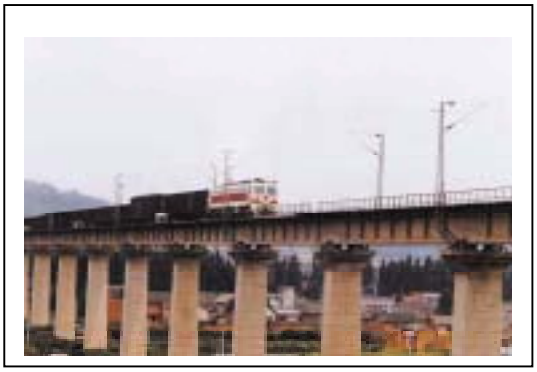
**China**

# Nanning-Kunming Railway Construction Project

Report Date: March 2001
Field Survey: August 2000

## 1. Project Profile and Japan's ODA Loan


Site Map: Yunnan Province



Bridge between Kunming and Kunming South, Nankun Line

### (1) Background

Freight transport in China is characterized by a high weighting towards railway transport. The modal division of freight transport at the end of 1988 showed that railway had a 14.8% share (1.45 billion tons) of total freight carried, and a 41.5% share (987.7 billion ton-km) of the freight transport volume in ton-km. Clearly the railways had an important role in the long-distance transportation of freight. The area covered by this project, namely Yunnan Province, Guizhou Province and the Guangxi Zhuang Autonomous Region, contained 4,712km of railways, 8.9% of the national total. Freight shipping volume was 64.78 million tons, 4.6% of the national total. The area has abundant mineral resources, such as coal and phosphorous ore, which has led to its economic growth far exceeding that of other areas. Under that situation, it was anticipated that the volume of railway freight, particularly the minerals mentioned above, would grow substantially. There was a growing need for the construction of a new line to meet that demand.

**Table 1 Coal and Phosphorous Ore Production in the Related Provinces and Regions**

Unit: 10,000 ton

| Category | | 1989 | 1990 | 1995 | 1996 | 2000 (Estimate) | 2005 (Estimate) |
|---|---|---|---|---|---|---|---|
| Coal | Yunnan | 2,181 | 2,227 | 2,803 | 3,072 | 5,200 | 6,200 |
| | Guizhou | 3,500 | 3,695 | 5,472 | 6,143 | 7,000 | 9,000 |
| | Guangxi Zhuang Autonomous Region | 1,140 | 979 | 1,391 | 1,252 | 1,000 | 800 |
| Phosphorous ore | Yunnan | 437 | 486 | 666 | 764 | 1,000 | 1,300 |

Source: Materials prepared by Ministry of Railways

### (2) Objectives

The railways between Kunming and Nanning (such as the Guikun Line) had already reached saturation. This project was to build a new electrified line to supplement their freight capacity and expand the capacity for supplying resources, such as coal, coke and phosphorous ore, to the south of China and its coastal industrial areas.

### (3) Project Scope

This project constructed a new electric single railway line between Kunming and Nanning (873km), including civil works for track bed, station buildings, tunnels, bridges and other facilities. The ODA loan covered the entire foreign currency portion for the procurement of equipment, materials and services necessary for the implementation of the project.

### (4) Borrower/Executing Agency

Ministry of Foreign Trade and Economic Cooperation, The People's Republic of China / Ministry of Railways, The People's Republic of China

### (5) Outline of Loan Agreement

| | 1991 (Phase I) | 1992 (Phase II) | 1993 (Phase III) | 1994 (Phase IV) |
|---|---|---|---|---|
| Loan Amount/<br>Loan Disbursed Amount | ¥5,461 million /<br>¥5,455 million | ¥9,904 million /<br>¥9,873 million | ¥23,342 million /<br>¥17,254 million | ¥18,989 million /<br>¥8,194 million |
| Exchange of Notes/<br>Loan Agreement | September 1991 /<br>October 1991 | October 1992 /<br>October 1992 | August 1993 /<br>August 1993 | January 1995 /<br>January 1995 |
| Terms and Conditions | Interest rate: 2.6%,<br>Repayment period:<br>30 years<br>(10 years for grace period),<br>General Untied | Interest rate: 2.6%,<br>Repayment period:<br>30 years<br>(10 years for grace period),<br>General Untied | Interest rate: 2.6%,<br>Repayment period:<br>30 years<br>(10 years for grace period),<br>General Untied | Interest rate: 2.6%,<br>Repayment period:<br>30 years<br>(10 years for grace period),<br>General Untied |
| Final Disbursement Date | November 1997 | November 1997 | December 1997 | Not completed yet |

## 2. Results and Evaluation

### (1) Relevance

The Nankun Line built under this project is the shortest route from Yunnan Province into the Guangxi Zhuang Autonomous Region (approximately half the distance of the existing route). The transport capacity of the old lines, such as the Guikun Line, which were reaching saturation, had to be supplemented. Instead of expanding the existing lines, which would have been technically very difficult, the plan called for the construction of a new line, which was a relevant choice. The production volumes of coal and phosphorous ore in provinces such as Yunnan and Guizhou are increasing steadily, and therefore this project remains relevant today.

