China

Beijing Subway Construction Project (1) (2)
Beijing Subway Second Phase Construction Project (1) (2) (3) (4)

Report Date: February 2003

Field Survey: December 2002

1. Project Profile and Japan's ODA Loan

Project area location map

Inside of Line 1 subway car

1.1 Background

As of 1985, bus services accounted for 94.8% of public transport in Beijing, while the subway and taxis accounted for 3.9% and 1.3% respectively. This tendency to depend on bus transportation was expected to last for some time. As bicycles are an important mode of personal transport, roads were flooded with automobiles and bicycles, which caused a decline in the speed of bus operations and increases in traffic accidents. The data for the same year show that the peak hour cross-sectional traffic volume (transport volume in one direction per hour) on Chang'an Street was 36,000 persons, vastly exceeding the transport capacity of 12,600 persons. In light of this situation, extension of subway lines was needed to ease road traffic congestion.

Hence this project was implemented under the 7th Five-Year Plan (1986-1990) to establish "metropolitan passenger transport systems with railway transport playing a central role" (according to the central government), and the Beijing Municipal Government, in planning subway construction, gave "highest priority to subway extension eastward from Fuxingmen."

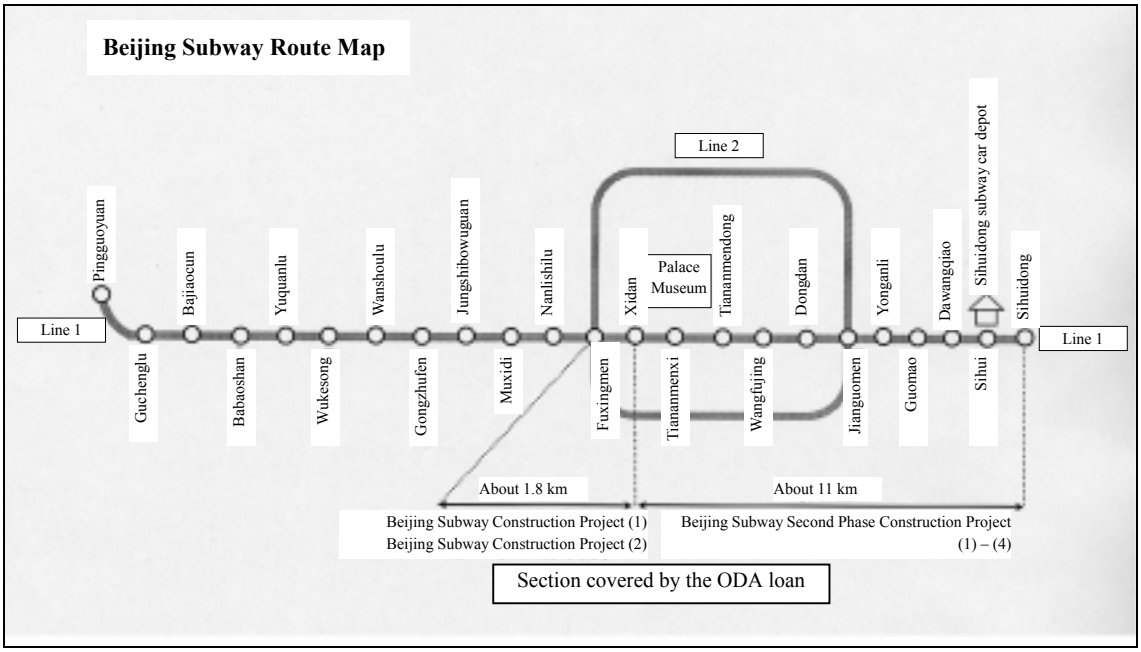
1.2 Objectives

The objective of the project is to alleviate the congestion of road traffic on Chang'an Street, the main street of Beijing, by constructing subway facilities.

1.3 Project Scope

Construction of a 12km-long subway line between Fuxingmen Station and Sihuidong Station (formerly Bawangfendong Station) (see the Beijing Subway Route Map below), construction of subway stations (10), construction of a subway car depot, and procurement of subway cars (186).

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



1.4 Borrower/Executing Agency

Ministry of Foreign Economy and Trade of the Peoples Republic of China[1]/Beijing Mass Transit Railway Corporation

1.5 Outline of Loan Agreement

First Phase (Fuxingmen-Xidan)

	Beijing Subway Construction Project (1)	Beijing Subway Construction Project (2)
Loan Amount Loan Disbursed Amount	2,510 million yen 2,506 million yen	1,490 million yen 1,489 million yen
Exchange of Notes Loan Agreement	July 1988 August 1988	May 1989 May 1989
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.5% 30 years (10 years) General untied (Partial untied for consulting services)	 2.5% 30 years (10 years) General untied
Final Disbursement Date	August 1995	May 1997

[1] Currently the Ministry of Foreign Trade and Economic Corporation. The borrower of ODA loans to China provided in 1999 and after has changed to the Government of the Peoples Republic of China (Ministry of Finance).

