construction of Widening the Second-class Road

3.1.3 Relevance with Japan's ODA Policy

At the time of appraisal, "The Country Assistance Policy (China)", then-guideline of ODA assistance to China, prioritized the infrastructures of transportation, telecommunications and electric power which then hampered the progress of the Chinese economy. With respect to the transportation sector, a principle was formulated to help China augment transportation capacity by construction of traffic roads and facilities and also improve maintenance and administration techniques for more efficient transportation. This project is consistent with this policy.

Considering above, this project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: a)

3.2.1 Project Outputs

The original plan and the actual achievements of this project are as shown in the following table, and it was carried out almost as planned:

Project Outputs	Original	Actual
(1) Section	242.1km in total	240.5km in
First-class road	37.1km	total
Second-class road	204.9km	36.9km
(2) Number of lanes		203.65km
First-class road	Both ways 4 lanes (25.5m wide)	As planned
Second-class road	Both ways 2 lanes (12.0m wide)	As planned
(3) Bridges		
Large	12 (2,707m)	14(3,136m)
Middle	13(751m)	9(630.6m)
Small	18(524m)	22(788.42m)
(4) Interchange	2	3
(5) Service area	1	As planned
(6) Tollhouse	5	As planned
(7) Maintenance and Administration	2 wrecker trucks &4 road rollers	As planned
(8) Consulting service	30M/M (including 10M/M for overseas training)	17.5M/M

There were some changes in the original plan. Some bridges were lengthened from middle to large; at the detailed design drawing stage, part of the routes had to be redesigned for protection of swamps and for prevention of landslides. The number of interchanges was increased; and level crossings scheduled at some spots (crossings with railways) had to be changed into multi-level crossings in consideration of safety and predicted increase in truck traffic. As regards consulting service, overseas training was cancelled because the construction period was too short.

Fig. 4 Heihe Tollhouse

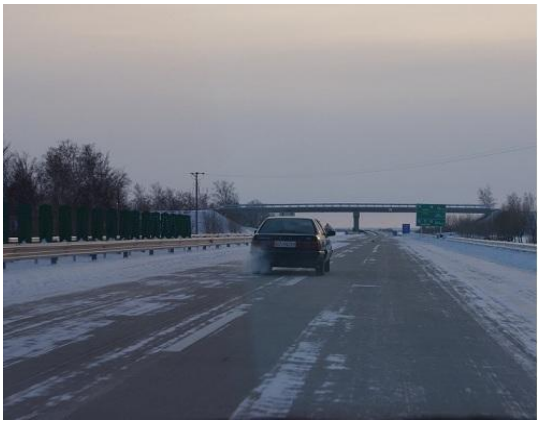

Fig. 5 First-class Road

3.2.2 Project Inputs

3.2.2.1 Project Period

The project period that originally had been planned to be 32 months from March, 2001 until October, 2003 was shortened to be 28 months from July, 2001 until October, 2003. In other words, the actual project period was 87.5 percent shorter than planned. Although the date of tender was delayed, by carrying out construction works scheduled in 2001 together with those scheduled in 2002-2003 in package, this project was completed mostly as planned. As a result, the entire period was shortened. The following are the reasons why this project could be completed efficiently:

(1) There was no change in the project plan itself and no big modification review in the design.

(2) The executing agency, Heibei Road Construction Co., Ltd., has accumulated experience of road construction, especially in the road maintenance work in cold areas. Its management ability was high as evidenced by its use of appropriate contractors and adoption of the right construction methods.

(3) The contractors took the necessary steps to shorten the construction period.[6]

3.2.2.2 Project Cost

The total project cost actually incurred was lower than planned, being 20,441 million yen (including 12,187 million yen as Japanese ODA loan portion) as against 20,890 million yen (including 12,608 million yen as Japanese ODA loan portion) planned.

