China

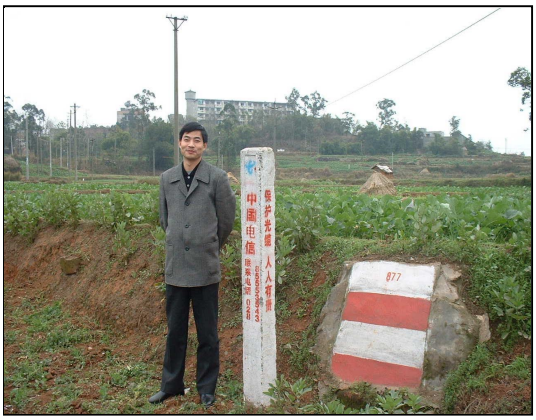
Optic Cable Construction Project in Guanzhou, Kunming and Chengdu

Report Date: January 2003

Field Survey: December 2002

1. Project Profile and Japan's ODA Loan

Project area location map



Marker pole at the site where the optic cable is buried (Huayangzhen, Shangliu County, Chengdu, Sichuan Province)

1.1 Background

Since China shifted its policy toward the direction of reform and liberalization in December 1978, a high priority has been given to the construction of telecommunications facilities as an important element of infrastructure supporting economic development. The communications capacity has increased remarkably since 1990, particularly as a result of the introduction of digital systems. For example, the number of installed telephones has increased by 35% on an annual average during the period between 1990-1995, suggesting the rapid growth in the telecommunications sector.

In the 9th Five-Year Plan (1996-2000), too, expansion of communications networks was considered important for the establishment of basic infrastructure. It was planned to increase the capacity of transmission lines from economically underdeveloped inland regions to developed coastal regions as a measure to promote economic development of the inland regions and rectify regional disparities. From this viewpoint, a fiber cable network was planned to be built in a mesh pattern in which east-west and north-south lines would intersect, covering 90% of cities throughout the country.

In the project area of Guangdong Province, Guangxi Zhuangzu Autonomous Region, Yunnan Province and Sichuan Province, industries such as fruit processing, mining and manufacturing, and development of resources, were growing rapidly with the advancement of the open-door policy. Under such circumstances, demand for communications in these regions was expected to grow in the future. This project was to provide economically retarded inland provinces with a route of information and communications to the coastal areas. In this sense, the project was much needed by the local economy and also was in line with the 9th Five-Year Plan. Also, this project, which was to establish a communications network in these regions that border on other countries such as Vietnam, Laos and Thailand, was expected to play an important role in the construction of international communications networks and the promotion of the open-door policy.

1.2 Objectives

The objectives of the project were to construct a long-distance optic transmission network extending over Guangdong Province, Guangxi Zhuangzu Autonomous Region, Yunnan Province and Sichuan Province in order to accommodate the growing demand for communications in these regions, and at the same time, to improve the investment environment in inland regions such as Sichuan and Yunnan Provinces with a view to promoting economic development.

1.3 Project Scope

Construction of fiber optic transmission lines (total length: 4,417km) and transmission facilities.

The ODA loan covered the entire foreign currency portion of the cost of the above.

1.4 Borrower/Executing Agency

Ministry of Foreign Trade and Economic Cooperation of the People's Republic of China[1]/Ministry of Post and Telecommunications of the People's Republic of China

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	5,349 million yen 3,819 million yen
Exchange of Notes Loan Agreement	December 1996 December 1996
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.3% 30 years (10 years) General untied
Final Disbursement Date	June 2002

2. Results and Evaluation

2.1 Relevance

In the 9th Five-Year Plan (1996-2000), expansion of communications networks was considered important for the establishment of basic infrastructure. Promoting economic development of inland regions by increasing the capacity of transmission lines from economically underdeveloped inland regions to developed costal regions, thereby rectifying disparities between the inland and coastal regions, was one of important issues to be tackled under the plan. The optic cables planned to be built under the project were to connect economically retarded Yunnan Province and the Western part of Guangxi Zhuangzu Autonomous Region, the then developing Eastern part of the same region, the inland economic center Chengdu, and Guanzhou, one of the economic centers of the country, in line with the 9th Five-Year Plan. Therefore, the objectives of the project were relevant enough.