Second Phase (Xidan-Sihuidong)

	Beijing Subway Second Phase Construction Project (1)	Beijing Subway Second Phase Construction Project (2)	Beijing Subway Second Phase Construction Project (3)	Beijing Subway Second Phase Construction Project (4)
Loan Amount Loan Disbursed Amount	3,281 million yen 3,281 million yen	6,235 million yen 6,178 million yen	3,819 million yen 3,590 million yen	2,343 million yen 2,141 million yen
Exchange of Notes Loan Agreement	September 1991 October 1991	October 1992 October 1992	August 1993 August 1993	January 1995 January 1995
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.6% 30 years (10 years) General untied	 2.6% 30 years (10 years) General untied	 2.6% 30 years (10 years) General untied	 2.6% 30 years (10 years) General untied
Final Disbursement Date	November 1996	November 2000	October 2000	May 2001

2. Results and Evaluation

2.1 Relevance

The project area covers Chang'an Street, the east-west main street of Beijing, the capital of China. This street has always suffered traffic congestion caused by extreme traffic volumes, and measures to alleviate road traffic congestion were desperately needed at the time of appraisal. Traffic congestion on Chang'an Street remains ongoing because the number of automobiles is increasing and public transport remains heavily reliant on bus service (see Table 1 and Figure 1). Therefore, there was, and still is, a strong need for the project at the time of appraisal and today. However, questions remain as to the accuracy of the demand projection, because the actual demand is only one-fifth of the projection, although the current peak hour congestion rate is about 80%.

The fact that this project was positioned as a high priority project under the 7th Five-Year Plan (1986-1990) and the 8th Five-Year Plan (1991-1995) shows that the project was consistent with the national policy of China.

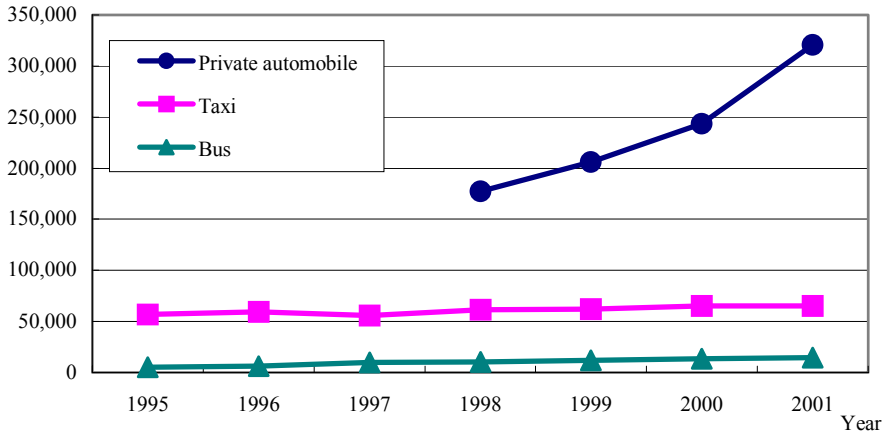
Table 1: Public Transport Volume in Beijing and Ratios by Means of Transport

Item	1995	1996	1997	1998	1999	2000	2001
Total Passenger Transport Volume (ten thousand persons)[1)]	432,418.6	418,440.8	475,668.7	501,741.9	507,610.1	484,814.9	523,694.0
Ratio of bus users (including streetcar)	73.0%	73.0%	72.9%	74.3%	74.5%	74.9%	76.9%
Ratio of microbus users	0.3%	0.9%	4.0%	3.8%	3.8%	3.2%	2.0%
Ratio of subway users	12.9%	10.6%	9.4%	9.2%	9.5%	9.0%	9.0%
Ratio of taxi users	13.8%	15.5%	13.7%	12.7%	12.2%	12.9%	12.1%

Source: Beijing Traffic Bureau

Note 1) For the purposes of these statistics, "one person" is a commuter traveling one way from one point to another using public transport.

Figure 1: Number of Registered Vehicles in Beijing by Type



2.2 Efficiency

2.2.1 Project Scope

In the first phase, hiring of a consultant was cancelled, and the location and construction method for Xidan Station were changed. In the second phase, the construction of Wangfujing Station was added and, as a result, the location of Dongdan Station was changed and the area of the car depot was increased. The subway cars planned for procurement in the first phase were procured together with those procured in the second phase. The total number of the cars procured in the first and second phases was reduced to 174 from the initially planned 186 due to changes in the demand projection.

