China

"Hengshui-Shangqiu Railway Construction Project (I) ~ (IV)"

Project Summary

Borrower	Ministry of Foreign Trade and Economic Cooperation of P.R.C.
Executing Agency	Ministry of Railways of P.R.C.
Exchange of Notes	March 1991 ~ August 1993
Date of Loan Agreement	March 1991 ~ August 1993
Final Disbursement Date	September 1998
Loan Amount	¥23,603 million
Loan Disbursed Amount	¥22,216 million
Procurement Conditions	General Untied
Loan Conditions	Interest Rate: 2.6% (interest rate was 2.5% for Phase I) Repayment Period: 30 years (10 years for grace period)

<Reference>

(1) Currency: Yuan

(2) Exchange Rate: (IFS annual average market rate)

Year		1991	1992	1993	1994	1995	1996	1997	1998
Rate	Yuan/US$	5.32	5.51	5.76	8.62	8.35	8.31	8.29	8.28
	Yen/US$	134.71	126.65	111.20	102.21	94.06	108.78	120.99	130.91
	Yuan/Yen	25.32	22.99	19.31	11.86	11.26	13.09	14.59	15.81
CPI		100	106.3	121.8	151.3	176.9	191.6	197.0	195.4

(3) Rate at the time of appraisal: 1 yuan = ¥34.4, 1US$ = ¥146 (at the time of appraisal in 1990)
1 yuan = ¥20.9, 1US$ = ¥121 (at the time of appraisal in 1993)

(4) Fiscal Year: January ~ December

Foreword

"Hengshui-Shangqiu Railway Construction Project (I)~(IV)" (hereinafter referred to as "the project"), was originally planned with the objective of increasing China's coal transportation capacity. As the project later became a segment of the Beijing-Kowloon (Hong Kong) Railway, it came to have effects of including developments along the route, which were not anticipated before. Therefore, of all the project's effects, this evaluation will focus on its impact on development along the route. The evaluation has been commissioned to the State Department Development Research Center, one of China's leading investigating research agencies.

The State Department Development Research Center is a policy research institute directly responsible to the State Department. As a national research agency, it is used to study openness policies, the national economy and social development, and is involved in the central government's decision-making processes, such as the preparation of the Five-Year Plans. Dr. Lin Jiabin, an expert in regional economy, is Deputy Director at the Development Strategy and Regional Economy Research Department.

1. Project Summary

1.1 Project Location

The project spans three provinces: Hebei, Shandong and Henan. The new line starts in Hengshui in Hebei province, runs south through Hebei and Shandong provinces and finishes in Shangqiu, Henan province, covering a total length of 401km.

The Hengshui - Shangqiu railway hereinafter (referred as the Hengshang Line) is located midway between the Beijing - Guangzhou railway (the Jingguang Line) and the Beijing - Shanghai railway (the Jingko Line[1]), marking the third trunkline between China's northern and southeastern areas.

The Hengshang Line, which branches from the Shide Line that links Dezhou in Shandong province and Shijizhuang in Hebei province, runs almost due south. It passes through Linqing and enters Shandong province, passing to the west of Liaocheng and crossing Yanggu to reach Taiqian in Henan province. There it crosses the Huanghe River and passes through Heze to reach Shangqiu in Henan province. At this point it joins the Longhai Line, which joins Lianyungang Port in Jiangsu province in the east to Lanzhou, Gansu Province in the west.

1.2 Project Summary and ODA Loan Portion

The project aims to expand the coal supply capacity to the southeast of China and its coastal industrial zones, and to strengthen the country's north-south transport capacity. It was constructed as a bypass route for the Jingguang and Jingko Lines, which were already laden to capacity.

The project is comprised of 401km non-electrified, multi-track railway starting in Hengshui in Hebei Province and running south through Shanxi Province to Shanqiu in Henan Province. The ODA loan covered the entire foreign-currency portion of the project cost.

1.3 Background

1.3.1 Project Background

China's coal production marks the world's largest, at 980 million tons in 1988. The production site is unevenly located, however, with 36% coming from the Huabei region (Shanxi and Hebei Provinces and the Inner Mongolia Autonomous Region), with Shanxi Province alone producing 25%. While the coal production is thus concentrated in the north of the country, the manufacturing industry which accounts for three quarters of the country's energy consumption is broadly spread in the southeast of the country. Large-scale, long-distance coal shipment capacity between coal production in the north and consumption in the south is vital, which then places an enormous load on tail transport, creating a transport bottleneck.

[1] "Ko" is used in China as an abbreviated name for Shanghai.

Table 1 Coal Production (1985-1988)

(Unit: 10,000 tons)

	1985	1987	1988
Total (A)	87,228	92,809	97,987
Heibei region only (B)	31,685	33,747	35,713
(B) / (A) (%)	36.3	36.4	36.4

(Source) China Statistical Yearbook, JBIC materials

However, the Jingguang and Jingko Lines, which carry the coal produced in Shanxi province to the east and to the industrial zones of the southern coast, had been laden to capacity to carry passengers and other freight. The balance of supply and demand for transport capacity had to be eased urgently (Table 2). The government then took the matter seriously and came up with a plan to build the Hengshang Line (this project) as a bypass for the Jingguang and Jingko Lines that carry the coal from Taiyuan in Shanxi province via Shijiazhuang to Hengshui and on to the southeast. This plan was to be incorporated in the Eighth Five-Year Plan (1991~1995).

Table 2 Level of Saturation of Jingguang and Jingko Lines

	Transport capacity		Transport volume (for coal)	
	1988	1996 (estimate)	1988	1996 (estimate)
Jingguang Line (Shijiazhuang-Zhengzhou)	5200	5200*	5567(2420)	7120(3670)
Jingko Line (Fuzhou-Xuzhou)	4000	4000*	4854(2106)	6250(2760)
Hengshang [This Project]	---	2000	---	1500(900)

* The completion of electrification works by 2000 is expected to increase transport capacity by 65 million tons.

(Source) JBIC materials

In 1991 the State Department drew the construction plan of the Beijing - Kowloon railway (referred to below as the Jingkow Line), with a total length of 2,397km. After reviwing the construction process, technical standards and other aspects which began in October 1992, it was decided that this project should serve as a segment of the new Jingkow Line. The freight volumes between Hengshui and Shangqiu for 2000 as planned at the time of the 1993 contract appraisal were three or more times higher than those envisaged in the initial plan, as shown in Table 3.

