China

Qiqihar Nenjiang River Highway Bridge Construction Project

Report Date: October, 2002
Field Survey: August, 2001

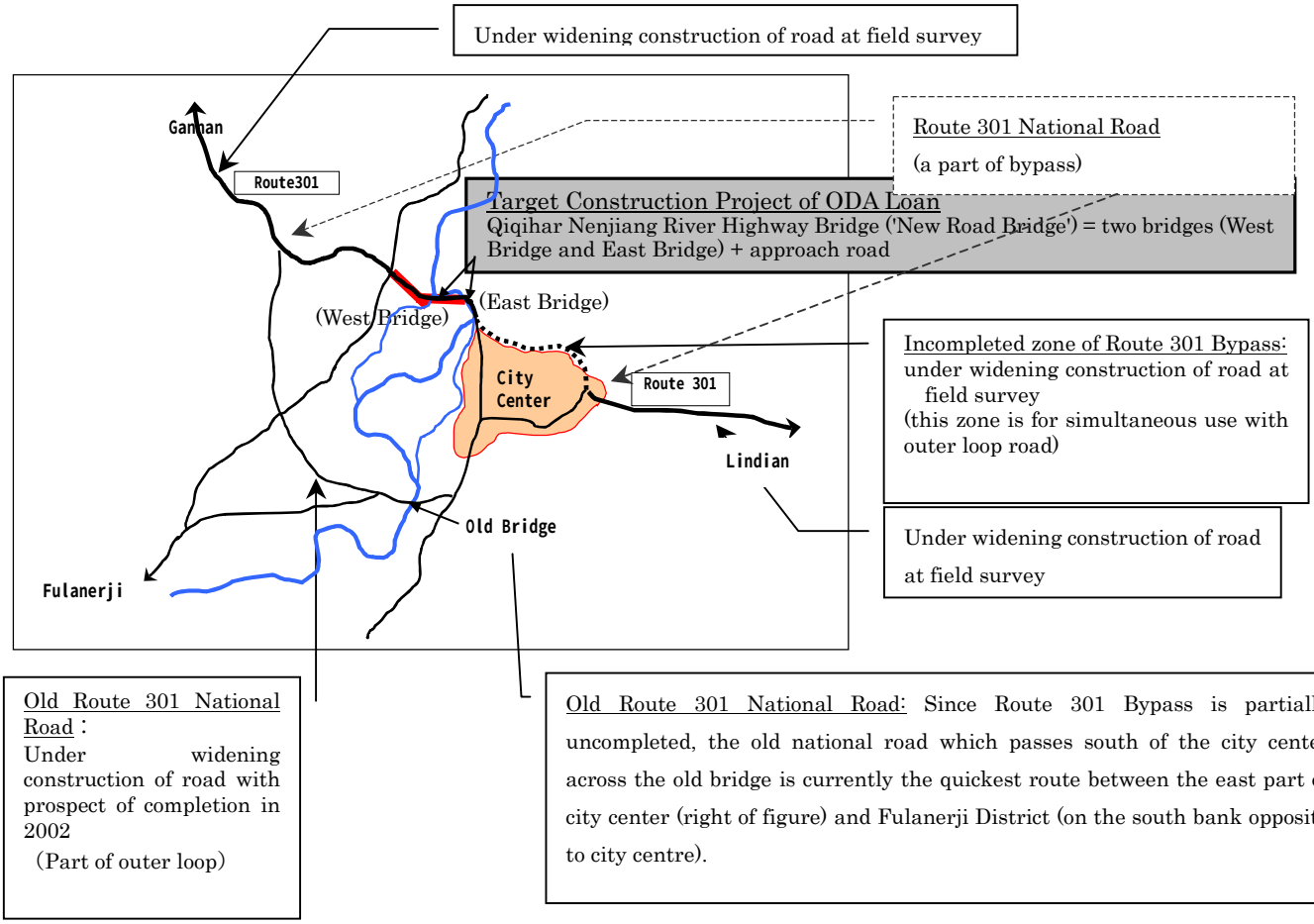
1. Project Profile and Japan's ODA Loan

Site Map: Qiqihar City, Heilongjiang Province
(Magnified Figure in Below)

Site Photo:Qiqihar Nenjiang River Highway Bridge
(East Bridge)

Sketch Map of the Area of Project Site (Around Qiqihar City Area)

Location of Qiqihar Nenjiang River Highway Bridge (constructed through this project: hereafter 'New Road Bridge'), old road bridge, Route 301 National Road, outer loop road and Qiqihar City area.



