

Beijing-Shenyang-Harbin Telecom Systems Project (1) (2)

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Field Survey: May 1999

1 Project Summary and Japan's ODA Loan

In the early 1990s rapid economic growth in northeastern China, the target area for this project, brought a sharp rise in demand for communications. Between 1989 and 1991 the rate of increase in long-distance telephone usage was 30% per year in Beijing and Tianjin and 20% per year in Shenyang, Changchun and Harbin. This rate of growth raised fears of capacity shortages in long-distance switching systems and transmission facilities. This project is designed to increase long-distance switching systems and improve the long-distance transmission network with an aim of dealing with the increasing demand of long-distance communications.

The ODA loan covered the entire foreign currency portion of optical fiber transmission facilities, long-distance switching systems and technical training.

Borrower	Foreign Trade and Economic Cooperation Department, People's Republic of China	
Executing Agency	Posts and Telecommunications Department, People's Republic of China (currently Ministry of Information Technology and Telecom Industries)	
Loan Amount	(I) ¥3,145 million	(II) ¥4,055 million
Loan Disbursed Amount	(I) ¥2,778 million	(II) ¥3,258 million
Date of Exchange of Notes	(I) October 1992	(II) August 1993
Date of Loan Agreement	(I) October 1992	(II) August 1993
Final Disbursement Date	(I) November 1997	(II) September 1998



2 Analysis and Evaluation

(1) Project Scope

(i) Optical Fiber Transmission Facilities

Both main lines and feeder lines were built as planned.

Transmission equipment was increased to meet demand that was rising faster than anticipated. The additional equipment comprised 16 systems (140Mb/s PDH), 19 systems (2.5Gb/s SDH), and eight sets of metering equipment for 2.5Gb/s systems. These additions brought a remarkable improvement in the communications situation in the Northeast, reducing the overflow rate from 60% in 1993 to 10% in 1994.

(ii) Long-distance Switching Systems

The project was implemented as planned in Dalian, Siping, Baichang and Tongliao. The Tangshan and Qiqihar portions of the project were carried out by the Chinese side using its own funds due to the extreme urgency of the situation, but the overall scope of the project was still as planned.

(iii) Technical Training

The first round of training was carried out, but the second and third rounds were not. This change was made because the engineering staff on the Chinese side had built up their experience on other projects, and because when the communications equipment is installed, the manufacturers always provide technical instruction and training. As a result, the training was not required.

(2) Implementation Schedule

As noted above, the project was completed within the planned implementation schedule despite the additions to project scope.

(3) Project Cost

The actual project cost was ¥12,404 million, a cost underrun of approximately 22% relative to the initially planned ¥15,952 million (excluding contingency). This occurred because technological advances sharply reduced the cost of equipment and materials in the communications field, which meant that the optical fiber transmission facilities could be bought much more cheaply (in the JBIC portion), and that the cost of the works to install long-distance switching system was considerably lower (in the Chinese portion).

Comparison of Original Plan and Actual

Item		Plan	Actual	
1. Project Scope				
i) Construction of optical fiber transmission facilities				
Facilities	Section			
Main lines	Beijing ~ Tianjin ~ Qinhuang	1,654km	As planned	
	Dao ~ Shenyang ~ Changchun ~ Harbin			
	Beijing ~ Chengde~Fuxin ~ Baichang ~ Qiqihar	1,622km		
	Shenyang ~ Dalian	479km		
	Shenyang ~ Fuxin	212km		
Feeder lines	Harbin ~ Qiqihar	362km		
	Changchun ~ Baichang	380km		
	Optical fiber			
Transmission	Beijing ~ Tianjin	(7+1) x 140Mb/s		(9+1) x 140Mb/s, 4 x 2.5Gb/s
Equipment ^(Note)	Tianjin ~ Shenyang	(5+1) x 140Mb/s		7 x 140Mb/s, 3 x 2.5Gb/s
	Shenyang ~ Changchun	(4+1) x 140Mb/s	(6+1) x 140Mb/s, 2 x 2.5Gb/s	
	Changchun ~ Harbin	(3+1) x 140Mb/s	(4+1) x 140Mb/s, 2 x 2.5Gb/s	
	Beijing ~ Chengde	(3+1) x 140Mb/s	(5+1) x 140Mb/s, 1 x 2.5Gb/s	
	Chengde ~ Fuxin	(3+1) x 140Mb/s	5 x 140Mb/s, 1 x 2.5Gb/s	
	Fuxin ~ Qiqihar	(2+0) x 140Mb/s	(2+1) x 140Mb/s, 1 x 2.5Gb/s	
	Shenyang ~ Dalian	(2+1) x 140Mb/s	(3+1) x 140Mb/s, 2 x 2.5Gb/s	
	Yinkou ~ Dashiqiao	(2+0) x 140Mb/s	(2+1) x 140Mb/s	
	Shenyang ~ Fuxin	(3+1) x 140Mb/s	(5+1) x 140Mb/s, 1 x 2.5Gb/s	
	Changchun ~ Baichang	(2+0) x 140Mb/s	(2+1) x 140Mb/s, 1 x 2.5Gb/s	
	Harbin ~ Qiqihar	(2+0) x 140Mb/s	(2+1) x 140Mb/s, 1 x 2.5Gb/s	
	ii) Installation of long - distance switching systems			