Table 3 Changes of Freight Volume Plan (in the year 2000)

(Unit: 10,000 ton)

	Original Plan (A)	Plan at the time of appraisal in 1993 (B)	Ratio B/A
Hengshui-Liaocheng	2,050	6,411	313 %
Liaocheng-Heze	1,779	6,176	347 %
Heze-Shangqiu	2,002	7,139	357 %

(Source) MOR materials

The original plan was to build a single track with consideration for future conversion to multiple tracks, but the new plan included construction as a multiple-track line from the beginning. (The slabs and piers of bridges were already being built to accommodate multiple tracks under the initial plan).

The additional equipment and materials necessitated by the conversion to multiple tracks was procured by the Chinese side using its own funds.

1.3.2 History

May	1989	Completion of F/S (implemented by the Third Railway Design Institute)
January	1990	Official request for FY1990 ODA loan by Chinese side (17 loans)
March	1991	FY1990 ODA Loan Agreement signing (Phase I, loan amount: ¥5,695 million)
September	1991	Start of civil works
October	1991	FY1991 ODA Loan Agreement signing (Phase II, loan amount: ¥6,550 million)
October	1992	FY1992 ODA Loan Agreement signing (Phase III, loan amount: ¥4,951 million)
November	1992	Conference on Beijing-Kowloon line construction and its technical standards
August	1993	FY1993 ODA Loan Agreement signing (Phase IV, loan amount: ¥6,407 million)
September	1996	Completion (completion ceremony)

2. Comparison of Original Plan and Actual

2.1 Evaluation on Project Implementation

2.1.1 Project Scope

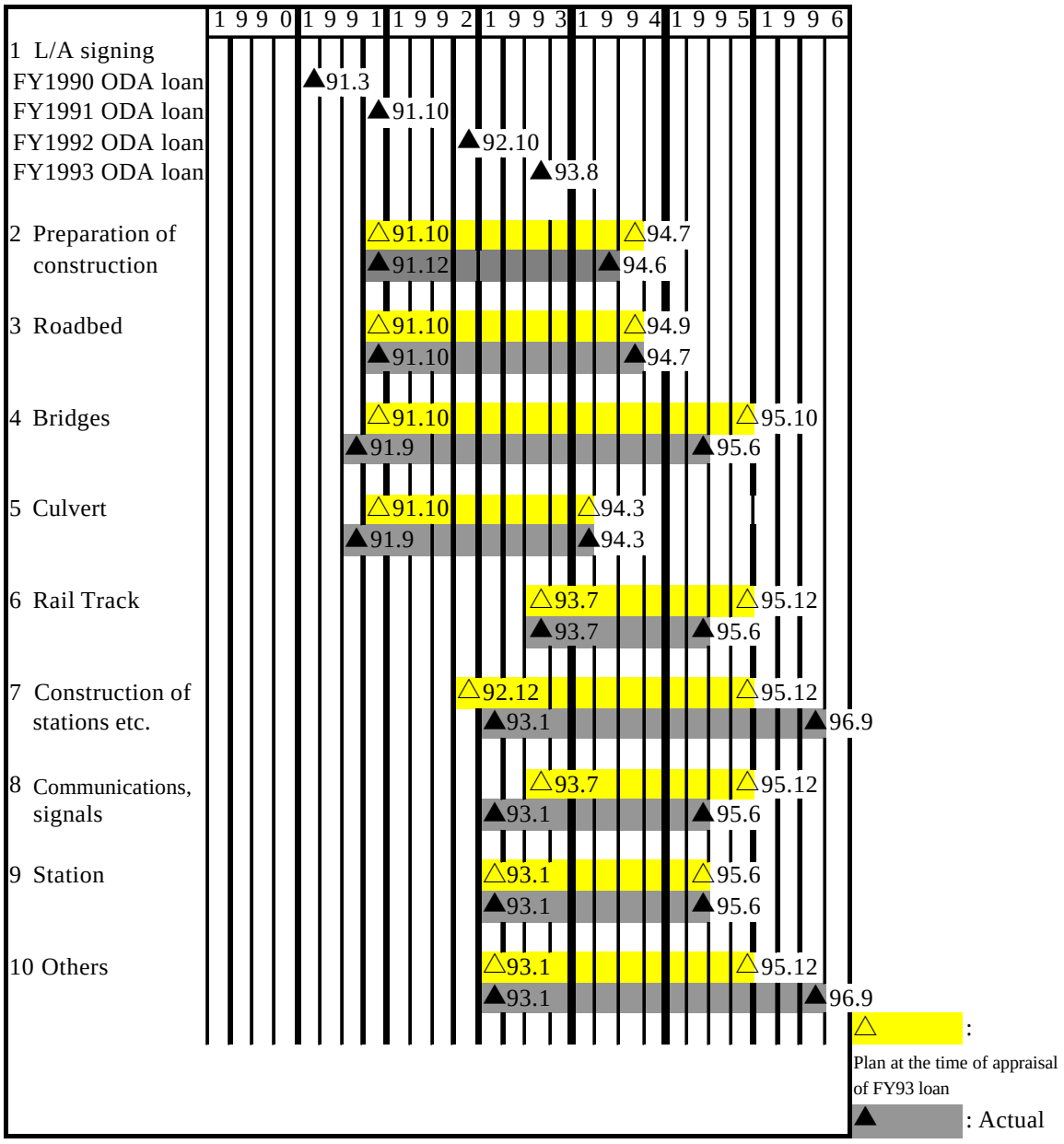
The project is comprised of 401km of non-electrified, multi-track railway starting in Hengshui in Hebei province and running south through Shanxi province to Shangqiu in Henan province. Construction was for a single-track until the loan appraisal was conducted in 1992, with the plan on future conversion to multiple tracks. In 1992 the project was redefined as an element of the Jingkow Line, and the decision was made to convert to multiple tracks earlier than planned as above. As a result the scope of construction and the quantities of equipment and materials were substantially altered, compared to the time of the first-year appraisal. The bridges and other major structures were built for multiple tracks from the start.

Items	Units	Original Plan (A)	At the time of 1993 loan appraisal Plan (B)[1]	Actual (C)	Difference (C) – (B)
Roadbed	m^3	21,050,000	34,900,000	36,349,510	1,449,510
Bridges	nos.	173	162	160	-2
Culverts	nos.	1,237	1,358	1630	272
Rail truck	km	414	1,071	1,085	14
Main depot, stations	nos.	5	5	5	-
Intermediate depot, stations	nos.	23	27	27	-
Signals	set	0	436	436	-
Signal cable	km	538.3	1,626	1,626	-

1) The plan after the project scope was substantially revised for incorporation into the Jingkow Line.