1.1 Background

Qiqihar City is a center city of distribution and economy in the western part of Heilongjiang Province. Qiqihar City and its controlling prefectures are an area of heavy industry based on the machine industry. The agglomerative area of major industries spreads separately into the east and west banks of the Nenjiang River which runs between north and south. Particularly, the factories of the heavy industries, which have high level of production are concentrated on the west bank of the Nenjiang River. The situation of the infrastructure developed for crossing the Nenjiang River has been significant for industrial development around the city.

At appraisal, there were two routes which connect east and west of the Qiqihar City area: old Route 301, a national road passing over a ready-made road bridge ('old bridge' hereafter) in the south of the city; and a ferry route connecting the north of the city and its opposite bank. However, the old bridge was opened to traffic in 1935 and therefore more than fifty years have passed since it came into service, and it has become seriously decrepit. Due to one-way traffic alternating according to time and traffic control with vehicles with a weight of more than 10 tons, there have been chronic traffic jams. In the case of the ferry route, since the river is shallow and only small-scale vessels can be used; this made transport capacity poor. In addition, because of the frozen river and ice floes during winter, this route was available only during half of the year. Thus, the transport capacity of both routes of the Nenjinag River was low. This was not only an obstacle for the economic development in this area, but also a reason for lowering the transport capacity of Route 301 which was the only main line across northeast China.

To solve this situation, the Route 301 Bypass, running around Qiqihar city center and across east and west of the city area, and the Qiqihar outer loop road were being constructed. Qiqihar Nenjiang River Highway Bridge (hereafter 'new road bridge'), which was covered by the scope of this project, was a part of the Route 301 Bypass (part of the crossing of the Nenjiang River). Cross-river transportation connecting from the outer loop road via the bypass was also planned.

1.2 Objectives

To construct a new road bridge on the Nenjiang River which runs through the outskirts of Qiqihar City　the second largest city in Heilongjiang Province, to ensure safe and efficient access to the opposite bank area, thereby promoting economic development in Qiqihar City and its surrounding area.

1.3 Project Scope

Construction of concrete bridges across the Nenjiang River (consisting of two bridges, the East Bridge and West Bridge, which are divided by a holm) approach roads, and related bank protection. The ODA loan was to cover the total amount of the foreign currency portion of the project costs.

1.4 Borrower / Executing Agency

Ministry of Foreign Trade and Economic Co-operation of the People's Republic of China／ Ministry of Communications of the People's Republic of China

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	2,100 million yen 2,099 million yen
Date of Exchange of Notes Date of Loan Agreement	October, 1992 October, 1992
Terms and Conditions Interest Rate Repayment Period (Grace Period) Procurement	 2.6% 30 years（10 years） General untied
Final Disbursement Date	November, 1995