The 10th Five-Year Plan (2001-2005) announced in March 2000 set the target of facilitating development of the information service industry and vigorously promoting information-oriented development, with particular importance given to the establishment of information infrastructure. Increases in the communications speed and the volume, and the construction of long-distance optic cables which laid the foundations for ensuring high quality communications under the project,

[1] The borrower of ODA loans to China provided in 1999 and after has changed to the government of the People's Republic of China (Ministry of Finance).

contributed to the achievement of the overall goal of establishing information infrastructure in China. In this sense, the project maintained its relevance at the time of this evaluation.

2.2 Efficiency

2.2.1 Project Scope

The total actual length of fiber optic cables built under the project was 4,174km, 243km shorter than the planned 4,417km. This resulted from a change in the cable route at the stage of detailed planning. Since the project area includes mountainous regions, the initial plan was subject to change to better adapt to the actual situation. Transmission facilities were procured and installed as planned.

2.2.2 Implementation Schedule

Project completion was delayed by 2 months mainly because of a delay at the stages of facility bidding and procurement planning. In spite of a reported delay in the engineering work due to bad weather, the construction per se was completed within the planned period.

2.2.3 Project Cost

The foreign currency portion of the project cost was 3,819 million yen, resulting in a cost under run of 30% compared to the initially estimated 5,349 million yen. The domestic currency portion, which was estimated at 793 million yuan (RMB), turned out to be 393 million RMB, a cost under run of as much as 50%. These under runs are mainly attributable to (1) the reduction in the length of optic cables constructed, and (2) price reductions as a result of international competitive bidding.

2.3 Effectiveness

2.3.1 Changes in Switch Capacity, Number of Telephone Subscribers and Number of Waiting Applications

Following project completion in 1999, the constructed facilities were formally put in service in October 2000. During the period from 1998 to 2001, both the switch capacity and telephone subscribers increased in the project area. In particular, the capacity of long-distance switches marked an enormous increase from 1998 to 2001, around the year of project completion (see Table 1). The number of waiting applications for subscriptions had already been reduced to "0" in 1998, before project completion. The number of subscribers to fixed telephones in each region shows that subscribers increased remarkably from 1995 to 2000 in all regions including urban and rural areas, pushing up the overall telephone density (see Table 2). The data prove that the project helped provide long-distance communications services for a larger number of people.

Table 1: Switch Capacity, Number of Fixed Telephone Subscribers and Number of Waiting Applications in Provinces Covered by the Project

Province	Station switch capacity (ten thousand lines)			Long-distance switch capacity (ten thousand lines)			Fixed telephone subscribers (ten thousand persons)			Waiting applications (ten thousand lines)		
	1995	1998	2001	1995	1998	2001	1995	1998	2001	1995	1998	2001
Guangdong	1,007	1,394	1,752	45	54	84	361	958	1,711	6	0	0
Guangxi	149	289	461	10	15	23	76	167	415	1	0	0
Sichuan	275	513	779	15	19	34	136	280	682	2	0	0
Yunnan	134	313	432	7	13	19	64	188	360	2	0	0
Total	1,565	2,509	3,424	77	101	160	637	1,593	3,168	11	0	0