The positions and numbers of bridges and culverts were altered to accommodate natural and geographical conditions and traffic, leaving some divergence between the plan and the actual construction. There was also some damage due to natural disaster during the construction, necessitating repairs to some of the bridges and culverts and the tracks.

2.1.2 Implementation Schedule



(Note) After " preparation of construction", all categories include phases (1) ~ (4).

Despite the major change from single to multiple tracks, the project made progress largely as planned. The Chinese side took a strong initiative in order to complete the line before the return of Hong Kong in July 1997. Even on a tight schedule, the construction process was managed properly and the project was implemented smoothly.

2.1.3 Project Cost

Item	Plan (at the time of appraisal in 1990)		Plan (A) (at the time of appraisal in 1993)		Actual (B)		Difference (A) – (B)	
	Foreign currency (¥ million)	Local currency (1million yuan)	Foreign currency (¥ million)	Local currency (1million yuan)	Foreign currency (¥ million)	Local currency (1million yuan)	Foreign currency (¥ million)	Local currency (1million yuan)
Preparation of construction	865	24,154	1,311	32,696	1,311	7,734	-	-24,962
Roadbed	190	14,266	145	17,606	145	135,067	-	117,461
Bridges	7,136	32,807	5,880	46,506	5,880	179,921	-	133,415
Culverts			619	10,172	619	53,235	-	43,063
Rail Track	9,479	8,313	8,922	23,203	8,922	193,156	-	169,953
Communications, signals	2,037	6,415	2,991	20,034	2,991	72,182	-	52,148
Buildings	2,829	14,564	2,121	40,977	2,121	51,672	-	10,695
Depot, stations	47	1,405	331	4,835	0	2,109	-331	-2,726
Others	0	28,385	-	53,511	227	85,227	227	31,716
Price escalation	0	47,804	621	8,771				
Contingency	1,129	6,515	662	15,289				
Total	23,712	184,628	23,603	273,600	22,216	780,303		

[Exchange Rate]
At the time of 1990 ODA loan appraisal (August 1990): 1 Yuan = ¥34.4
At the time of 1993 ODA loan appraisal (April 1993): 1 Yuan = ¥20.9
At the time of completion (1996 IFS): 1 Yuan = ¥13.09

As mentioned above, the project scope was enlarged because it was incorporated into the Jingkow Line and converted to double tracks. In principle, the ODA loan covered the original single track. The additional equipment and materials necessitated by the conversion to multiple tracks was procured by the Chinese side using its own funds.

2.1.4 Implementation Scheme

(1) Executing Agency

The executing agency for the project was the central government's Ministry of Railways, which is responsible for most railway construction and transports in China. In addition to managing 60,000km of railways, it carries out projects every year for new railway construction, electrification, and conversion to multiple tracks. With abundant experience in railway construction, despite the expansion in the project's scope by the early conversion to multiple tracks, the project was completed largely as planned. No problems were observed in the Ministry's implementation capability.

The Ministry of Railways has 20 Regional Railway Administrations, and this project spanned areas under the jurisdiction of three of the offices. From Hengshui to Dagecun (11km) is under the jurisdiction of the Beijing Railway Administration, from Dagecun to Peiwuzhuang is under the Jinan Railway Administration and Peiwuzhuang to Shangqiu (16km) is under the Zhengzhou Railway Administration.

(2) Consultant

No consultants were employed. The design was prepared by the Design Institute at the Ministry of Railways and construction was supervised by the Ministry's Regional Railway Offices.

(3) Contractor

An international competitive bidding was conducted which was won by multiple Engineering Bureaus (bureaus responsible for the construction of new lines) within the Ministry, which handled the construction works. The Ministry of Railways says that all contractors finished their work within their schedules, and their construction capability was equal to all their tasks.

2.2 Evaluation on Operation and Maintenance

2.2.1 Operational Performance

Refer to the third-party evaluation report for the operation situation.

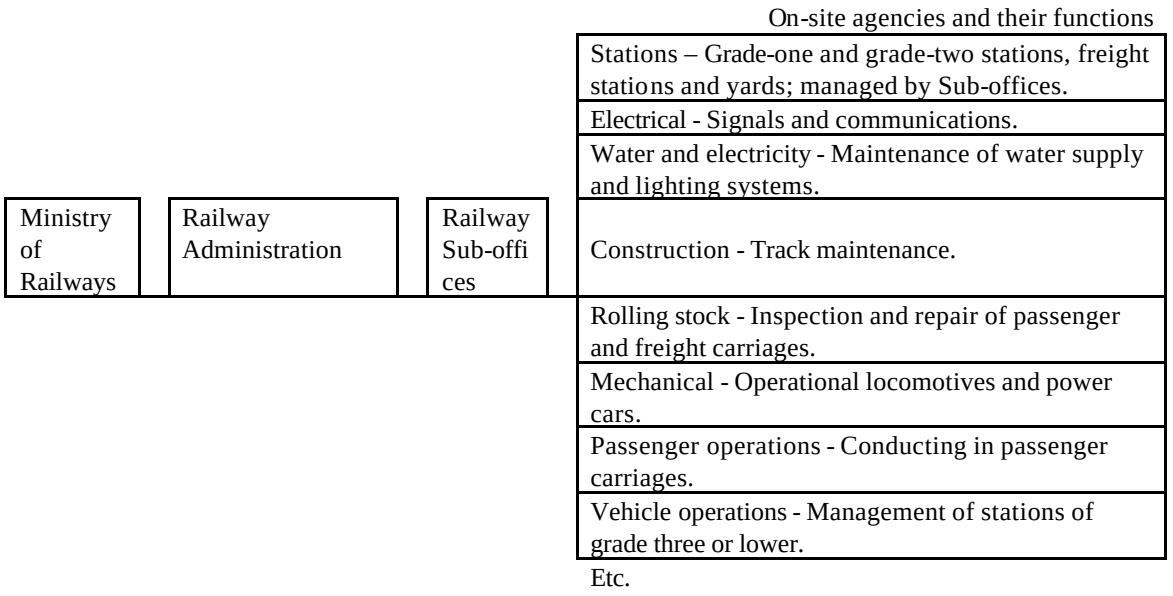
2.2.2 Operations and Maintenance Scheme

While the Ministry of Railways is declining gradually in size, it is still the largest government agency in China, with over three million staff as of the end of March 1998. The Ministry itself is a government agency, in charge of the operation and maintenance of railway transport, whose task in many ways corresponds to that of Japan's JR (Japan Railways Co.). As economic reform progresses, the Ministry has long faced calls to improve its efficiency, for it has always been

first to be called for reduction in size. A sweeping decentralization of power took place in 1985, ceding authority to, construction supervision and part of the operation and maintenance of basic construction projects (railway construction up to 2,000km) to the Regional Railway Administrations. The Regional Railway Administrations, with two to ten (depending on their size) Railway Sub-offices under them, directly carry out the operation of the railways under their jurisdictions. Under this project, the Shijiazhuang, Zhengzhou and Jinan Sub-offices under the above three Regional Railway Offices handled operation and maintenance in their jurisdiction.