2. Results and Evaluation

2.1 Relevance

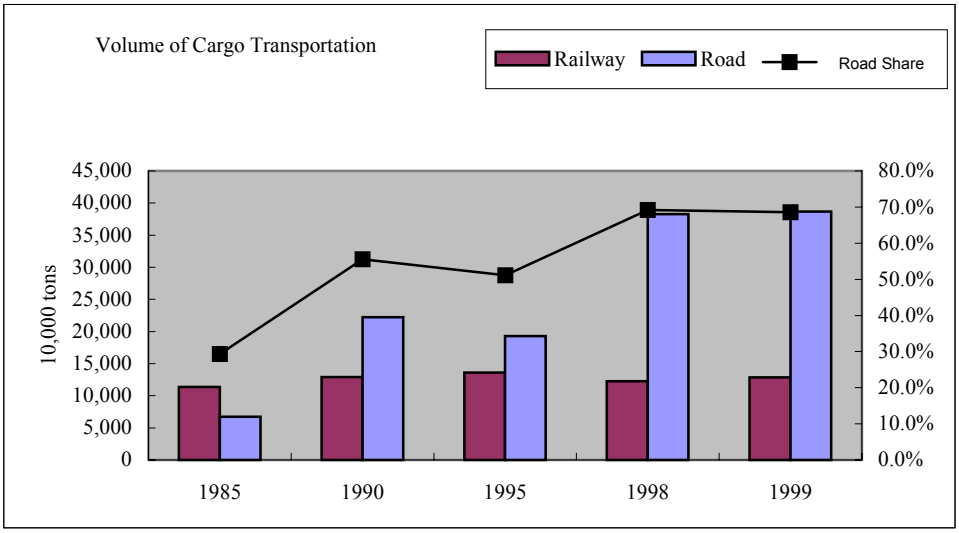
The volume of passengers and cargo through roads in Heilongjiang Province and its share in that of all traffic modes in the province increased between 1985 and 1990 before appraisal. Its increase was particularly outstanding in recent years (see Figure 1). The new road bridge is located on the Route 301 Bypass (the main road crossing west to east in northeast of China), which was being constructed through a development plan of both the central government and the province. Since this project was expected to shorten the transport length in the Bypass section, which is a shortcut in the Northern part of Qiqihar city, by 17 km, it was relevant to the aim at appraisal of establishing an efficient traffic route.

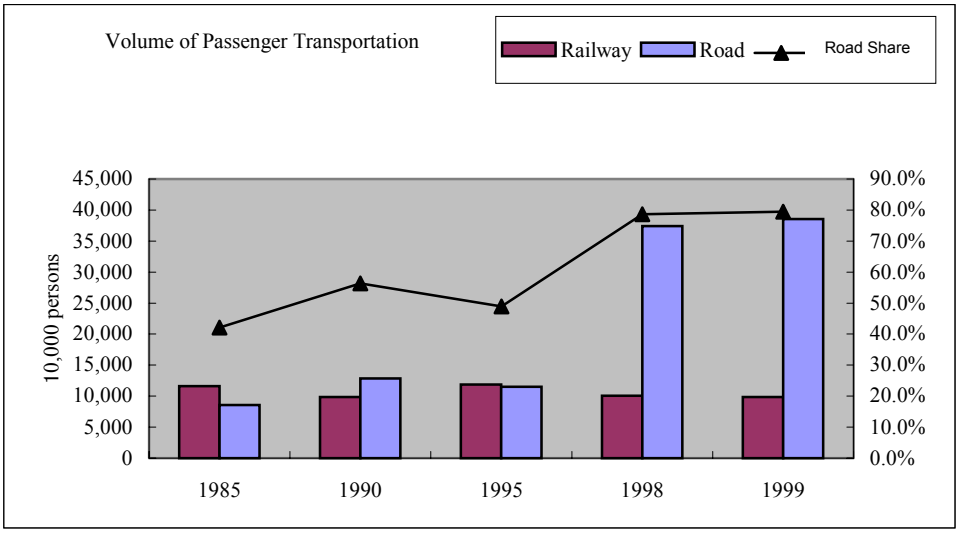
Afterwards, the provincial road investment strategy was revised in 1994, resulting in a relative down-grading of investment priority in the west of the province (including Qiqihar and its surrounding). Nevertheless, despite some delay in the construction of the junction road leading to the new road bridge (out of scope of this project),[1] the relevance of this project still remains as the new road bridge (covered by the project scope) is the only traffic route which crosses the river on the bypass route.

Since it was possible to ensure an alternative traffic route to the old bridge in the case of a natural disaster in the strategic area of Qiqihar City area and northeast of China, as well as to establish bridges which could be used all year, instead of a ferry which is out of service in winter, this project to establish safe traffic routes was relevant at the stage of appraisal, and is relevant still now.