[6] In order to shorten the construction period, a measure was taken to carry materials for roadbed to the mixing stations at each construction spot during the winter season when construction work was discontinued. Another measure was to use materials that are quick to lay on concrete-paved road surface, which accounts for the large proportion of the section (about 210km).

(Foreign currency portion is Japanese ODA loan). Although there was a cost-increasing factor of having built more interchanges and having lengthened bridges, due to cost reduction in negotiations with the contractors for competition in tender, reduction of administration cost by shortening the project period and cancellation of overseas training, the actual total project cost was lower than planned.

Both project period and project cost were mostly as planned/within the plan, therefore efficiency of the project is high.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1. Results from Operation and Effect Indicators

(1) Change in Traffic Volume

The following is average traffic volume on the Heihe-Beian route after the project completion:

Table 2 Average Traffic Volume on the Project Section

(Unit: number of cars)

		2003 **Completed in October**	2004	2005	2006	2007	2008	2009
Auto-mobiles only	Planned	1,756	1,896	2,048	2,211	2,388	2,579	2,785
	Actual	**1,106**	**1,153**	**1,285**	**1,436**	**1,797**	**2,052**	**2,310**
All cars	Planned	2,245	2,424	2,618	2,827	3,053	3,297	3,561
	Actual	**1,420**	**1,511**	**1,633**	**1,796**	**1,836**	**2,150**	**2,395**
Auto-mobiles only	Actual/ Planned	**63%**	**61%**	**63%**	**65%**	**75%**	**80%**	**83%**
All cars	Actual/ Planned	**63%**	**62%**	**62%**	**64%**	**60%**	**65%**	**67%**

Source: Heida Road Administration Office

Note 1: Average traffic volume was obtained by obtaining the weighted average in each section from eight observation spots.

Note 2: A number of data were available for obtaining the planned traffic volume, but the F/S forecast was employed in this study. Figures obtained were only in 2003 and 2020, and therefore the planned traffic volume in each year was calculated with eight percent as a growth rate on average.

Note 3: "All cars" mean the total traffic volume including automobiles and motorbikes.

Actual/planned traffic volume on the average is 67 percent for all cars (83 percent for automobiles only) in 2009. In general, the Heihe-Beian route has good utilization with about 10 percent % of growth each year. In addition, Heilongjiang Government made the toll free in June 2006 as part of its policy to boost economic conditions. Consequently, traffic volume in 2009 was 11 percent higher than in the previous year. In

the years to come, traffic volume is expected to increase even more.

The fact that the actual traffic volume was only 60 percent of the original plan is thought to be due to an overestimated forecast by the executing agency. The present traffic volume is considered to be reasonable. This gap had something to do with the background that no reliable data and no answers could be available to help inquirers figure out a forecast. In understanding exactly the effectiveness of the project and in considering the relevance of having expressways as mentioned above, a scheme to get reliable data and to do effective monitoring work needs to be established.

(2) Influence of the Road Reconstruction on Transportation and Logistics

Transportation and logistics between Harbin and Heihe have been vitalized by this route opening. For the purpose of learning the effect of the road reconstruction, a survey was made with beneficiaries to see their opinions and to analyze evaluations of local people and those concerned with transportation. A face-to-face inquiry was made by investigators by use of a questionnaire[7] with a total of 100 random sampling subjects, consisting of 80 bus passengers and 20 express companies. The following analytical results are based on the official statistical data compiled by Heihe Road Transportation Administration Office and the results obtained from the investigation with beneficiaries.

1) Traffic Volume of Bus Passengers

As a result of the road opening of the target section, bus services between Heihe and Beian and between Heihe and Harbin have remarkably increased. The traffic volume was 2.99 million passengers by buses registered in Heihe City in 2004, and increased by about 2.5 times up to 7.36 million passengers in 2008. As shown in the following table, bus services between main cities are showing remarkable increase.