Source: Data of the Ministry of Information Industry

Table 2:Number of Fixed Telephone Subscribers and Telephone Density by Province

Province	Item	1995	2000	2001
Guangdong	Subscribers in urban areas (ten thousand persons)	N.A.	916.0	1092.4
	Subscribers in rural areas (ten thousand persons)	N.A.	498.9	618.6
	Telephone density (sets/100 persons)	10.4	28.2	48.4
Guangxi	Subscribers in urban areas (ten thousand persons)	65.6	233.5	289.6
	Subscribers in rural areas (ten thousand persons)	11.0	85.6	124.9
	Telephone density (sets/100 persons)	2.3	14.3	15.5
Sichuan	Subscribers in urban areas (ten thousand persons)	136.0	407.0	481.1
	Subscribers in rural areas (ten thousand persons)	23.0	151.0	201.2
	Telephone density (sets/100 persons)	1.4	N.A.	15.4
Yunnan	Subscribers in urban areas (ten thousand persons)	64.0	222.0	276.2
	Subscribers in rural areas (ten thousand persons)	9.9	67.0	83.7
	Telephone density (sets/100 persons)	4.7	20.1	16.5
Total	Subscribers in urban areas (ten thousand persons)	-	1,779	2,139
	Subscribers in rural areas (ten thousand persons)	-	803	1,028

Source: Yearbooks of each region and data of Ministry of Information Industry

2.3.2 Contribution to Handling the Demand for Long-Distance Calls

In China today, means of communication are rapidly being diversified to include the Internet, mobile telephone (including PHS) and IP telephone card in addition to fixed telephones.[2] These communications media use optic cables to some extent. Although no data were available on use of optic cables built in the course of the project for each communications medium, it can be said that, after all things considered, the project made some contributions to handling the demand for long-distance calls.

The overall number of long-distance telephone lines, for example, increased greatly after project completion in 1999, compared with the figures for 1995. (see Table 3. There are some exceptions.) This increase partly resulted from other investment projects made in related fields during the same period. Still, as a general tendency, the capacity of transmission facilities in each region increased remarkably after the construction of optic cables under the project.

As for the number of long-distance calls handled (Table 4), the figure for each region doubled from 1995 before the project to 2000, and continued increasing in 2001, with the exception of Yunnan Province. According to interview surveys by Sichuan Provincial Telecommunications Corporation and Yunnan Provincial Telecommunications Corporation, both the number of fixed telephones and number of long-distance calls handled increased remarkably due to the project.

[2] The number of internet users in China increased from 160,000 in 1997 to 36.56 million in 2001, representing a more than 200-fold increase, and the number of mobile telephone subscribers increased from 13.23 million in 1997 to 145.22 million in 2001, a 10-fold increase. In the project area, mobile telephone subscribers in Sichuan Province increased from 8.52 million in 1998 to 59.20 million in 2001 (a sevenfold increase) and those in Guanxi Zhuangzu increased from 0.1 million in 1995 to 2.7 million in 2001 (a 27-fold increase).

Table 3: Number of Long-Distance Telephone Lines by Province

(Unit: line)

Province	1995	1999	2000	2001
Guangdong	159,162	478,513	694,100	N.A.
Guangxi	21,905	N.A.	84,027	64,203
Sichuan	27,579[1)]	111,301	87,670	147,721
Yunnan	13,104	50,706	95,725	N.A.
Total	194,171	N.A.	961,522	N.A.

Source: China Yearbook 2002, yearbooks of each region, and JBIC's data for appraisal
Note): The figure for 1994

Table 4: Number of Long-Distance Calls from Fixed Telephones

(Unit: 10 thousand calls)

Province	Item	1995	2000	2001
Guangdong	Projection	316,400	1,038,730	N.A.
	Actual	N.A.	481,044	492,755
Guangxi	Projection	26,560	178,860	N.A.
	Actual	24,369	44,848	46,222
Sichuan	Projection	42,330	197,630	N.A.
	Actual	46,485	82,927	86,430
Yunnan	Projection	14,600	102,130	N.A.
	Actual	16,750	38,105	33,969
Total	Projection	399,890	1,517,350	N.A.
	Actual	N.A.	646,924	659,376

Source: China Yearbook 2002 and yearbooks of each region

However, in comparison with the projections at appraisal, the number of long-distance calls handled through fixed telephones was less than half of the planned figure (as of FY2000, see Table 4). One reason is that the number of calls from mobile telephones (including PHS), which are now replacing fixed telephones, is not reflected in the actual results. At the appraisal, optic cables were planned to be used for long-distance calls from fixed telephones. Now that mobile telephones are widely used as an alternative to fixed telephones, long-distance calls can also be made from mobile telephones. As we could not obtain the "actual data" on long-distance calls including those from mobile telephones in this survey, we made trial calculations of the total number of long-distance calls handled including those from mobile telephones, based on the percentage of telephone densities of fixed and mobile telephones against the total telephone density (Table 5). The result is shown in Table 6.