[1] As a development strategy of the province, it was planned at the 1992 appraisal to regionally disperse public investment into road sector in Heilongjiang Province and to construct Route 301 and the outer loop road in Qiqihar City and its surrounding area at an earlier time. However, the road investment strategy at province-level was modified in 1994: investment priority was given to the eastern district of the province such as Harbin. As a result, investment to the western district including Qiqihar was expected to be delayed.

Figure 1: Trends in the Traffic Volume Share in Heilongjiang Province (Cargo and Passengers)





Source: Heilongjiang Yearbook of Statistics for 2000.

Note: The share of transport by road refers to that of passengers and cargo volume.

2.2 Efficiency

2.2.1 Project Scope

Implemented without any modification of the initial plan.

2.2.2 Project Cost

There was cost overrun in the local currency portion of the scope of the ODA loan. However, the province took additional budgetary steps and thus there was no influence on the timing of completion of the construction. Besides, it can be assessed that this project was efficiently implemented.

Regarding the local currency portion of the project (not covered by the ODA loan), there was cost overrun of more than 50 %, increasing the initial 87 million RMB to 131 million RMB. Yet if an average exchange rate (1 yuan = 16.2 yen) is applied, instead of the 1992 exchange rate (1 yuan = 23.4 yen) which the Chinese counterpart used for calculation, the cost overrun of local currency

converted to yen would be less than 5 %.

Due to the cost overrun, the Communication Department of Heilongjiang Province took budgetary steps in the 1996 fiscal year. Reasons given for the cost overrun are, (1) additional construction was necessary to thicken the (paved) surface of the approach road appropriately because the geological survey at the planning stage had been inadequate, and (2) the consumer price index increased 13 % on an annual average between 1991 and 1995.

2.2.3 Implementation Schedule

Construction was completed in September 1995 one month earlier than planned.

2.3 Effectiveness

This section assesses the degree to which the project objectives were achieced: to construct the Qiqihar Nenjiang River Highway Bridge on the Nenjiang River and to assure a safe and efficient traffic route to the opposite bank area.

1) The Establishment of a Safe and Efficient Traffic Route

As explained in the section 'Relevance', the new road bridge is located on the Route 301 Bypass which is equivalent to a main line crossing west to east in northeast China. As a result of this project, its haul distance was shortened by 17 km in the Bypass section which is a shortcut in the Northern part of Qiqihar city. Before September 1995 when new road bridge was opened to traffic, the ferry and the old bridge were the means of crossing the Nenjiang River. However the ferry ran only for seven months from spring to autumn, offering no service for five months in winter. As regards the operation of the ferry at appraisal, there were four ferries, the number of cars which could be loaded on each ferry were 28, and it took one hour and 20 minutes to cross the river including waiting time. This, the transport capacity of the ferry was low and inefficient. In addition, at appraisal, due to its decrepitude, old bridge imposed weight limits on vehicles of more than 10 tons.[2] In such a situation, because the new road bridge enables passage in winter time as well as accommodating vehicles up to 20 tons, it can be said that the objectives of this project to establish a safe and efficient traffic route has been achieved. In particular, when floods hit China in August 1998,[3] both sides of the approach of old bridge were damaged by soil erosion, causing service interruption for half month. By contrast, the new road bridge suffered from no critical damage; therefore it can be surmised that a safe transport route, which is sustainable from the same level of disasters, had been established. If the fact is considered that there existed no alternative means of transport except the ferry without the construction of a new road bridge, construction could be said to have contributed to the establishment of an alternative traffic route to the old bridge. The ferry service was abolished in 1995 upon the opening of the new road bridge.

2) Traffic Volume

The initial plan at appraisal foresaw the traffic volume of the new road bridge at 2.786 million cars annually in 2000,[4] but the actual volume (see Figure 2) was less than half of this —1.3 million cars in annually 2000 [5]

---

[2] At the time of the field survey, despite weight limits of more than 10 ton, in fact vehicles of a special type with more than 15 tons ran over the old bridge. Thus, the weight limits were not strictly applied in practical terms. Yet the number of vehicles of that special type currently passing over the old bridge seems to be less than that of the new bridge.