Table 3 Number of Daily Bus Services between Heihe and Main Cities (Round Trip)

	Heihe - Sunwu	Heihe - Harbin	Heihe - Beian	Heihe - Wudalianchi
Before project	2	2	4	2
After project	4	10	8	6

Source: Survey with bus/express companies

Eight bus services are available between Heihe and Beian as a round trip from 7 a.m. to 3 p.m. every day. It is surmised from the inquiry survey with beneficiaries that passengers

[7] The inquiry survey was conducted mainly at bus terminals in Heihe City and its vicinity.

prefer bus service than railways in light of convenience on the frequency of services, travel time and fare. The survey with bus companies revealed that the bus services are in great demand with the use rate for the Heihe-Beian service reaching about 80 percent on average. The daily number of bus passengers between Heihe and main cities increased dramatically after construction, as shown below:

Table 4 Daily Number of Bus Passengers between Heihe and Main Cities

	Heihe-Sunwu	Heihe-Harbin	Heihe-Beian	Heihe-Wudalianchi
Before Reconstruction	60	58	120	60
After reconstruction	132	350	264	198
After/Before	220%	600%	220%	330%

Source: Survey with beneficiaries

In case the railway is taken for the same section, it takes about six hours, but the bus service takes you to the destination in almost half that time (3-4 hours). Daily services are more frequent on buses; eight services a day as against only one service on the railway. In this respect, an increase in bus services resulting from the road reconstruction gives much more convenience to the residents than before. Many of the bus companies inquired predict that bus passengers will increase, and about 40 percent of the respondents are considering increasing the frequency of bus services.

Fig. 6 Buses Running on the Route

Fig. 7 Heihe Bus Terminal

The following findings were obtained from the survey with bus passengers:

1. From among a total of 80 subjects, there were 33 bus passengers who had been using the railway before the road reconstruction. The reason was mainly that they found advantages in bus services in terms of travel time and convenience.
2. All of the respondents who had been taking buses before evaluated highly the

improvement in the road following reconstruction.

3. About 75 percent of the respondents responded that they came to avail themselves of bus services more often or a little more often than before.
4. Travel time was dramatically shortened by about 49 percent from 6.42 hours before the road reconstruction to 3.25 hours.

It is evident from the above findings that about 96 percent of the respondents are satisfied with the new bus services, and evaluate highly the effect of the road reconstruction. This demonstrates that improvement in roads plays an important role in making the daily life of the local people more convenient.

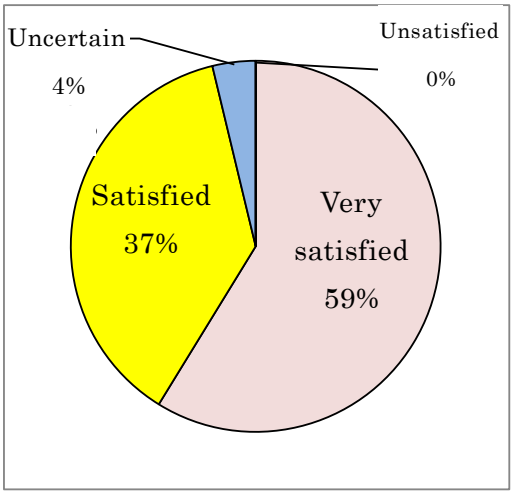

Fig. 8 Survey Results on Satisfaction of Bus Passengers

Fig. 9 Scene of the beneficiary Face Survey

2) Increase in the Number of Trucks and Cargo Handling

There was a remarkable increase in the number of trucks registered in Heihe City and cargo handling volume after the project was completed. Most of the trucks were small (5-8 tons) before, but as cargo handling volume has increased, large container trucks have become more prevalent.

Table 5 Cargo Handling Volume by Trucks Registered in Heihe City

	Before Project (2003-04)	2009
Cargo Handling Volume (10 thousand ton)	652	935
Truck (Number)	400	1,800~2,000

Source: Heihe Road Transportation Administration Office

In the survey results obtained from express companies, 80 percent of them recognize that there was an increase in cargo handling volume in terms of quantity and variety after the road reconstruction. Annual cargo handling volume on average by the respondents increased from 3,023 tons before reconstruction to 5,520 tons after reconstruction (about 180 percent up). Their recognition is in conformity with the data shown above.