As for the consultant, it was deemed unnecessary to hire one because Beijing Mass Transit Railway Corporation (BMTRC) already had experience in subway construction. The new station was added out of concern over further increases in residents and traffic congestion in the surrounding area, which the onset of building construction projects was expected to cause. As for the subway car depot, the maintenance facility and the plant site were added in the expectation that not only the subway cars procured under the project but also all the cars operated on Line 1 would to be stored in this depot, and also in order to ensure the efficiency of the maintenance and repair functions of the depot. All of the above changes were made to adjust to the changes in the situation and needs after the time of planning.

2.2.2 Implementation Schedule

The first phase was completed in September 1992, more than two years behind the scheduled completion date of June 1990, and the second phase was completed in June 2000, four years and six months behind the scheduled completion date of December 1995. The main factor for the delay in the completion of the first phase was that the construction method for Xidan Station was reconsidered from the designing stage. In the second phase, changes in the original plan, including the additional construction of Wangfujing Station, contributed to the delay in schedule. Other time-consuming factors, such as delays in the bidding evaluation and bidding process and

handling of groundwater encountered during the construction, affected the progress of the project, according to BMTRC. These changes resulted in decreased implementation efficiency of the project as far as the implementation schedule was concerned.

2.2.3 Project Cost

The foreign currency portion of the project cost amounted to 19,184 million yen in total for both phases, which is within the estimated project cost of 23,473 million yen. On the other hand, the local currency portion for the first phase was 402 millionyuan, 2.5 times more than the estimated 164 million yuan, and that for the second phase was 6,117 million yuan, resulting in a significant cost overrun as compared to the initially estimated amount of 353 millionyuan. This cost overrun was caused by inaccuracy in the estimation of the local currency portion, delays in the implementation schedule, expansion of the project scope, changes in the construction methods, and increases in the cost of relocation of residents. As the implementation period was prolonged, the project cost was affected by the sharp increase in prices from the late 1980s to early 1990s. All in all, then, the actual cost was seven times more than the estimated amount.

Table 2: Comoparison of Estimated and Actual Amount of the Local Currency Portion of the Project Cost in the Second Phase

(unit: million RMB)

Item	Oririnal plan (1988)	Revised plan (1992)	Actual cost (2000)
Project Cost	353	1,545	6,117
Adjusted for inflation	353	1,152	2,517
CPI (1988=100)	100	134	243

2.3 Effectiveness

2.3.1 Alleviation of Traffic Congestion (directing part of the road commuter volume to a subway system on Chang'an Street)

The objective of the project was to alleviate traffic congestion on Chang'an Street. However, as mentioned in "2.1 Relevance", traffic congestion on Chang'an Street continues, with the number of automobiles increasing and public transport remaining heavily reliant on bus services. Therefore, it is impossible to measure quantitatively the effect of the project on the reduction of traffic congestion.

In a questionnaire survey of subway users, over 90% of the respondents used bus services before the opening of the subway section constructed in the project. This indicates that the punctuality and travel time reduction effects of the subway are recognized. Therefore, the project is thought to have been potentially effective in easing congestion by directing part of the road commuter volume to a subway system.

2.3.2 Operation of Trains and Passenger Transport Volumes

380 trains were operated per day at intervals of 4 minutes during peak hours in 1992 when the project section partially opened, as shown in Table 3. Since 2000, when the whole system opened, 432 trains have operated at intervals of 3 minutes during peak hours, showing a steady increase in subway operations.

Table 3:Number of Trains and Operation Intervals (actual)

Item	1992 Fuxingmen-Xidan section opened	1993	1994	1995	1996	1997	1998	1999	2000 Fuxingmen-Sihuidong section opened	2001
Number of trains operated (average number of trains/day)	380	380	380	380	380	380	380	380	432	430
Operation intervals (minutes/peak hour)	4	4	4	4	3	3	3	3	3	3

Source: BMTRC

With respect to passenger transport volumes, we could not obtain accurate data for the number of passengers on the section constructed under the project or those on Line 1 in this and the subsequent supplemental surveys. Therefore, it is difficult to accurately assess the effect of the project. According to ancillary information sources such as the China Yearbooks (published by the National Bureau of Statistics of China) and data provided by the Beijing Traffic Bureau (Table 1), the total number of passengers on the Beijing subway is 460 to 500 million persons a year. Among them, passengers on Line 1 amount to 160 million in total, according to the executing agency. Considering that the project section covers the central area of Beijing including business and shopping quarters, the number of passenger on this section is estimated to be more than half of the total on Line 1.

Table 4 shows the peak hour cross-sectional traffic volumes on the project section. The peak hour cross-sectional traffic volume during the first year after the project completion was 31,000 persons. The result of dividing it by the transport capacity of 38,400 persons (20 trains operated in one-direction per peak hour × passenger carrying capacity of 240 persons × 8 cars per one train) suggests a peak hour congestion rate of approximately 80%.