[3] Qiqihar Nenjiang River Highway Bridge was opened to traffic on 19 September 1995.

[4] On completion, the implementing agency made a downward revision of the traffic volume when a road bridge was constructed on the Nenjiang River. For example, as regards the estimation of the traffic volume in 2000, it was 2.786 million cars annually at appraisal, but 1.678 million cars annually after revision. As for reasons for this downward revision, the Nenjiang Road and Bridge Administration Department of the Qiqihar Municipal Government, in charge of management and operation of the bridges, points out: (1) the City was defined as a key heavy industrial city under economy planning system, therefore its transition to a market economy has been slow, making the regional economy grow less than expected; and (2) the development of Route 301 is delayed.

[5] Calculated by the number of cars which were actually counted at the toll booth. Since there are just one-way toll booths for the

It is estimated that it is because the volume of cross-river traffic saw a sluggish growth, that the traffic volume did not shift from the old bridge to the new road bridge as expected at appraisal. As data demonstrates, although the original estimate for total traffic volume of the new and old road bridge in 2000 was 4.315 million cars (1.529 million cars for the old bridge and 2.786 million for the new road bridge), actual traffic volume in 2000 was 2.6 million cars (1.3 million for old and 1.3 million for new), illustrating a lower growth in the traffic volume of both bridges[6] as well as a lower share of the total traffic volume for the new road bridge than expected.

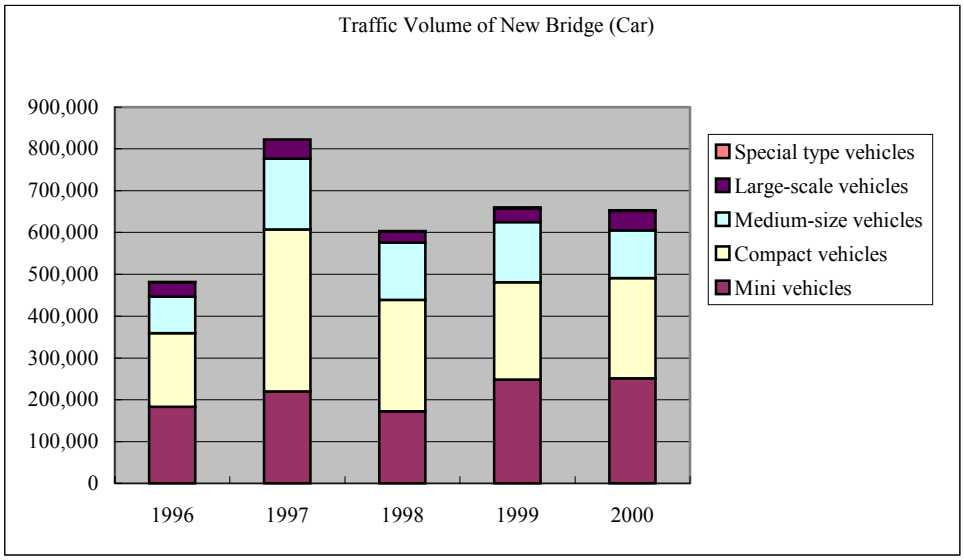
Major reasons why the traffic volume did not shift from the old bridge to the new road bridge as much as expected were a delay in the construction of connecting roads such as Route 301 and the Qiqihar outer loop road, the influence of the widening of surrounding roads after 1999, and lower than expected economic improvements around Qiqihar City. In addition, weight controls were more loosely imposed than initially expected, and traffic to the opposite bank such as to the Fulanerji industrial park preferred access to the convenient old bridge over the new road bridge, making less of a shift in traffic from the old to the new road bridge. This can be also counted as one of the reasons.