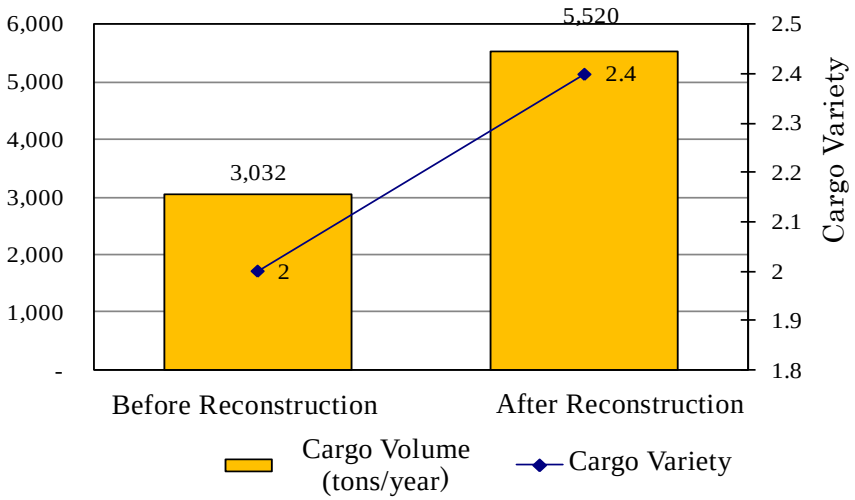

Figure 10 Cargo Handling Volume before and after Road Reconstruction

In general, the actual growth of traffic volume on average is 60-80 percent smaller than planned, but it has been increasing constantly since the project was started. Also, in consideration of an increase in passengers of long-distance buses, the road opening can be evaluated as having contributed much to the vitalization of logistics and traffic conditions.

(3) Travel Time

The original plan and the actual achievements in running time and average speed are as follows:

Table 6 Change in Travel Time and Speed

Item	At Appraisal(1995)	Original	Actual(2009)
Travel Time Saved	6-8 Hrs. Required	4.1Hrs. Shortened	Summer: 4.39Hrs. Winter: 4.15 Hrs. Shortened
Average Speed First-class Road Second-class Road	 24km/h 33km/h	 70km/h 60km/h	 89.5km/h 67.5km/h

Source: Heida Road Administration Office/ Running time at appraisal is based on the survey results with beneficiaries.

Travel time was shortened as planned, and also average running speed could be attained as planned. At the time of the Field Study, the evaluator actually drove this road section, and could reach the destination in less than four hours to find the required time shortened by half as against eight hours before the road reconstruction. As seen from the above table provided by the executing agency, clear effect on travel time was confirmed[8].

The beneficiary survey with express companies showed that all respondents were satisfied with the improvement in road conditions (compared to that before the project). The reasons were, shortened travel time between Heihe and Beian (Before project:10 hours/ After the project about 4.36 hours), lowered risk of accidents, and saving overall transportation cost.

(4) Traffic Accidents

As a result of the road construction, the incidence of traffic accidents was reduced down to the 30 percent-level (decreased by 70 percent) compared to before construction. This achievement cleared the appraisal goal set at 60 percent decrease during the design stage. A great improvement was seen in the incidence of traffic accidents in relation to the average traffic volume.

Table 7 Number of Traffic Accidents on Target Section

Year	At Appraisal (1995)	2004	2005	2006	2007	2008	2009
Accidents	80	24	21	20	25	20	18
Comparison w/ Appraisal		30%	26%	25%	31%	25%	23%
Incidence	3.5%	1.59%	1.29%	1.11%	1.36%	0.93%	0.75%
Dead	25	18	20	18	15	15	12
Wounded	50	20	22	26	22	18	10

Source: Heida Road Administration Office

[8] According to Heihe Road Administration Office (Transportation Dept. of City Government), the time required between Harbin and Heihe was shortened from 13 hours to 7.5 hours as a result of the road opening. The time required for the same route by the railway is about 12 hours.