Table 5: Telephone Densities by Province (2001)

Province	Telephone density	Fixed telephone density	Mobile telephone density
	(sets/100 persons)	(lines/100 persons)	(sets/100 persons)
Guangdong	48.4	19.7	27.6
Guangxi	15.5	9.1	6.0
Sichuan	15.4	8.2	6.8
Yunnan	16.5	8.3	7.9

Source: Data of Ministry of Information Industry

Table 6: Number of Long-Distance Calls by Province

(Unit: 10 thousand calls)

Province	2000		
	(a) Projection	(b) Actual (estimate)	b/a (%)
Guangdong	1,038,730	1,154,994	111
Guangxi	178,860	74,418	42
Sichuan	197,630	151,696	77
Yunnan	102,130	74,374	73
Total	1,517,350	1,455,481	96

Note: Projections were taken from Table 4 and actual calls were estimated based on Table 4 and Table 5.

According to the result of these trial calculations (Table 6), the actual figure exceeds the projected figure by 11% in the case of Guangdong Province, while actual figures for the other 3 provinces are 30-60% less than planned. In total, the projected number has almost been achieved.

2.3.3 Quality Improvement of Long-Distance Communications

Although no data concerning the quality of telephone services, such as call completion rates, were available, the fact that the transmission capacity has increased enormously after the introduction of the optic cable system and the system has been properly operated suggests that the quality of communications has been improved. In the interview surveys with the subsidiaries of China Telecommunications Corporation (the organization in charge of operations and maintenance of the optic cables constructed under the project) and users, the following replies were obtained:

- Although it is difficult to prove based on quantitative data that the quality of communications services has improved, the project helped increase the number of long-distance telephone lines and that of fixed telephones installed. The call quality also has improved in general. (according to Yunnan Provincial Telecommunications Corporation of China Telecom)
- Because of the project, the transmission capacity has increased remarkably (1,260-times increase from 2Mbps to 2.5Gbps) and the communications capability has improved. (according to Sichuan Provincial Telecommunications Corporation of China Telecom)
- We were using telephones and facsimile machines before 1997, when communications services were low in quality and inconvenient. After the project was completed, the quality of calls was ensured and the services became more convenient. We started using the Internet in 1999 and became able to obtain trade information around the world via the Internet. Thus, we benefit from the increase in the forms of communications services. (according to owner of a private company in Xichang, Yi Liangshan Autonomous Region, Sichuan Province)
- Before the construction of fiber optic cables under the project, communications problems often interfered with our business. Problems occurred both when making and receiving telephone calls. With the completion of the project, these problems were solved and no problem has occurred relating to the communications quality ever since. Long-distance calls are always connected to the exclusive line. (according to a lodging facility in Xichang, Yi Liangshan Autonomous Region, Sichuan Province)
- After the project was completed, the transmission capacity increased from 2Mbps to 310Mbps and the bottleneck in communications was eliminated. Also, as a result of the diversification of communications services, both international and domestic long-distance call services became more convenient and the quality of communications services was ensured. (according to Government of Liangshan, Sichuan Province, based at South Rd., Sanchakou, Xichang)

2.3.4 Financial Internal Rate of Return (FIRR)

Since reliable data on the revenue from the project and O&M costs are not available from China Telecommunications Corporation that is the executing agency, O&M costs are assumed to be 1.89 million RMB, the figure reported in the Project Completion Report (PCR). The revenue was estimated based on the result of a trial calculation of the total number of long-distance calls handled (including those from mobile telephones) (Table 6). (The annual growth rate of the number of long-distance calls

handled from fixed telephones was assumed to be about 2%[3], and that from mobile telephones was assumed to be 11%[4] up to 2013 and to remain at that level thereafter.) Calculations based on the above conditions resulted in an FIRR of 13.4% (it was estimated at 13.1%[5] at appraisal).