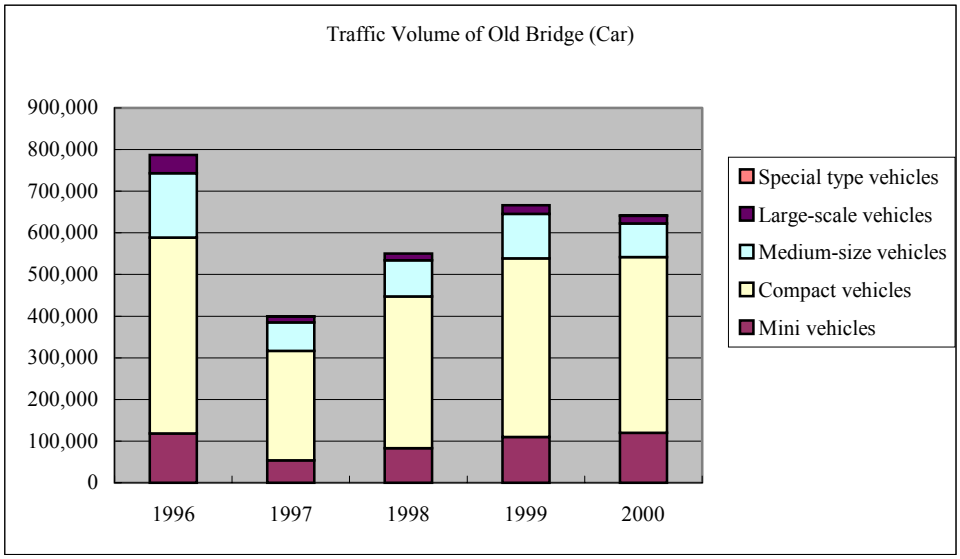
city center, by doubling the number of 650,000 cars (the annual volume of the one-way traffic), the total traffic volume of the year was calculated at 1.3 million.

[6] Comparison of actual traffic volume before and after the opening of the new road bridge also reveals an actual total traffic volume (old + new road bridges) after the opening (2.786 million cars in 2000) which is less than the total traffic volume (ferry + old bridge) before the opening (3.108 million in 1991). This proves that the traffic volume itself decreased.

Figure 2: Traffic Volume of the New and Old Road Bridges

(Both volumes were counted at the toll booth to city center = one way traffic)





Source: Nenjiang Road and Bridge Administration Dept. Qiqihar Municipal Government.

Note: 1) Although the traffic volume of the old bridge decreased in 1997, it seems that this was because of the three month refurbishment of the bridge (painting of bridge and improvement work of approach road). The decrease in 1998 would be because of a natural disaster.

2) The classification of vehicles from special type to mini vehicle is as following.

Vehicles of special type = motor lorries with more than 15 tons

Large-scale Vehicles = motor lorries from 7.5 tons to 14 tons, buses with more than 40 seats

Medium-size Vehicles = motor lorries from 2.5 tons to 7 tons, buses with between 20 and 39 seats

Compact Vehicles = passenger cars with less than 5 seats, motor lorries with less than 2 tons, mini-buses with from 6 to 19 seats, tractors with more than 21 hp

Mini vehicles = motor cycles, cow carriages, tractors with less than 20 hp

As regards the construction of surrounding roads, the necessity of expanding the following connecting road in order to enhance the effect of the construction of this road bridge was pointed out at appraisal. Firstly, it was planned to respond to the increasing traffic by constructing this road bridge through the expansion of the connecting road in Qiqihar City, while it was also planned to construct

an outer loop bypass in order to make traffic in the city run more smoothly. This was expected to be completed in 1994. Secondly, since the new road bridge was supposed to be a part of the Route 301 Bypass, by improving the bypass from Lindian to Gannan, the impact of this improvement schedule (except for the new road bridge) on the outcome of this project were expected to be great (the zone Lindian–Qiqihar was expected to be completed by the end of 1992 and Qiqihar–Gannan by 1995). During the field survey, the improvement of these connecting roads (the Qiqihar outer loop road and Route 301) was, although it had been suspended by changes in development strategy in the province, under construction.