According to the executing agency, safety campaigns were strengthened, following in the wake of the road reconstruction, and this step contributed much to the decrease in incidence of accidents. The measures taken in this line were that the traffic police formed a team for expressways, placed signposts of speed limits, increased patrol frequency by patrol cars[9], and intensified inspection of trucks carrying overcapacity cargoes.

3.3.1.2 Results of Calculations of Internal Rates of Return (IRR)

Recalculation of the economic internal rate of return (EIRR) of this project was made with the following assumptions, since no detailed data on the calculation method at appraisal were available. The result obtained was 18.3 percent as shown below, a little better than 17.4 percent in the original plan. Simple comparison is difficult because of the difference in calculation assumptions, but the shortening of travel time and reduction in transportation cost brought about by the road construction were conspicuous. It is concluded, therefore, that the economic benefits expected at the time of the plan were obtained.

Table 8 Recalculation of Economic Internal Rate of Return (EIRR)

(1) Economic Internal Rate of Return (EIRR) 17.4% at Appraisal	18.3% at Ex-Post Evaluation
(2) Economic Benefits 1) Travel time shortening effect 2) Travel distance shortening effect 3) Economic effect through decrease in accidents 4) Economic effect through expansion of road network	(3) Economic Cost 1) Converted economic cost of initial investment 2) Converted economic cost of operation and maintenance costs

3.3.2 Qualitative Effect

In interviews during beneficiary survey, favorable opinions were expressed by them in that opportunities for human communications were enlarged, as more frequent bus services resulting from the road reconstruction enabled them to go to other cities on day trips to see their relatives and friends. Also qualitative improvements in comfort and safety were evaluated as an effect of the road reconstruction. It is evident that the road construction made a certain contribution to the qualitative improvement in society and

[9] In driving the target section, the evaluator often could see patrol cars on alert and lookout along the road, and had the impression that they were stationed in many more places than on other roads.

human life.

In general, although the traffic volume remains 60 percent of the original plan, a high evaluation could be made for successful road reconstruction in that travel time and distance saved and that bus services, truck services and passengers were increased as a result of the road opening. As the toll has been made free since 2009, a certain degree of growth can be expected for the traffic volume in the future. Moreover, the incidence of traffic accidents has been on the decrease, and no negative effects due to the road reconstruction have so far been reported.

This project has largely achieved its objectives, therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts (Regional Economic Development)

3.4.1.1 Promotion of Border Trade with Russia

The total foreign trade of Heihe amounted to $1.297 billion in the time frame of January - September, 2009. It occupied 14 percent of the total export/import amount of Heilongjiang. The main import items are structural steel scraps and pulpwood, while the main export items are machinery and electric products as well as clothes, which occupy half of the total exports. The export/import amount fluctuates largely year after year under the influence of economic conditions, but this amount in the past few years has been doubled as compared with the level in 1995. The number of people entering into and departing from China is showing steady growth, totaling about 1.4 million in 2008. This figure is four times larger than that in 1995 before this project was started. All these phenomena reflect rapid growth of Heihe as a base of the border trade and international exchange with Russia.

Table 9 Export/Import Amount in Heihe

	Export/Import			People Entering into / Departing from China
	Total	Import	Export	Total
1995	158,557	116,098	42,459	376,773
2003	216,900	135,486	81,414	407,100
2004	372,075	253,675	118,400	627,923
2005	443,941	315,846	128,095	920,025
2006	296,503	129,023	167,480	1,085,125
2007	386,122	130,148	255,974	1,262,924
2008	337,485	61,127	276,358	1,398,812
2009	207,815	57,506	150,309	867,447