2.4 Impact

2.4.1 Facilitation of Investment and Economic Development

Foreign Direct investment and economic growth in each region in the late 1990s are various depending on the regions (see Table 7). In terms of the GDP growth rate, a trend towards growth is observed in all regions. However, the amount of foreign direct investment increased only in Sichuan Province and in other provinces either decreased or remain almost unchanged.

Table 7: Economic Indicators in China and Provinces in Project Area

Province	Item	1996	1997	1998	1999	2000	2001
Whole country	GDP growth rate	9.8%	8.6%	7.8%	7.2%	8.4%	7.0%
	Direct investment (hundred million US dollars)	417.3	452.6	454.6	403.2	107.1	468.8
	Cases of foreign capital participation	24,556	21,001	19,799	16,918	22,347	26,140
Guangdong	GDP growth rate	10.7%	10.6%	10.2%	9.5%	10.5%	9.5%
	Direct investment (hundred million US dollars)	116.2	117.1	120.2	116.6	112.8	119.3
	Cases of foreign capital participation	-	-	-	-	4,243	5,315
Guangxi	GDP growth rate	10.3%	8.1%	9.1%	7.7%	7.2%	8.2%
	Direct investment (hundred million US dollars)	6.6	8.8	8.9	6.4	5.2	3.8
	Cases of foreign capital participation	-	-	-	-	246	285
Sichuan	GDP growth rate	10.1%	10.2%	9.1%	5.6%	9.3%	9.2%
	Direct investment (hundred million US dollars)	2.3	2.5	3.7	3.4	4.4	5.8
	Cases of foreign capital participation	-	-	-	-	293	356
Yunnan	GDP growth rate	10.4%	9.4%	8.0%	7.2%	7.1%	6.5%
	Direct investment (hundred million US dollars)	0.7	1.7	1.5	1.5	1.3	0.6
	Cases of foreign capital participation	-	-	-	-	106	140

Source: China Yearbook 2002

Since macroeconomic indicators are largely affected by other external factors, it is impossible to accurately determine the project's contribution to economic growth and facilitation of investment. However, based on a general recognition that there is a correspondence between the level of communications infrastructure and the level of investment increase and economic growth, the project is believed to have facilitated industrial development to some extent. The followings are replies received in interview surveys with the subsidiaries of China Telecommunications Corporation and users in Sichuan Province.

- Economic and investment activities have been expanding over the past 4-5 years. Quality improvement of communications services seems to have benefited high technology companies mostly situated in the "Gaoxin Economic Development West Zone" established in 2000 in the city. (according to Sichuan Provincial Telecommunications Corporation of China Telecom)
- I am engaged in export of agricultural products and domestic trade of ore mineral products. I often make domestic and international long-distance calls. I would not be able to manage my business without today's convenient communications services. (according to the owner of a

[3] The growth rate that was actually achieved in the period 2000-2001.
[4] Estimated based on an assumption that mobile telephone density in China will reach 50% by 2013.
[5] In a recalculation based on the annual increase rate of long-distance calls adjusted to reflect the actual situation, the revenue is less than estimated at appraisal. Also, the expenditure recalculated using the figures obtained at evaluation is less than estimated at appraisal.

private company in Xichang, Yi Liangshan Autonomous Region, Sichuan Province)