The on-site agencies of each Sub-office and their functions are as described below in the hierarchical diagram of the operation and maintenance system.

Figure 2 Hierarchical Diagram of the Operation and Maintenance System



Maintenance is carried out complying to the nationwide standards, as defined in "Ministry of Railways, Track Maintenance Manual", "MOR Communications and Signals Maintenance Manual" and others. Since the line opened there have been no accidents or major repair works, and the maintenance situation remains good.

2.2.3 Environmental Impact

The Environmental Impact Assessment (EIA) was carried out at the time of F/S by the 3rd Survey and Design Institute, and was approved by the National Environmental Protection Office.

(1) Environment

Trees were planted along both sides of the tracks to minimize the impact of noise and vibration from train passings. The locomotives are IV (Dong Feng) diesels (the first diesel-electric

locomotives used in China), which according to Ministry of Railways generates less pollution. The impact is also lessened by the low residential density along the tracks. Dust collectors are installed in boiler rooms in stations and inspection sites, and rolling stock cleaning facilities have the waste water treatment equipment. The data to back these claims was not obtained, however, it suggests that there is no major impact on the environment, as the exhaust gas and waste water are processed appropriately complying to China's domestic standards.

(2) Land acquisition

The land acquisition and relocation of residents were conducted by the local governments with the Ministry of Railways reimbursement of the related costs.

Table 8 Land Acquisition Plan (at the time of appraisal in 1993)/Comparison of Plan and Actual

Item	Plan	Actual
Area of land purchased (km^2)	23.13	27.66
Cost of purchase (x 10,000 Yuan)	9,716	30,924
Households relocated (household)	260	n.a.
People relocated (person)	1,470	n.a.

Note) Concrete data on the numbers of households and residents relocated were held by the local governments and were unavailable. The Ministry of Railways reports that the relocation of residents proceeded smoothly.

Source) Prepared from the interviews with Ministry of Railways

2.3 Project Effects and Impacts

2.3.1 Quantitative Effect

(1) Financial Internal Rate of Return (FIRR)

When the FIRR of the project was calculated at the time of the 1990 appraisal, with revenue from transport charges as the Benefit and the Cost being the costs of project construction and maintenance, the resulting FIRR was 8.0%.

The FIRR of the project was recalculated at the time of the 1993 loan appraisal and put at 13.6%. The difference was mainly due to the large increase in transport volumes, and income from charges generated by the switch to multiple tracks.

The FIRR calculated by the executing agency on the basis of the actual costs and the anticipated income came to 6.5%, a lower figure than that produced for the appraisal in 1993. The main reason was that the appraisal calculation predicted a large increase in traffic volume, but actual traffic fell below the prediction, reducing income from charges. Now that three years have passed since the completion of the project, the Ministry of Railways expects to see growing revenues and does not see any problem with the operating finances of the line.

Assumptions for FIRR calculation

- Benefit: Income from fares and charges for passengers and freight, and the residual value of freight cars and other assets.
- Cost: Cost of implementation of the project, and of its maintenance.

- Project life: 25 years.

(2) Economic Internal Rate of Return (EIRR)
The EIRR was calculated at the time of the appraisal in 1990, taking the Cost as the cost of the construction of project and its maintenance, and the Benefit as the reduction of cost (reduction of travel expenses and savings in maintenance cost), and time saved (reduced transit times). The result was 40.0%.

When EIRR was revised in 1993 in the same way as the FIRR, it came out slightly higher as 43.6%.

The actual EIRR as recalculated by the executing agency from the actual costs and the anticipated effects came to 24.3%, below the level calculated at the time of the appraisal. This was due to the actual traffic falling below the planned level, which diminished the benefit anticipated at the time of the appraisal (the saving on alternative means of transport).

Assumptions for the EIRR calculation
- Benefit: Savings in various costs of shipping by other means of transport (including roads), and the value of time saved.
- Cost: Cost of the implementation of project, and of its maintenance management etc.
- Project life: 25 years.

2.3.2 Qualitative Effect

A third-party evaluation on this project with the theme of "Economic Development Impact in Regions Along the Route (evaluation by the recipient country)" was conducted by Dr. Lin Jiabin of the State Department Development Research Center. The findings of the evaluation are contained in the appended third-party evaluation report.

The completion report prepared by the Ministry of Railways raises the following benefits, in addition to the development of regions along the route:
2) Enhancement of the railway network expansion.
3) Alleviation of excessive traffic density on other north-south routes.
4) Increased opportunities for economic links between the interior of China and Hong Kong and Macao.
5) Underwriting the stability and prosperity of Hong Kong.

China
"Hengshui-Shangqiu Railway Construction Project"

Third-Party Evaluation

Dr. Lin Jiabin

Department of Development Strategy and Regional Economic Research,

State Department, Development Research Center of P.R.C.

March 2000

1. Background

China is seen as a coal-dependent nation with more than 70% of its energy needs provided by coal. Meanwhile, most of the nation's coal production is in the northern regions and thus railway freight plays an extremely important role in transporting coal from the north to the south.

Until completion of the Hengshui-Shangqiu Railway Line, China has relied on three main north-south trunklines; the Beijing-Shanghai line, the Beijing-Guangzhou line, and the Jiaozuo-Zhi Cheng line. The rapid economic growth brought about by China's policies towards reform and economy has resulted in saturating the nation's transport systems. The overloaded rail freight system has manifested a bottleneck to economic growth since the middle of the 1980's. There have even been a period when the amount of coal produced was decided by the railway transport capacity. Then in 1989 the decision was made to construct the Hengshui-Shangqiu Railway line to alleviate this situation. The main goal of this construction project was to improve the capacity for coal transportation.