3) Financial Internal Return Rate

In appraising, the financial internal return rate (FIRR) of this project was estimated at 11.1 % by identifying the benefits of the tolls. So far, traffic volume has been less than the expected level at appraisal and costs (investments) considerably overrun benefits, therefore it is unlikely that we can obtain significant results by recalculation.

4) Economic internal return rate

At appraisal, the economic internal return rate (EIRR) of this project was calculated at 10.4 % by identifying the benefits of the shortened haul distance and transit time as well as the decreased maintenance expense for the ferry. Since traffic volume did not reach the expected level at appraisal, it was recalculated at 1.8 %.

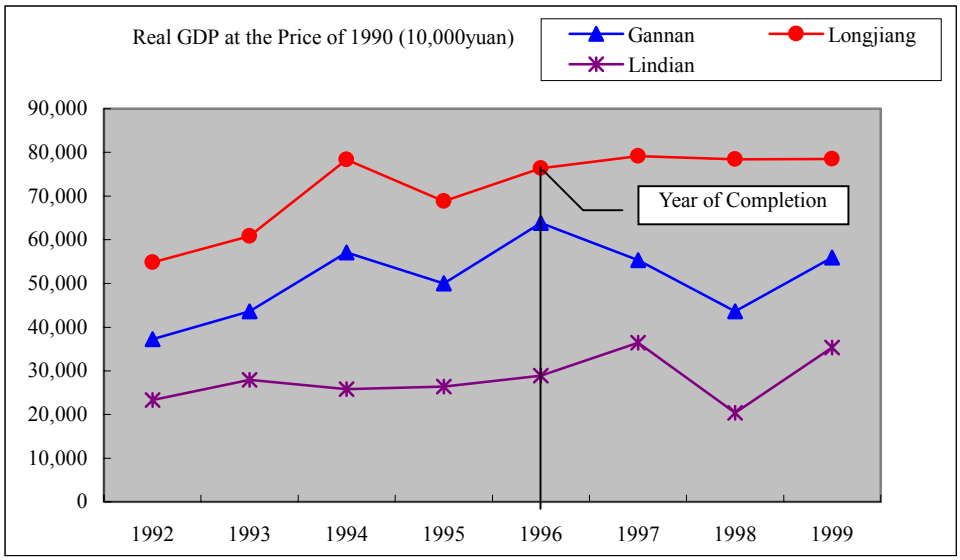
Preconditions
Project life: 20 years after completion
Benefits: shortened transit time after this project, and lessened maintenance expense for the ferry
Costs: initial investments + maintenance expense

2.4 Impact

1) Economic Impacts

This project was expected to 'promote economic development in Qiqihar City and its surrounding area' (overall goals) by constructing 'new road bridge on the Nenjiang River […] to ensure safe and efficient access to the opposite bank area' (project objectives). Among the prefectures under Qiqihar City, those which might be affected by project completion would be Gannan, Longjiang and Lindian which neighbor the road bridge. The following shows the trends in real GDP (the amount of added value) of the three prefectures.

Figure 3: Trends in GDP of the Three Neighboring Prefectures



Source: Heilongjiang Yearbook of Statistics for 2000.

There was a growth in 1996, the year after completion. However, judging only from the statistical data, the effect on economic growth in these areas is still unclear.

2) Impacts on the Environment and Residential Resettlement

As regards environmental impacts, the Environmental Protection Bureau of the Qiqihar Municipal Government conducted environmental research in November 1990 and published results in May 1991. At the time of the appraisal, it was confirmed that the expected effects were supposed to meet the domestic environmental standard in China, and that the Environment Monitor and Inspection Bureau of the Qiqihar Government had a plan to carry out regular environmental research on environment conservation measures every three months. Nonetheless, according to the Nenjiang Road and Bridge Administration Department of the Qiqihar Municipal Government (a subordinate organization of the Communication Department of Qiqihar Municipal Government), which is in charge of the management of the new road bridge, environmental monitoring had not been undertaken until the time of the field survey. Due to the fact that there is currently less traffic volume than expected, more serious impacts on environment than were expected are unlikely to appear. However, if the volume of traffic increases in the future, the implementation of monitoring should be considered.