**(2) Efficiency**

(i) Implementation schedule

Geological structures in the construction area are complex and the implementation schedule appears to have been tight from the beginning, but work began on schedule (October 1990) and was also completed on schedule, after 87 months.

(ii) Project cost

There was a 40% cost overrun in the total funding required. This is because the cost of the local currency portion, which was not covered by the ODA loan, rose 3.3 times, for the reasons below.

1. The stations at Nanning and Kunming had to be improved to serve as terminus stations, but the cost of the works (equal to approximately 10% of the original plan cost) was not counted in the initial plan.
2. Additional construction equipment had to be brought in to cope with complex geological structures while adhering to the implementation schedule.
3. The budget was planned at 1988 prices, but the prices of construction equipment and materials rose substantially after 1993.
4. The central government demanded higher design standards for the track bed, raising the design speed from 45km/h to 60km/h.

(iii) Executing agency

The project was implemented by the Ministry of Railways, which had previously used ODA loan projects to build railways between Yanzhou and Shijiusuo, between Beijing and Qinhuangdao, between Hengyang and Guangzhou, and others. The Ministry performed commendably in this project as well, solving the problems of complex geological structures and completing the works within the implementation schedule.

**(3) Effectiveness**

**(i) Record of transport**

The Nankun Line went into operation at the end of 1997, and the freight volume it carries has been growing steadily since 1998, as shown in Table 2. In particular, the transport volume from Kunming to Nanning in 2000 (15.62 million tons/ year) exceeded the forecast for 2005 (13 million tons/year). Freight on the old line dipped in 1998, the year after the Nankun Line opened, before starting to rise again from 1999. Therefore the new line appears to be succeeding in its role of supplementing the capacity of the old line.

**Table 2 Freight Transport Volumes**

Units:Tons/year x 10,000

| Category | | 1998 | 1999 | 2000 (Ministry of Railways forecast from the completion of the project)[1] | 2005 (Ministry of Railways forecast from the completion of the project) |
|---|---|---|---|---|---|
| (Kunming→Nanning) | Coal | 302 | 457 | 365(450) | (650) |
| | Phosphorous ore | 104 | 118 | 108(150) | (200) |
| | Coke | 41 | 44 | 58(80) | (100) |
| | Others | 254 | 301 | 1,031(220) | (350) |
| Total | | 701 | 920 | 1,562(900) | (1,300) |
| (Nanning→Kunming) | Oil | 90 | 50 | 87(170) | (200) |
| | Metallic ore | 98 | 130 | 265(140) | (200) |
| | Others | 232 | 230 | 288(340) | (430) |
| Total | | 420 | 410 | 640(650) | (830) |

**Table 3 Freight Transport Volumes on the Old Lines**

Units: Tons x 10,000

| Category | Towards Beijing | | | Away from Beijing | | |
|---|---|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 1997 | 1998 | 1999 |
| Kunming ~ Fenghuangshan | 830 | 703 | 928 | 1,577 | 1,332 | 1,360 |
| Fenghuangshan~ Guiyang | 1,495 | 1,319 | 1,634 | 1,352 | 1,096 | 1,325 |
| Guiyang ~ Guiding | 2,000 | 1,989 | 2,244 | 2,057 | 1,792 | 1,968 |
| Guiding ~ Mawei | 631 | 607 | 622 | 553 | 452 | 508 |
| Mawei ~ Liuzhou | 975 | 922 | 906 | 564 | 440 | 482 |
| Guiding ~ Dalong | 1,569 | 1,537 | 1,774 | 1,497 | 1,368 | 1,546 |
| Dalong ~ Huaihua | 1,576 | 1,523 | 1,744 | 1,514 | 1,369 | 1,584 |
| Huaihua ~ Yatunpu | 1,096 | 777 | 787 | 1,410 | 1,178 | 1,257 |
| Yatunpu ~ Liuzhou | 1,058 | 740 | 750 | 1,427 | 1,190 | 1,275 |

Source: Materials prepared by Ministry of Railways (Tables 2 and 3)

The ports of Fangcheng and Zhanjiang are situated along the Nankun Line and the existing line, making them ports for loading and unloading railway freight. Freight volumes on the lines connecting the two ports, which are the Liuzhou – Litang – Zhanjiang and the Liuzhou - Litang – Nanning – Fangcheng sections, are as shown in Table 4. The data is only for 1998, but it appears that a portion of the freight passing in and out of the two ports is carried on the Nankun Line.

[1] Figures in parentheses are forecasts made by the Ministry of Railways when the project was completed, and those outside are recorded figures.