In 1991 the Chinese government decided to construct the Beijing-Kowloon railway line. Here it was decided that the Hengshui-Shangqiu railway would be integrated as a part of the Beijing-Kowloon railway, and construction standards for the project were reviewed. The new Beijing-Kowloon railway was expected to fill a number of roles. Among these are relieving pressure on the north-south transport system, improving the convenience for production sites, promoting the development of regions along the line (especially the central region), promoting the unification of national markets, maintaining the stability and prosperity of Hong Kong and improving economic ties between Hong Kong and the mainland.

In this manner the Hengshui-Shangqiu railway was expected to play a major role as an important section of the larger Beijing-Kowloon railway. In particular, the Hengshui-Shangqiu line was expected to help better meet energy demand through improved transport of coal, and to have a positive economic impact on the regions running along the line.

2. Evaluation Viewpoints

The following viewpoints are deemed as necessary when conducting post-evaluation of the Hengshui-Shangqiu Railway Construction Project.

(1) The line's role as a main line for transporting coal in China. Further, its role to help improve China's energy situation

(2) Its role to bring greater social and economic development to the surrounding regions.

(3) The impact of the Hengshui-Shangqiu railway is included in the overall impact of the larger Beijing-Kowloon railway, as the line is part of Jing-Kow railway.

(4) From the viewpoint of (3), the role of Hengshui-Shangqiu railway, as a section of the

Beijing-Kowloon railway, to help relieve the usual congestion seen on the Beijing-Guangzhou and Beijing-Shanghai lines, while producing a bypass effect[1] and an increased redundancy effect[2] for the overall network.

The following is an analyses of the effects of this project from the above viewpoints (1)~(4).

3. Role of Hengshui-Shangqiu Railway in Improving China's Energy Situation

As mentioned above, the initial purpose for constructing the Hengshui-Shangqiu railway line was to improve China's north-south transport of coal. The purpose of the line later became much more comprehensive when it was decided that the line would function as a section of the larger Beijing-Kowloon line. Still, the transport of coal has remained a very important duty of this line.

There is no exact data on how much coal is handled by the Hengshui station, however the stationmaster tells that of all the freight trains passing through Hengshui (currently 32 roundtrip freight trains each day) more than 60% are carrying coal and the majority of these are using the Beijing-Kowloon railway to move the coal down south. Furthermore, the Hengshui Thermal Power Plant, a project launched along with the construction of the Hengshui-Shangqiu railway, began its operation in 1996. This plant currently generates 600,000 kW of power with plans to produce 1.2 million kW of power in the future. This thermal power plant relies completely on coal delivered by the Beijing-Kowloon railway. Therefore, the local residents are keenly aware of the large contribution the railway line plays in the running of this power plant. This power plant has completely eliminated power shortage problems for the Hengshui region, and is a very important part of the infrastructure for industrial development in the region. Currently excess power is being provided from this plant to locations outside of the region via the power network.

Looking at Shangqiu we see that quality coal is being produced in the region and provided to steel manufacturing sites such as Baotou, Shoudu and Baoshan. According to the data for Shangqiu Station, the amounts of coal handled for the years 1996, 1997, and 1998 were 492,600 tons, 1,897,160 tons, and 2,093,800 tons respectively. This data clearly shows the trend towards increasing amounts of coal handled each year. Coal also accounts for roughly 80% of all of the freight handled by this station.

In the case of Liaocheng, container relay stations and large-scale storage facilities for coal, foodstuffs, oil, and cotton were constructed along with the construction of the Beijing-Kowloon line. Construction of all of these projects has been completed and these facilities are all currently in use. In Liaocheng adding to one thermal power plant producing 300,000 kW of

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[1] The term "bypass" refers to a line that can be used by the rail traffic to bypass a different line. In many cases, such a line serves the role of smoothly dispersing and introducing rail traffic in the region where that line starts or ends. In other words, the Hengshui-Shangqiu line in this project provides this bypass function to help relieve the congested state seen on the Beijing-Guangzhou and Beijing-Shanghai line.

[2] The term "redundancy" in the railway network refers to spare lines that allow for traffic to bypass other lines when part of the network is being repaired or maintained, or when one line has to be shut down in an emergency. The larger the redundancy for a particular network, the less likely it is to see a drop in transport efficiency during repairs or when there is a natural disaster.

power, in 1998 construction of four large-scale power plants capable of producing 600,000 kW of power was started.

The Zhengzhou Railway Administration provided us with the following breakdown of the freight handled by the Shangqiu Station. Here we can see that coal accounted for roughly 80% of all freight handled by this station.

Table 1 Freight Handled at the Shangqiu Station (tons)

Year	Coal	Steel	Cement	Rice	Other Grains	Others
1996	492,600	40,000	20,000	20,000	25,000	45,000
1997	1,897,160	95,000	60,000	70,000	60,000	125,000
1998	2,093,800	120,000	65,000	75,000	80,000	150,000

Source: Ministry of Railways of P.R.C.

This shows that the Hengshui-Shangqiu railway has played a significant role in improving coal transport and the energy situation in China.

4. Economic Development Effects in Regions along the Hengshui-Shangqiu Railway

Economic development effects brought to the local regions by the construction of the Hengshui-Shangqiu railway include expanded production and employment, increased tax revenues, expanded economic activity zones, promotion of industrial development, expanded opportunities for local citizens, land utilization effect, and increased value of land assets. This section provides an overview of each of these items.

4.1 Expanded Production

The impact that the Hengshui-Shangqiu railway has had on expanding production can be seen by looking at time series data for the GDP growth in the four administrative districts along the railway line (Hengshui, Liaocheng, Heze, and Shangqiu). In 1993 each of these cities had economic growth exceeding the national average. Up until 1995 there was a multiplier effect due to the investment in the railway construction, and from 1996 there has been a facilities effect brought about by the opening of the railway line. Officials with the Hengshui municipal government said that the Hengshui's GDP growth rate in 1998 was 14.2%, a full 3.5% higher than the GDP growth rate for the entire Hebei Province. Furthermore, over the past three years Hengshui has been among the top two cities in Hebei Province in terms of economic growth. As this city was usually ranked 4th or 5th before the opening of the Beijing-Kowloon line, the railway line has clearly had a positive economic effect.