Tangshan	1,500 lines	} As planned
Dalian	2,900 lines	
Siping, Qiqihar	500 lines for each	
Baichang, Tongliao	300 lines for each	
iii) Technical training	Canada • Japan • USA	Canada
2.Implementation Schedule		
Civil works	Jul. 1992 to Dec. 1992	Jun. 1992 to Aug. 1992
Optical fiber transmission equipment	Jul. 1993 to Dec. 1995	Nov. 1993 to Dec. 1995
Installation of switching system	Jul 1994 to Mar. 1995	Apr. 1995 to Dec. 1995
3.Project Cost (excluding contingency)		
Foreign currency (=ODA loan portion)	¥6,853 million	¥6,032 million
Local currency (=Chinese portion)	435 million Yuan	395 million Yuan
Total	¥15,952 million	¥12,404 million
Exchange Rate	1 Yuan = ¥20.9 (at the time of appraisal)	1Yuan = ¥16.13 (average for 1992~1995)

Note: The figures in the parentheses show “Current system number” + “Reserved system number”.

(4) Project Implementation Scheme

The executing agency for this project was Posts and Telecommunications Department (it has since merged with another ministry to form the Ministry of Information Technology and Telecom Industries). The execution of this project was managed by Basic Construction Section and constructed by the basic construction office of each regional authority.

The optical fiber transmission facilities were selected by international competitive bidding. The order for the 140Mbit/s equipment was won by a Japanese company, while that for the additional 2.5Gbit/s equipment was won by a German company.

The manufacture and delivery of the equipment went according to schedule and the technical guidance and training etc. were carried out thoroughly on delivery. Therefore the performance of the contractors was good.

(5) Operations and Maintenance

The operations and maintenance after the completion of the project is conducted by Telecommunications Regulatory Bureau, under the umbrella of Ministry of Information Technology and Telecom Industries. As noted above, the contractors (equipment manufacturers) provided thorough technical guidance and training when they installed the equipment, and there have not been any significant problems since the system began operation in 1996.

Call charge collection is handled by the billing section within Telecommunications Regulatory Bureau. Charges are recorded by automatic charge recording devices and bills are mailed to users every month. Normally, large users pay by bank transfer and small (individual) users pay by cash. The overall collection rate for both fixed and cellular phones together is around 90%. The collection rate is lower for cellular telephones than for fixed lines.

The equipment installed under this project achieves extraordinarily high levels of reliability.

The proportion of breakdowns repaired within the next business day was 100% in Beijing, Shenyang, Harbin and overall northeast region and 98% in China overall.

Preparations for the Y2K problem are proceeding under the direction of a working group established by State Council. By now, 90% of systems are Y2K compliant and the remaining systems are scheduled to be compliant before the arrival of 2000.

(6) Project Effects and Impacts

(i) Improvement in the Overflow Rate

The overflow rate, which indicates how difficult it is to place a telephone call, improved dramatically in 1994, when part of this project went into operation, and improved further in 1996, when the 2.5Gbit/s SDH system was added. Further improvements in 1997 and 1998 were due to the beginning of operation of a 10Gbit/s system which was installed after this project.

Table 1 Transition in Overflow Rates

Year	1991	1992	1993	1994	1995	1996	1997	1998
All China	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	8.32	1.16
Northeast region	75	77	60	10	5	3	6	0.3
Beijing	40	40	35	30	25	10	2	1
Shenyang	70	83	60	5	13	4	*10	0.3
Harbin	79	65	65	10	5	2	5	0.2

*The increased overflow rate in 1997 was due to flooding.

(ii) Financial Internal Rate of Return (FIRR)

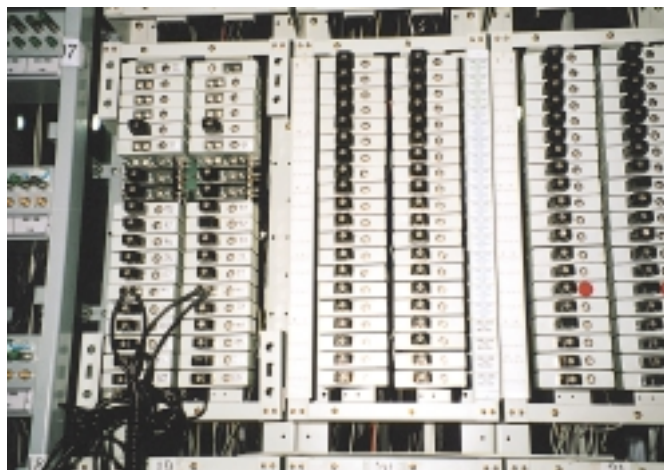
FIRR of 12.11% was anticipated before this project was implemented. Actually, the cost underrun and the substantial increase in call capacity yielded by the introduction of SDH increased profitability, raising the FIRR to 52.14%.



Shenyang Telegraph Office



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Long distance Switching Board of Shenyang Telegraph Office