**Table 4 Freight Transport Volumes (Liuzhou – Litang - Zhanjiang and the Liuzhou - Litang – Nanning – Fangcheng sections) (1998)**

Units: Tons/year x 10,000

| Category | Up | Down | Category | Up | Down |
|---|---|---|---|---|---|
| Liuzhou ~ Litang | 1,957 | 2,455 | Litang ~ Nanning | 1,134 | 1,104 |
| Litang ~ Zhanjiang | 1,456 | 1,815 | Nanning ~ Fangcheng | 417 | 385 |

Source: Materials prepared by Ministry of Railways

**(ii) Quantitative effects**

(Financial Internal Rate of Return)
FIRR was calculated taking freight charges as the benefit and construction and maintenance as the costs.

Compared to the time of the appraisal, revenue was largely as anticipated, but the substantial increase in construction costs was compounded by much higher maintenance costs (see Table 6) which made it impossible to recalculate FIRR. The Economic Internal Rate of Return cannot be calculated because the executing agency does not have the necessary data.

**(4) Impact**

**(i) Impact on society and environment**

The relocation of residents was handled by local authorities in the areas concerned, and was accomplished without significant problems. No complains were raised from the residents concerned.

An environmental inspection report produced jointly by the Ministry of Railways and the State Environmental Protection Administration (dated December 4, 1998) made the following four suggestions, which were dealt with as listed below.

Article 1 Forestation → Completed at the end of 1999.
Article 2 Completion of waste water treatment facilities and implementation of training.
→Construction completed in June 1999. Training completed.
Article 3 Noise prevention for two schools affected by the noise from a silk factory.
→Countermeasures completed by June 1999 (double glazed windows and cooling equipment).
Article 4 Collection of the data necessary for environmental protection measures, and other measures for monitoring of implementation.
→ Carried out by the Liuzhou and Kunming Railway Offices at the end of 1998, under the direction of the Ministry of Railways Construction Supervision Section.

**(ii) Employment situation**

Table 5 shows the number of workers employed by the Liuzhou and Kunming Railway Offices for this project.

**Table 5 Employee numbers**

(Unit: person)

| Cagegory | Goal | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| Liuzhou Railway Office | 7,661 | 7,295 | 7,293 | 7,487 |
| Kunming Railway Office | 5,411 | 5,029 | 6,311 | 6,664 |

Source: Materials prepared by Ministry of Railways

### (5) Sustainability

Originally the Railway Offices of Liuzhou and Chengdu were to handle maintenance and management, but since April 1, 1997 the Kunming Railway Office took over from the Chengdu Railway Office. Maintenance is carried out within the budget. After the construction of the project was completed in December 1997, it was inspected by the Ministry of Railways. However, until the appraisal i is to be conducted by the National Audit Office after a financial study by the Ministry of Railways (completed in 2000), the transfer of assets from the Ministry of Railways to the local railway offices (Kunming and Liuzhou) cannot be completed. The appraisal is scheduled for completion within this year, but until then the railway is being operated on a provisional basis. The Ministry of Railways acknowledges losses of 20 million Yuan/year between 1998 and 2000.

**Table 6 Revenue and Expenditure after Completion of the Project**

Unit: million yuan

| Category | | 1998 | 1999 | 2000 | 2001 (estimate) |
|---|---|---|---|---|---|
| Liuzhou Railway Office | Revenue from freight charges | 519.68 | 657.88 | 797.25 | 830.00 |
| | Maintenance cost | 539.38 | 636.59 | 771.42 | 803.11 |
| Kunming Railway Office | Revenue from freight charges | 194.94 | 280.99 | 344.89 | 320.00 |
| | Maintenance cost | 219.86 | 296.25 | 352.41 | 309.44 |

Source: Materials prepared by Ministry of Railways

**Comparison of Original and Actual Scope**

| Item | Plan | Actual |
|---|---|---|
| ①Project Scope | ・Construction of single-track electrified line for Nanning ~ Kunming: 873km (Nanning ~ Kunming: 802km, Weishe ~ Hongguo: 71km )<br>・Track bed civil works: 73.93 million $m^3$<br>・No. of stations: 88<br>・Tunnels: 252 (191.9km)<br>・Bridges: 413 (63.755km)<br>・Culverts: 2,222 (45.97km) | ・Same as left 896km<br>・Same as left 101.74 million $m^3$<br>・Same as left 95<br>・Same as left 263 (195.33km)<br>・Same as left 463 (72.014km)<br>・Same as left 2,631 (61.963km) |
| ②Implementation Schedule | Oct. 1990 ~ Dec. 1997<br>(87 months) | Oct. 1990 ~ Dec. 1997<br>(87 months)<br>・Official transfer of assets has not been completed |
| ③Project Cost<br>Foreign currency<br>Local currency<br><br>Total<br>ODA loan portion<br>Exchange rate | <br>¥69,036 million<br>¥172,115 million<br>(6,569 million yuan)<br>¥241,151 million<br>¥69,036 million<br>1 yuan ＝¥26.2 | <br>¥40,742 million<br>¥311,395 million<br>(22,056 million yuan)<br>¥352,137 million<br>¥40,742 million<br>1 yuan＝¥14.1 |