Table 2 Rate of GDP Growth for Four Cities along the Railway Line (%)

	National	Hengshui	Liaocheng	Heze	Shangqiu
1993	13.5		19.3	10.1	14.1
1994	12.6		19.4	16.7	10.5
1995	10.6		17.8	12.5	19.7
1996	9.6		15.2	12.9	17.1
1997	8.8	16.2	10.3	6.1	10.1
1998	7.8	14.2	11.4	7.9	8.4

Source: National data was taken from the China Statistical Yearbook. Other data was provided by the governments of each city.

A research[3] was conducted to compare the economic growth of four economic belts in the Shandong Province; namely the Jiaoji Belt, the Land Bridge region Belt, the Beijing-Kowloon line Belt and the Yellow River Delta Belt. If the GDP growth rate for the Jiaoji Belt, the most prosperous of the four belts, is to be designated as 1, the Land Bridge region Belt would be 0.95, the Beijing-Kowloon line Belt would be 0.84 and the Yellow River Delta Belt would be 0.75 during the 8th Five-Year Plan (1991-1995). However, during the 1996-1998 period these figures changed to 1 : 0.99 : 1.03 : 0.91, respectively. In other words, economic growth in these regions was roughly 80% of that in the Jiaoji Belt prior to the opening of the Beijing-Kowloon railway line, but exceeded the Jiaoji Belt in some cases after the opening of this line. These figures eloquently show the effect that the Beijing-Kowloon railway has had on developing the economies of these local regions.

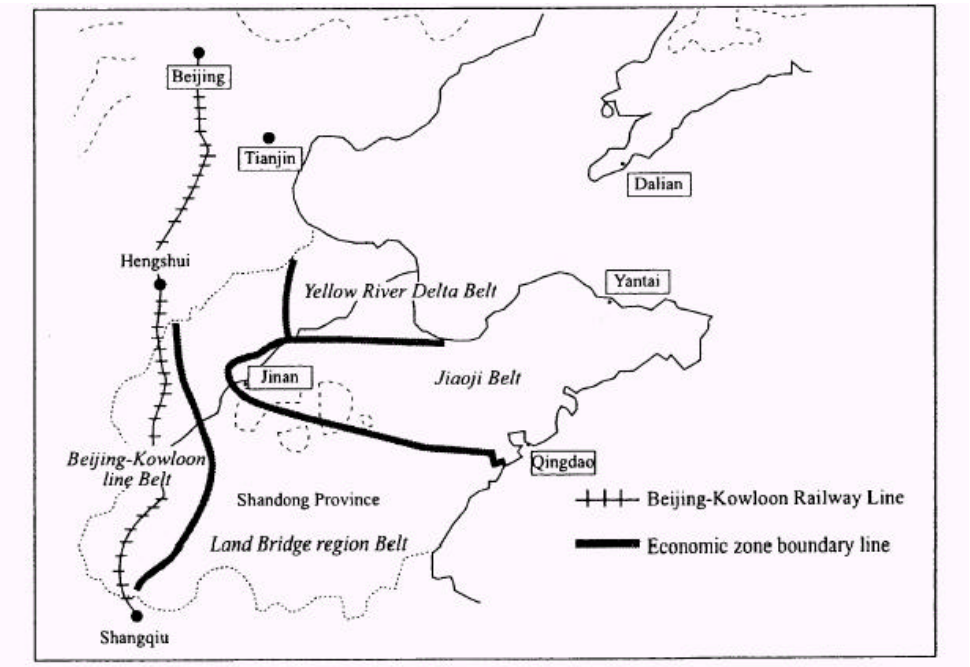

Figure Four Economic Belts in Shandong Province

[3] Editing by Xue Kezhu: "Research on Regional Development Strategies in Shandong Province", Shandong Province Science & Technology Publishing Company, September, 1999

4.2 Growth of Industrial Structure

One indicator of growth in the industrial structure is improvement in employment status, or in other words, the shift in the workforce from primary industries to secondary and tertiary industries. Such an effect has been notable in Hengshui and Shangqiu. In Hengshui the number of people employed in primary industries has decreased, while those employed in secondary and tertiary industries has increased. In Shangqiu there has been a marked increase in the number of employees in the tertiary industries. Based on hearings and on-site inspections of Hengshui and Shangqiu, it was learned that a large number of farmers are shifting to the markets and construction sites. This is seen as an indication of the effect the railway line has had on advancing the growth of the industrial structure.

Table 3 Changes in Employment Status for Four Cities along the Railway Line

(unit: 10,000 people)

	Hengshui				Liaocheng				Heze				Shangqiu			
	All Industries	Primary	Secondary	Tertiary	All Industries	Primary	Secondary	Tertiary	All Industries	Primary	Secondary	Tertiary	All Industries	Primary	Secondary	Tertiary
1990	177	120	31	26	280	149	63	68	418	208	117	93				
1991	182	124	32	26	278	148	62	68	423	210	119	94				
1992	186	127	33	26	286	153	64	69	428	213	120	95				
1993	188	127	35	26	288	154	64	70	431	214	121	96				
1994	189	119	40	30	289	154	65	70	434	216	122	96				
1995	193	114	44	35	290	155	65	70	437	217	123	97	431	302	74	55
1996	203	102	57	44	291	155	65	71	439	218	123	97	427	292	74	62
1997	203	101	57	45	294	157	66	71	443	220	124	99	452	302	78	72
1998													458	300	73	85

Source: Data for Shangqiu was provided by the Shangqiu municipal government. Other data was provided by the Ministry of Railways of P.R.C.

4.3 Tax Revenue Increases

The following table shows a comparison of tax revenues for 1992 and 1997 for four cities along the Beijing-Kowloon line, as well as for the provinces in which they are located.

Table 4 Changes in Tax Revenues for Four Cities along the Railway Line

(unit: 100 million yuan)

	1992	1997	1997/1992
Hebei Province	101	176	1.74
Hengshui	3.0	7.0	2.33
Shandong Province	139	290	2.09
Liaocheng	2.9	8.5	2.93
Heze	3.4	7.6	2.15
Henan Province	123	186	1.51
Shangqiu	3.9	7.2	1.85

Table 4 clearly shows that all of the cities experienced growth rates in tax revenues exceeding those for their provinces. This was especially true for Liaocheng and Shangqiu.

It would be reasonable to say that this increase in regional tax revenues is due largely to the greater economic activity in the region following the opening of the Beijing-Kowloon line.