In this project, residential relocation and resettlement (25 households, 103 residents) were required for the construction of the approach road at the eastern side of East Bridge. The plan for residential resettlement and compensation was drawn up by the City of Qiqihar, was implemented by the Land Administration Bureau of the Qiqihar Municipal Government, and completed in 1990. Compensation was made not in the form of provision of alternative land but by money. No problems were reported.[7]

2.5 Sustainability

1) Maintenance System

At appraisal, it had been understood that the High-grade Road Administration Bureau of Heilongjiang Province would be in charge of maintenance, but, at the field survey, it was the Nenjiang Road and Bridge Administration Dept. of the Qiqihar Municipal Government, a subordinate organization of the Communication Department of Qiqihar Municipal Government, that was in charge of the maintenance of the road bridge. The Nenjiang Road and Bridge Administration

[7] At appraisal, the group of residents for resettlement was targeted to be wage workers in Qiqihar City. It was confirmed that no changes in vocation and living conditions were caused.

Department employs 170 staff,[8] maintaining two road bridges: the new road bridge (the Nenjiang River Bridge) constructed by this project and the old bridge (the steel bridge). Besides 170 staff, 20 to 30 temporary staff were employed for 6 months annually, mainly for works such as cleaning, snow removal and anti-icing measures.

Daily cleaning is the main service related to maintenance. Railing paint is reapplied once every 4 years. Light bulbs are replaced as needed. Toll booths are manned in three alternating shifts while its maintenance works are conducted only during the day-time. There seems to be no problem with maintenance.

2) Financial Conditions

Financial conditions during the past four fiscal years are shown in Table 4. After three revisions of the fares, both income and profit are increasing every year. Income includes that of the new and old bridges. The share of each bridge in 2000 is in equilibrium: each occupies 50 % of the total income. The old bridge as well as the new road bridge began taking tolls, thus increasing profitability. It can be evaluated therefore that there is a financial sustainability.

The maintenance costs are currently covered by income from tolls. Conceptual profit and loss, which are obtained by deducing costs from income, remain as a surplus. The surplus is paid to the City Government. In the case of a deficit, necessary expenditure is supposed to be arranged from the budget of the City Government.

Table 4: Income Statement of the Nenjiang Road and Bridge Administration Dept.

	1997	1998	1999	2000
Revenue	9,226	9,191	11,621	
From Tolls	9,226	9,191	11,609	15,314
Of New Bridge	6,519	5,468	5,636	7,703
Of Old Bridge	2,707	3,723	5,974	7,611
Expense	8,547	8,906	10,269	11,607
Net Profit	679	284	1,351	3,706

Source: Nenjiang Road and Bridge Administration Dept. of Qiqihar.

Note: Fiscal year is from 1 January to 31 December.

3. Lessons Learned

None.

4. Recommendations

None.

[8] The operation of the ferry, abolished upon the opening of the road bridge, was under the Communication Department of the City of Qiqihar. At abolishment, 70 staff of the Communication Department who had been in charge of ferry operation were transferred to the current Nenjiang Road and Bridge Administration Dept.

Comparison of Original Plan and Actual Scope

Item	Plan	Actual
①Project Scope (A) Bridges (B) Approach Road (C) Bank Protection	(a) East Road Length: 1,057 m Width: 17 m Lanes: 4 lanes (b)West Bridge Length: 577 m Width: 17 m Lanes: 4 lanes Total Length: 6,442 m Grade: 1st Grade Width: 15 m Lanes: lanes Total length: 1,407 m	Same as plan
②Implementation Schedule	April, 1991～October, 1995	April, 1991～September, 1995
③Project Cost Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 2,100 million yen 2,036 million yen (= 87 million yuan) 4,136 million yen 2,100 million yen 1 yuan＝23.4 yen （as of April, 1992）	 2,100 million yen 3,076 million yen (=131.45 million yuan) 5,176 million yen 2,100 million yen 1 yuan＝23.4 yen （as of April, 1992）