Source: Heihe Custom Office

Note: 2009= January-September

Heihe City is implementing measures for promoting foreign trade, having a free trade zone in its downtown and admitting visa-free travel of Russians. Many Russians come to Heihe from the neighboring city Blagoveshensk for shopping or sightseeing. It has a shopping mall where there are many electric appliances and clothing shops. These products come from various areas of China. Some shops are run by people from South China. It was learned from interviews with express companies that these products are carried here by trucks and by railway. In this connection, they evaluate highly the road construction from the aspect of logistics. There is a sightseeing spot called Wudalianchi City, which is famous for hot springs, in two-hour driving distance southward from Heihe. Blagoveshensk dispatches a sightseeing bus going straight to Wudalianchi, and sightseers enjoying hot springs are on the increase. This prosperity can be evaluated as one of the good effects brought about by the road reconstruction.

Fig. 11 Shopping Mall in Heihe

Fig. 12 Grocery Shops Handling Russian Products

3.4.1.2 Growth of Regional Economy

The main economic statistics in Heihe show that both GRDP and per capita GDP are growing far larger than the level at the time of the project planning and that the scale of the transportation and telecommunications sectors has grown three times larger. The growth of the border trade with Russia and international exchange with the Russians is considered to have made Heihe what it is today.

Table 10 Main Economic Indexes

(Unit: per capita GDP by Chinese yuan, the other indexes by 10 thousand Chinese yuan)

		1995	2003	2004	2005	2006	2007
GRDP	Results	573,921	914,289	1,059,846	1,204,960	1,389,153	1,663,188
	Growth rate			15.9%	13.7%	15.3%	19.7%
Transportation/ Telecommunications	Results	32,541	98,498	107,650	77,773	82,019	90,999
	Growth rate			9.3%	-27.8%	5.5%	10.9%
Wholesale/Retail /Trade/Restaurants	Results	50,022	87,184	91,185	101,024	111,665	129,945
	Growth rate			5%	11%	11%	16%
Per capita GDP	Results	3,549	5,264	6,098	6,911	7,981	9,573
	Growth rate			15.8%	13.3%	15.5%	19.9%

Source: Heilongjiang Statistics Almanac

3.4.1.3 Benefits for Regional Residents

In parallel with economic growth in Heihe, the average income of impoverished residents in agricultural villages is also on the increase. The table below shows chronological changes in the income of the residents in agricultural villages in main cities and counties in Heihe district. It can be seen that the average income in this area has been almost doubled as compared with the level in 2003. The growth rate of the income in entire Heilongjiang is about 65 percent during the same period, and it is thus noticeable that growth in Heihe is far better than the level in Heilongjiang as a whole. The survey with beneficiaries revealed that some of them expressed appreciation for increased work opportunities in this area as trade and economic activities were vitalized. In interviews conducted at the time of the Field Study, some of the respondents evaluated highly this growth trend in that residents in agricultural villages are having more opportunities to go to Heihe area for work and to open shops in the shopping mall for Russian visitors.

Table 11 Chronological Changes in Income of Residents in Agricultural Villages in Main Cities and Counties in Heihe Area

(Unit: Chinese yuan)

	Heihe City	Beian City	Wudalianchi City	Nenjiang Xian	Xunke Xian	Sunwu Xian	Average	Heilong-Jiang Province
2003	1,831	1,971	1,500	1,817	3,050	1,202	1,895	2,509
2004	2,609	2,778	2,515	2,841	3,705	1,869	2,720	3,005
2005	3,323	3,217	3,000	3,808	3,934	1,937	3,203	3,221
2006	3,505	3,412	3,180	4,026	3,707	1,995	3,304	3,552
2007	3,947	4,003	4,067	4,356	3,893	2,154	3,737	4,132

Source: Heilongjiang Statistics Almanac

It is difficult to exactly identify what direct influence this project gave to such growth because there is an external factor represented by economic growth in China as a whole. Meanwhile, the growth rate of income in Heihe area is higher than that in entire Heilongjiang, as mentioned above. As a major public undertaking, this project has built up part of the main road as one of the key infrastructures indispensable for promotion of foreign trade, for instance, and in this sense can be evaluated as having played an important role in supporting high growth in the Heihe area.