- Improvement of communications infrastructure set the stage for further economic development and promoted market liberalization of this province. Fixed asset investments increased from 2 billion RMB in 1998 to 5.2 billion RMB today (2002), achieving an annual growth rate of 20%. The tourism industry has also been growing strongly. Advancement of communications methods has promoted exchanges with other regions and, as a result, people's way of thinking has begun to change. Regions that manage to get out of poverty are always those where communications infrastructure is quickly established. (according to Government of Liangshan, Sichuan Province, addressed at South Rd., Sanchakou, Xichang)
- After the improvement of communications infrastructure, our business capacity has been enhanced significantly. For example, immediate processing and reporting of financial data, which we never thought of before, became possible. (It used to take one to two months to prepare financial statements.) Thanks to the improved communications infrastructure, our methods of doing business have changed and productivity has increased enormously. (according to the Operations Control Center, China Southwest Airlines (a holding of the China National Aviation Company))
- Before the project, it took more than one month to prepare for domestic or overseas bidding. Since advanced forms of communication such as the Internet have become available, we have been able to prepare much more quickly. Also, the labor and time savings that result from this make our plant more profitable. (according to a plant in the Gaoxin Economic Development West Zone)

2.4.2 Development of China's National Transmission Network of Optic Cables and Enhancement of Communications Capacity

The project was tasked to construct part of China's national network of optic cables. Once the laying of optic cables started in China (around 1990) the network of fiber optic cables expanded rapidly, particularly after 1998 when the project was completed. At the same time, telephone density, telephone subscribers, long-distance transmission lines and long-distance calls handled have increased significantly, showing that communications infrastructure has been improved remarkably. The project is considered to have made a significant contribution to these improvements.

Table 8: Advances in the Establishment of a National Telephone Network and Expansion of Communications Capacity (Actual Achievements)

Indicators	1994	1995	1996	1997	1998	1999 (completion)	2000	2001	2002 (as of October)
Total number of telephones (ten thousand sets)	3,959	5,762	7,732	10,111	13,123	17,567	(12,100) 25,607	35,339	N.A.
Telephone density (sets/100 persons)	3.2	4.7	6.3	8.1	10.5	13.0	(10) 20.1	25.9	31.99
Telephone density in urban areas (sets/100 persons)	13.0	17.0	22.0	26.1	27.7	28.4	(30-40) 39.0	N.A.	N.A.
Local call switch capacity (ten thousand lines)	4,926	7,204	9,291	11,269	13,824	15,346	(15,040) 17,826	19,976	21,627
Out-of-area call switch capacity (ten thousand lines)	242	352	416	437	449	503	(600) 564	703.6	747
Subscriber lines (ten thousand lines)	2,730	4,071	5,495	7,031	8,742	10,872	(8,400) 14,483	17,903	20,906
Long-distance lines (ten thousand lines)	61.6	73.6	99.8	114.6	157	186	(280) 220	339	552
Number of long-distance calls handled (hundred million calls)	75.8	101.4	127.4	155.4	182.6	194	210.8	220.0	N.A.
Long-distance fiber optic cables (ten thousand km)	7.3	10.7	13.0	15.1	19.4	24.0	28.7	39.9	N.A.

Source: JBIC data, China Yearbook 2002, Data from the Ministry of the Information Industry
Note: The total number of telephones includes mobile telephones. Figures in brackets ( ) are target figures.

2.4.3 Environmental and Social Impacts

According to the executing agency, no environmental impact has been reported. As for social impacts, no problem has been reported with respect to land acquisition, relocation of local residents or other issues.

2.5 Sustainability

2.5.1 Agencies in Charge of Operation and Maintenance

As with other optic cable projects financed by the ODA loans, the Ministry of Post and Telecommunications and the Post and Telecommunications Administration Bureaus of three provinces and one ward were expected to have the responsibility for operations and maintenance at the time of appraisal. In 1998, however, the Ministry of the Information Industry was established by merging the Ministry of Post and Telecommunications and the Ministry of Electronics and Industry. At present, the Ministry of the Information Industry oversees the administrative aspects of the project and the project facilities are virtually operated and maintained by China Telecommunications Corporation. Consequently, agencies in charge of operations and maintenance of this project have changed from the Post and Telecommunications Ministry and the Telecommunications Administration Bureaus of three provinces and one ward to China Telecommunications Corporation and its subsidiaries in three provinces and one ward.