4.4 Expanded Economic Zones

With the opening of the Hengshui-Shangqiu railway there was a large expansion in the economic zones of the surrounding regions. On-site interviews revealed that sales routes for the abundant farm produce and livestock in the region have been greatly expanded to Beijing and Tianjin in the north and to Guangzhou, Shenzhen and Hong Kong in the south. Such products include beef, pigeon, and peaches from Hengshui as well as red Fuji apples from Shangqiu. The railway line plays an important role in promoting agriculture in this region, as well as promoting the processing industries using this produce and livestock as raw materials. The opening of the Beijing-Kowloon railway also reduced the travelling time between Hengshui and Beijing to 3~4 hours from the 7~8 hours this trip used to take. This has made it much easier for industries established in the local regions to invite "Sunday engineers" from Beijing. In this manner the Beijing-Kowloon railway has provided the opportunity for the brainpower in Beijing to be put to use in developing industries in the local regions.

4.5 Promotion of Industrial Development

The creation of the Hengshui-Shangqiu railway, and especially its inclusion as part of the Beijing-Kowloon railway, has been a major factor in developing industry in the regions along the line as these locations are now directly linked to major cites such as Beijing and Tianjin in the north and Guangzhou, Shenzhen and Hong Kong in the south. For example, the municipal government in Hengshui has developed its "North: Beijing, Tianjin / South: Hong Kong, Shenzhen" strategy for market development and has been developing its raising of chickens and pigs and its cultivation of vegetables and soybeans as major industries. The Liaocheng municipal government has been systematically sending labor to Shenzhen as part of its efforts to better develop human resources. The total number of people that have participated in this project topped 20,000 in recent years. The majority of the dispatched personnel are graduates from technical colleges and vocational schools. The municipal government hopes that these people will spend several years training in Shenzhen and then return to the local region to help establish industries.

4.6 Expanded Opportunities for Local Citizens

The opening of the Beijing-Kowloon railway has helped to expand opportunities for citizens living in the region along the Hengshui-Shangqiu railway. Officials with the Hengshui municipal government toll that before the opening of the Beijing-Kowloon railway its was difficult for citizens to make the 7-hour journey to Beijing. Now with the opening of the

Beijing-Kowloon railway citizens can reach Beijing in less than 4 hours. Currently there are roughly 415 people travelling from Shangqiu to Beijing each day on average. There has also been a large increase in the number of residents using the Beijing-Kowloon railway for sightseeing in such cities as Nanchang and Lushan in the south.

4.7 Land Utilization Effect

All of the municipal governments along the Hengshui-Shangqiu railway have used the construction and opening of the Beijing-Kowloon railway as an opportunity to carry out city development projects centered around new train stations. For example, the area of urbanization in Hengshui increased from 15 square kilometers before the opening of the train line to the current level of around 22 square kilometers. The area of urbanization in Shenzhen, which is under the jurisdiction of Hengshui, was more than doubled from 7 square kilometers to close to 15 square kilometers. The urbanization area in Shangqiu before the opening of the railway line was only 20 square kilometers. However, the city government saw the opening of the Beijing-Kowloon railway as a chance to further develop the city and so invested 500 million yuan to construct eight roads within the city and increase the area of urbanization to 60 square kilometers. The land market in China is still immature and so we could not obtain accurate data on land prices. Still, there is no doubt that the opening of the Beijing-Kowloon railway brought about a large land utilization effect and increased the value of land assets in this region.

5. Effects of Beijing-Kowloon Railway on Existing Lines

Before the construction of the Beijing-Kowloon railway, the Beijing-Guangzhou railway was the nations main north-south artery. However, the transport capabilities of the Beijing-Guangzhou railway line were already overburdened while transport needs continued to increase despite the already extremely tight schedules. Obtaining passenger tickets was also a constant struggle. Therefore, the Beijing-Kowloon railway, which runs the same north-south route, was constructed to alleviate the congestion on the Beijing-Guangzhou railway, improve transport capabilities for the overall network, and increase its redundancy.

5.1 Alleviating Congestion on the Beijing-Guangzhou Railway and Improving Transport Capabilities for the Overall Network

In order to evaluate the effectiveness of the Beijing-Kowloon railway in alleviating congestion on the Beijing-Guangzhou railway and improving transport capabilities for the overall network, we need to compare schedules of the Beijing-Guangzhou railway before the opening of the Beijing-Kowloon railway, and schedules for both the Beijing-Guangzhou and Beijing-Kowloon railways after this new line was opened. According to a schedule for the Beijing-Guangzhou railway in 1995 when the Beijing-Kowloon railway had yet to open, there were 28 roundtrip passenger cars and 57 round trip freight car (3 of these roundtrip cars separated and later rejoined during this process) counted at the Anyang point. In June of 1996, three years after the opening of the Beijing-Kowloon railway, the schedule for the Beijing-Guangzhou railway had

42 roundtrip passenger cars and 36 roundtrip freight cars at the Anyang point. The schedule for the Beijing-Kowloon railway for the same time had 7 roundtrip passenger cars and 35 roundtrip freight cars calculated from the Linqing point. Comparing schedules for before and after the opening of the Beijing-Kowloon railway clearly shows that there has been a marked improvement in transport capabilities along the north-south routes. The number of roundtrip passenger cars increased by 21 and the number of roundtrip freight cars increased by 14. There were a total of 85 roundtrip cars using the Beijing-Guangzhou railway prior to the opening of the Beijing-Kowloon railway, but this number was reduced to 78 after the opening of the new line. This clearly shows that the congested schedule was greatly alleviated.

The Ministry of Railways reported that they have established a plan for splitting the duties of the two lines, with the Beijing-Kowloon railway being used mainly for the transport of freight and the Beijing-Guangzhou railway used mainly for the transport of passengers. By shifting freight trains over to the Beijing-Kowloon railway, the Beijing-Guangzhou railway has been able to greatly expand its capabilities for passenger transport to better meet growing needs in this area.

The speed of passenger trains on the Beijing-Guangzhou railway has been increased thanks to the reduced congestion on this line. On April 1, 1998 the average speed between these two cities was raised from 80km/h to 110k/m. This has helped the railway better survive the stiff competition being put forth by long-distance buses and the airlines.