3.4.2. Other Impacts

It was pointed out that this project may have impact on the natural environment due to outflow of soil, noise and vibration during reconstruction and noise and air pollution thereafter. In the planning stage, a report was prepared concerning evaluation on the influence of the project on the environment, and this project was carried out with approval from the National Environmental Protection Department. Certain measures were taken to mitigate noise by means of planting trees and placing a median divider strip and to prevent outflow surface water by means of setting up a drainage way. There have so far been no particular problems.

Therefore, this project, having played an important role to establish a key infrastructure through the road reconstruction, contributes much to the economic growth of Heihe area as a center of border trade.

3.5 Sustainability (Rating: a)

3.5.1 Structural Aspects of Operation and Maintenance

This project was carried out by Heibei Highway Construction Co., Ltd. under the control of Heilongjiang Government. This company is a national enterprise entirely owned by Heilongjiang Government and an enterprise owned by Heihe City Government as its stockholders. Up until now there has been no substantial change in its operation and maintenance, but this company changed its name to “Heida Road Administration Office” after this project was completed, and assumes the responsibility of administering and maintaining the roads under its control. It is in the scope of this office’s responsibility to upgrade the roads under its control into expressways, as mentioned above in “3.1 Relevance.” At the time of planning this project, there was a rumor that Heibei Road Construction might be reorganized into a private company, but the evaluator confirmed that there is no such possibility at this stage. Considering the strong push by the central government as seen on the move of upgrading the project section to highway, toll-free policy, this office is likely to maintain current form of management.

3.5.2. Technical Aspects of Operation and Maintenance

Heida Road Administration Office has five tollhouses in the section under its control with 40-45 staff members stationed in each tollhouse, totaling up to 214 members engaged in administration and maintenance works. Even after the toll was made free, this regime is maintained with the number of staff members kept at an appropriate scale. The executing agency that controls a number of road construction projects in Heilongjiang, has enough experience in operation and maintenance, and no problem has so far been seen in its technical and managerial abilities.

Table 12 Stationing of Road Administration Staff Members (December, 2009)

	Section on duty	Number of staff
Heihe Tollhouse	37km	45
Caoji Tollhouse	54km	42
Sunwu Tollhouse	53km	42
Xiaoxingan Tollhouse	44km	40
Nemor Tollhouse	53km	45
Total	241km	214

Source: Heida Road Administration Office

Since the toll was made free in and after June 2009, collection of tolls has been abolished. The main works of staff are the administration of the speed control system and maintenance of the roads.

3.5.3 Financial Aspects of Operation and Maintenance

The operation and maintenance of this project are supported financially by the government. Up until recently, certain autonomous operation was conducted with the income of tolls used for the maintenance and repair of the roads. The table below shows the details of the tolls collected and the expenses incurred for repair and maintenance of the roads in 2003-2009. As will be seen from this, the direct expenses for repair and maintenance of the roads could be covered by the tolls collected[10].

There was an answer from a staff of the Traffic Department, Heilongjiang Government that reasonable financial support will continue to be obtained from the government

[10] The total amount for operation including personnel expenses was not disclosed.

Table 13 Tolls Collected and Road Maintenance Expenses in Each Year

(Unit: Chinese yuan)

Year	2003	2004	2005	2006	2007	2008	2009
Tolls Collected	663	3,762	4,237	5,361	5,563	7,227	2,014
Maintenance Expenses	962	2,227	1,942	2,156	1,946	2,538	2,587

Source: Heida Road Administration Office

According to the above staff of the Traffic Department, the self-supporting operation dependent on the income of tolls is out of the plan from the outset. The construction and maintenance of roads under the national policy have so far been supported financially by the government. As tolls have been made free since 2009, the government is to assume 100 percent financial responsibility. Heida Road Administration Office responded that there is no problem in operation and maintenance with the current budget, and that it is supported appropriately with government finances.