In May 2002, China Telecommunications Corporation was further divided into two separate entities: China Telecommunications, which has a control over subsidiaries in 21 provinces, cities and regions (out of the total 31) and owns 70% of the assets in trunk networks in China (also known as “Southern Corporation”); and China Network Communications Corporation, which covers 10

provinces, cities and regions in northern areas[6] and owns 30% of the assets in national trunk networks (also known as "Northern Corporation").[7] Facilities of this project are operated and maintained by each subsidiary of China Telecommunications Corporation in three provinces and on ward.

2.5.2 Operations and Maintenance Systems

As stated above, operations and maintenance of project facilities are fulfilled by each subsidiary, within which the Operations and Maintenance Division takes charge of facility operations and maintenance. The actual operations and maintenance work is performed by branch offices in each administrative district. Facilities are operated according to the standards set by the headquarters of China Telecommunications Corporation (standards for the number of accidents in a year, as well as the total length of disconnection caused by any accidents to be kept within 0.1% of the total time each year, etc.). No particular problem, such as a shortage of personnel or lack of required skills, has been reported. The systems of operations and maintenance at the two subsidiaries we surveyed on this occasion are discussed below.

(1) Yunnann Provincial Telecommunications Corporation of China Telecom

Operations and maintenance of the project facilities are managed by a Network Operations Division that has nearly 1,000 employees. There are 16 branch offices in each administrative district, and they operate and maintain facilities in the respective districts. At each branch office, personnel from a minimum of 4-5 persons to a maximum of 8-10 persons operate and maintain facilities. There has been no noticeable failure of facilities. In some areas, landslides occur because of the topographic features.In the event of landslides, cables are sometimes cut down, but are repaired immediately after the accident and an alternative route is temporarily used during the repair. Therefore, communications conditions are not affected in any way. The target of keeping serious trouble/incidence from happening at the rate of 1.8 has been achieved.

(2) Sichuan Provincial Telecommunications Corporation of China Telecom

Operations and maintenance of facilities are performed following the rules established by the Corporation's headquarters. The Network Operation Division is in charge of operation and maintenance. Among 5,000 employees engaging in duties related to operations and maintenance, 2,034 employees are involved in activities related to optic cables. There has been no failure of facilities. Optic cables were cut by natural disasters (landslides) on one occasion in 1999, on 2 to 3 occasions in 2001 and on 3 occasions in 2002. They were repaired immediately. Repair and recovery are conducted with the aim of achieving the target set by head quarters, which is to keep the yearly length of disconnection within 0.01% of total time (the provincial corporation set the target of within 500 minutes a year).

2.5.3 Financial Status

As we approached them shortly after the division of assets in FY2002, neither of the above-mentioned subsidiaries of China Telecommunications Corporation provided us with their financial statements, saying that the latest financial statements were still prepared. As already mentioned, 70% of the assets in fiber cable networks are owned by China Telecommunications

[6]The cities of Beijing and Tinajin, provinces of Hebei and Shanxi, Inner Mongolia Autonomous Region, and provinces of Liaoning, Jilin, Heilongjiang, Shandong and Henan. Another 21 provinces, cities and regions are served by China Telecommunications Corporation.

[7] The entire network assets were divided at the ratio of 7:3 without regard to the service areas. Therefore, both corporations can do business nationwide. In November 2002, China Telecommunications Corporation listed stocks of China Telecom Corporation Limited, which holds 100% of the shares in 4 regional subsidiaries including that in Guangdong. (China Telecommunications Corporation owns 70% of the shares in the listed company.)

Corporation and the remaining 30% are owned by China Network Communications Corporation. Considering this situation, we refrain from conducting an analysis and evaluation of this item, like other optic cable construction projects financed by the ODA loans.

3. Feedback

3.1 Lessons Learned

When implementing communications infrastructure projects, effect indicators should be set not only for the "traffic volume" but also for the "transmission capacity" (unit: Mbps) at appraisal.