There has been an increasing trend in China of greater competition between trains, long-distance buses and airlines. Table 5 shows changes in the market shares held by these different transport modes. Data for passengers is shown as passenger-kilometers and data for freight is shown as ton-kilometers. Between 1980 and 1995 the share of passengers using the railways decreased, while those using roads and airlines increased. There was also a similar change in the shipment of freight, but not to the same extent as with passengers. The railways have been struggling against this stiff competition. However, as mentioned earlier, the railway has been able to increase the number of passenger trains by shifting some of the freight traffic to the Beijing-Kowloon railway. This has contributed to improving the transport capabilities of the overall railway network.

Table 5 Changes in Share for each Transport Mode

Year	Passenger				Freight			
	Rail	Road	Water	Air	Rail	Road	Water	Air
1980	60.6	32.0	5.7	1.7	67.3	9.0	17.9	5.8
1985	54.5	38.9	4.0	2.6	62.5	14.6	18.2	4.6
1990	46.4	46.6	2.9	4.1	58.8	18.6	19.1	3.5
1995	39.4	51.1	1.9	7.6	53.7	19.6	24.1	2.5
Increase & decrease (1980-1995)	-21.2	+19.1	-3.8	+5.9	-13.6	+10.6	+6.2	-3.3

Source: China Statistical Yearbook and China Traffic Yearbook

5.2 Increased Redundancy for Railway Network

The opening of the Beijing-Kowloon railway not only added an important north-south artery to China's railway system, but also greatly increased redundancy for the entire network. This provided the network with room to reroute traffic in time of emergency and to better handle disasters. A typical example that verifies this point is the nighttime repair of the No. 38 bridge along the Beijing-Kowloon railway that took place on April 25, 1999. The No. 38 bridge, which is located in Hebei Province between Liulihe and Zhouqu had become decrepit and all of its crossbeams needed to be replaced. This bridge renewal project was conducted over an 8-hour period starting at 8:30 p.m. on April 25, 1999 and running until 4:30 a.m. of the following morning. During this period 10 passenger trains from the Beijing-Guangzhou line were rerouted to the Beijing-Kowloon line (West Beijing-Hengshui-Shijiazhuang section). Officials with the railway said that this was the first time in the history of China's railway system that operations on a major route such as the Beijing-Guangzhou line were suspended for an 8-hour period, but by rerouting traffic to the Beijing-Kowloon line, the railway was able to avoid impacting economic activities and inconveniencing train passengers.

6. Triggering Regional Development along the Beijing-Kowloon Line

There are many regions along the Beijing-Kowloon railway line that have seen relatively slow economic growth. Therefore, the local governments in these regions view the opening of the Beijing-Kowloon railway as an excellent opportunity to promote regional economic development, and have been working on development activities to make the greatest possible use of the positive effects brought about by this railway line. The following is a general overview of such activities focusing on the Hengshui-Shangqiu section.

- Along with the opening of the Beijing-Kowloon line, the city of Hengshui set the goal of becoming the first major city travelers would encounter when heading south from Beijing. To this end the municipal government has been actively preparing basic facilities, residential areas, and has even begun seeking foreign investment. On April 15, 1999 the Hebei provincial government ratified Hengshui as a "Comprehensive Test City along the Beijing-Kowloon Railway in Hebei" and plans were created for developing agriculture, industry, city facilities, tertiary industries and others. By establishing large-scale wholesale markets for farm produce and products made by the local industries, Hengshui has been able to make full use of the transportation advantage it has thanks to the Beijing-Kowloon railway.

- The government of Shandong Province saw the opening of the Beijing-Kowloon railway as the perfect opportunity to promote development of some of the regions along the line that were slower in development, and by doing so reduce the disparities among the regions within the province. Specifically, in Liaocheng and Heze a region for foreign processing and trade was established, a large-scale thermal power plant was constructed and storage facilities were built. Plans are being developed to use the historical and cultural characteristics of Liaocheng and the peony trees of Heze to attract tourists.

● The opening of the Beijing-Kowloon railway means that there are now two main railway lines intersecting at the city of Shangqiu (Beijing-Kowloon railway running north-south and the Longhai railway running east-west). The government of this city has been making efforts to capitalize on its prime location by seeking foreign investment, carrying out a comprehensive development of local agriculture, preparing wholesale markets and basic city facilities. During the three-year period from 1996 to 1998, some 223 foreign-funded companies were established in Shangqiu with the total investment reaching 1.936 billion yuan. Furthermore, tens of product wholesale markets have been established and everyday around 20 of these markets are bustling with a total of some 100,000 customers. The size of the produce wholesale market is so large that it has already been included among the nations "Big 10". Furthermore, Shangqiu invested 100 million yuan to construct the Shangqiu South Station as the largest station along the Beijing-Kowloon line after Beijing Station (the Railway Department also provided 15 million yuan in assistance for this project). Construction of the station, which began in September 1997, is scheduled to be completed in 1999. The station will boast of a floor space of 27,000 square meters with a 72,000 square meter plaza in front of the station building.

7. Conclusion

The Hengshui-Shangqiu railway has been incorporated into China's new Beijing-Kowloon route running north and south. Based on our on-site surveys in the regions running along this line, and based on related materials and collected data, we were able to confirm that this line has fully achieved the original project goals, namely improving the transport of coal and improving the supply of energy. However, the positive effects of this line reach far beyond these original goals. This line has helped to promote the economies of the local regions, has expanded opportunities for local residents, alleviated congestion and tight schedules on existing lines, increased redundancy for the overall network and has provided bypass routes in the time of emergency. Furthermore, all of the local authorities see the opening of the Beijing-Kowloon railway as a one-time opportunity to develop their local economies. We were deeply impressed with the diligent promotion of development projects aimed at obtaining the maximum effect from the opening of the Beijing-Kowloon railway. The responsible government officials in the cities of Hengshui and Shangqiu visited during our on-site inspections all expressed their gratitude for the assistance the Japanese ODA Loans played in the construction of the Hengshui-Shangqiu railway.

The Hengshui-Shangqiu railway project was part of a major national project. It effects have had a large bearing on the national economy and corresponded with the intended purpose of the ODA loan. However, since this project is only a portion of a larger project, the percentage covered by the ODA loan becomes smaller, and it become unavoidable that the role played by the ODA loan for the overall project takes on less significance. It is believed that this point needs to be compensated through greater cooperation between the borrower organization and executing organization in the area of strengthening PR activities. We would also like to point out that our on-site surveys showed that post-project evaluation activities in themselves played a large role in making everyone more aware of the ODA loan project.