As already mentioned in "3.1 Relevance", the road in the target section was constructed as a series of the road maintenance plan of Heilongjiang, and the upgrade of this section into expressways was carried out for more convenience. The Traffic Department published a comment to emphasize the importance of this section, and this comment is backed up by the policy of upgrading some other roads into expressways additionally. It is considered, therefore, that financial support to this section is continued at an appropriate level.

3.5.4 Current Status of Operation and Maintenance

At the time of the Field Study in April 2010, the evaluator drove the target section, and checked to make sure of the road conditions and the status of the equipment for maintenance. The road conditions were kept good in general, although cracks were found in certain areas. According to the executing agency, there is a frozen soil layer in the stratum in this target section, and in spring when frozen soil begins to melt, cracks are liable to occur. Maintenance works are performed periodically without particular problems[11].

[11] Repair of cracks is conducted by using repair materials or re-paving.

Fig. 13 Bulldozer of Maintenance Office

Fig. 14 Cracks on Road Surface

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aims to reconstruct the road over a section that is very important for foreign trade and economic development in Heilongjiang, and therefore, it will continue to be important. Efficiency in the process of project implementation is deemed to be high in that appropriate construction methods have been adopted and so on. The traffic volume has displayed steady growth for the past several years, and this project has exerted favorable influence on the regional economy with remarkable increases in cargo and passengers. The support prioritization by the government is high on this project, and it is expected that a pertinent operation and maintenance setup will be secured.
In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to Executing Agency

Now that there are plans to upgrade more and more roads into expressways, a scheme needs to be established to have data useful for predicting traffic volume and demand. Availability of reliable data is very important to verify the needs of the project plan and to determine the scale of the project.

4.2.2 Recommendations to JICA

Nothing in particular.

4.3 Lessons Learned

This project was completed in a shorter period than planned, even though its location in a cold area placed constraints on the works period. This successful achievement is attributable to the factors of having made contracts with the contractors with good experiences in cold areas, having employed proper construction and administration methods with the cooperation of the executing agency and having been able to work with contractors possessing high management abilities in project administration. When carrying out a project in a cold area, steadfast administration by the executing agency is a very important factor for influencing its efficiency.

Concluded

Comparison of the Original and Actual Scope of the project

Item	Original	Actual
1.Project Outputs		
(1) Section	242.1km in total	240.5km in total
First-class road	37.1km	36.9km
Second-class road	204.9km	203.65km
(2) Number of lanes		
First-class road	Both ways 4 lanes (25.5m wide)	As planned
Second-class road	Both ways 2 lanes (12.0m wide)	As planned
(3) Bridges		
Large	12 (27,97m)	14 (3,136m)
Middle	13 (751m)	9 (630.6m)
Small	18 (524m)	22 (788.42m)
(4) Interchange	2	3
(5) Service area	1	As planned
(6) Tollhouse	5	As planned
(7) Maintenance and Administration	wrecker trucks & 4 road rollers	As planned
(8) Consulting service	30M/M (including overseas training 10M/M)	17.5M/M
2.Project Period	March, 2001-October, 2003 (32 months)	July, 2001-October, 2003 (28 months)
3.Project Cost		
Amount paid in Foreign currency	12,608 million yen	12,187 million yen
Amount paid in Local currency	8,281 million yen (637 million yuan)	8,253 million yen (543 million yuan)
Total	20,890 million yen	20,441 million yen
Japanese ODA loan Portion	12,608 million yen	12,187 million yen
Exchange rate*	1 yuan = 13 yen (As of April, 2001)	1 yuan = 15.2 yen (Average July, 2001 - October, 2003)

* The Japanese ODA loan in this project was provided by foreign currency, all in Japanese yen. The above exchange rate was calculated as an average of the rate on the project starting date and the rate on the completion date.