In the past, communications infrastructure projects were implemented mainly for the purpose of providing fixed telephone services. However, with the technological innovations of recent years, communications infrastructure has come to be used for mobile telephone services and the Internet in addition to fixed telephone services. At the planning stages of any such project in the future, it will be important to use the "transmission capacity" (unit: Mbps), which measures the degree of effectiveness of communications infrastructure, including the extent to which it can be used for Internet purposes, as an indicator in addition to "traffic volume", an indicator for telephone services only.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope		
1) Fiber optic cables	1) Guangzhou-Beihai trunk line (825km), Beihai-Kunming-Chengdu trunk line (3,361km), Chuxiong-Dali trunk line (231km)	1) Guangzhou-Beihai trunk line (805.3km), Beihai-Kunming-Chengdu trunk line (3,167.3km), Chuxiong-Dali trunk line (202km)
2) Transmission facilities	2) Guangzhou-Chanchiang (STM16: 5 lines), Chanchiang-Beihai (STM16: 3 lines, STM4: 1 line), Beihai-Kunming-Chengdu (STM16: 2 line, STM4: 1 line), Chuxiong-Dali (STM4: 1 line)	2) As planned
2. Implementation Schedule		
1. Optic cables		
Bidding and contracting	Oct. 1996 – Jul. 1997	May 1997 – Nov. 1997
Manufacturing and delivery	Apr. 1997 – Dec. 1997	Dec. 1997 – Feb. 1998
Installation	Apr. 1997 – Dec. 1997	Feb. 1998 – Aug. 1998
2. Transmission facilities		
Bidding and contracting	Jan. 1997 – Oct. 1997	Jan. 1998 – Feb. 1998
Manufacturing, delivery and installation	Oct. 1997 – Dec. 1998	May 1998 – Feb. 1999 Feb. 1998 – Aug. 1998
3. Excavation	Oct. 1996 – Apr. 1997	
3. Project Cost		
Foreign currency	5,349 million yen	3,819 million yen
Local currency	9,516 million yen (793 million RMB)	5,738 million yen (393 million RMB)
Total	14,865 million yen	9,557million yen
ODA loan portion	5,349 million yen	3,819million yen
Exchange rate	1US$ = 100 yen 1RMB = 12 yen As of January 1996	1RMB = 14.6yen Average for 1998-2002

Third Party Evaluator's Opinion on China Optic Cable Construction Project in Guangzhou, Kunming and Chengdu

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Relevance

(1) The implementation of China Optic Cable Construction (COCC) project has high relevance with the economic development of China. Since Dec. 1978, the development of the communication industry has been accelerated accompanied with China's Economic Reform and Open-door Policy. Since 1990, the infrastructures for communication have developed greatly, especially the introduction of digital system. From 1990 to 1995, the number of mobile communication increased by 35% on the average per year. So the COCC project is important and timely.

(2) During the 9th Five-Year Plan, 1996-2000,the Digital Communication Net is considered as one of the most important infrastructures. Covering most of China, COCC strengthens the communication of the interior and the coastal, as well as the communication of China and oversea.

Impact

(1) It is difficult to estimate the contribution of the project to increasing the GDP and improving the environment. We can see that the foreign investment has nearly no change from 1996 to 2000 except for Sichuan Province. The foreign direct investment is affected by many factors, so we can't draw the conclusion that the COCC has no contribution to the improvement of the foreign investment environment. Roughly speaking, the COCC project should contribute to increasing the GDP and improving the environment. We can see this from the evaluation on the Sichuan Province and the high-tech industry parks in those areas invested by foreign capital.

(2) COCC promoted the fixed asset investments. Take Sichuan for example, from 1998 to 2002, the fixed asset investments in Sichuan increased from 2 billion RMB to 5.2 billion RMB with an annual growth rate of 20%, including the contribution arose from COCC.

(3) The business capacity has been enhanced rapidly after the improvement of communication. The airline industry was particularly benefited.

(4) The completion of COCC accelerated the construction of the China's National Transmission Network of Optic Cables. The communication capability of China was enhanced. In completion of COCC, the telephone density, telephone subscribers, long-distance transmission lines and long-distance operation in China had marked an increase.

(5) There has no negative effect of COCC on environment and society.