Table 4: Peak Hour Cross-Sectional Traffic Volume on the Project Section

Peak hour cross-sectional subway traffic volume (Tranport volume in one direction per hour)	Target	35,000 persons (at project completion)	43,000 persons (4 years after project completion)
	Actual	31,000 persons (1 year after project completion)	Not applicable yet

Source: Data of BMTRC

However, the number of passengers on the section constructed under the project was projected at appraisal to be 588 million persons two years after the opening of the whole section (1995) and 1,017 million persons in 2029, as shown in Table 5, based on the feasibility study prepared by the Chinese government. Given that the number of passengers on the Line 1 as a whole is about 160 million persons as stated above, there is a huge gap between the initial estimate and the actual result.

Table 5 : Projection of Demand on the Project Section at Appraisal of the First Phase (Fuxingmen-Sihuidong)

(unit: million persons)

Item	1990 partial opening	1993 full opening	1995	2000	2005	2010	2015	2020	2025	2029
Passengers	89	533	588	723	770	820	874	931	991	1,017

Source: JBIC's data for appraisal

2.3.3 Travel Time Reduction

In an comparison of travel times between Xidan and Sihuidong, a section covered by the project, the subway is the fastest means of transport with a travel time of 23 minues. Buses take more than one hour during peak hours, although the off-peak hour travel time is about 30 minutes. The subway is far superior to the buses in terms of travel time and punctuality.

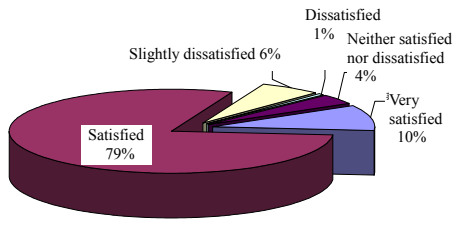
In a questionnaire to subway users[2], more than 90% of the repondents said their travel time has been reduced by the subway.The travel time reduction was 35 minutes on average, according to the respondents. This indicates that the project reduced travel times significantly.

In the same questionnaire survey, when asked to select reasons why they use the subway, the reason selected by most respondents was "rapidity of travel" (about 80%), followed by "punctuality and accuracy of operations" and "convenience" (both about 40%), and "safety" (about 30%). These results show that the travel time reduction effects and punctuality of the subway are highly rated by subway users.

2.3.4 Satisfaction Level of Subway Users

In the questionnaire survey of subway users, 10% of all respondents answered "very satisfied" and 79% answered "satisfied", which indicated a high level of satisfaction among the respondents (see Figure 2). The above-mentioned major reasons for using the subway, such as "rapidity of travel", "convenience" and "safety", are thought to contribute to this high satisfaction level. On the other hand, many respondents pointed out "subway fares", "discomfort" and "distance from destination point/residence to the subway station" as unsatisfactory elements. Their dissatisfaction with the "distance from destination point/residence to the subway station" probably reflects the present situation, where the subway network has been constructed only within a limited area in Beijing so far. When asked about the demerits of the subway and their opinions on the subway service, many respondents expressed demand for the improvement of ancillary facilities such as establishment of additional ticket offices and installation of air conditioners, lavatories, elevators, and easy-to-understand signs (guide plates). In future, it will be necessary to provide better services to meet users' demands for reasonable fares and improvement of ancillary facilities.

Figure 2: Satisfaction Level of Subway Users



Source: Result of a questionnaire survey of sampled subway users in Beijing

2.3.5 Recalculation of Financial Internal Rate of Return (FIRR) and Calculation of Economic Internal Rate of Return (EIRR)

The Financial Rate of Return calculated at the time of appraisal of the First Phase was 7.8%, which was modified to 4.6% on appraisal of the Second Phase. A recalculation of FIRR based on

[2] We conducted a questionnaire survey of randomly sampled subway users in November 2002 at Jinaguomen, Tiananmendong and Guomao Stations and obtained 396 effective responses (including 190 from male users and 206 from female users. More than 70% of the respondents were subway commuters and more than 70% were in their 20s to 40s).

the actual results up to the time of evaluation and future projections resulted in a large negative figure. The reasons behind this are that the actual initial investment exceeded the estimated amount by a large margin, there was a huge gap between the demand projected at the planning stage and the actual demand (see Table 5), and the maintenance costs also exceeded the initial estimate.

Project life: 40 years
Benefit: income from subway fares
Cost: investment in the project and maintenance costs

Since this is a project of a public nature, Economic Internal Rate of Return (EIRR) was calculated in addition to FIRR on a trial basis from a socioeconomic perspective. The conditions for the trial basis are shown below.

The trial calculation resulted in EIRR of 4.7%, suggesting that certain socioeconomic effects have been generated. However, as EIRR was not calculated at appraisal, this figure cannot be compared with the initial estimate.

Project life: 40 years
Benefit: reduction of travel time and vehicles operation costs achieved by the subway
Cost: investment in the project and maintenance costs

2.4 Impact

2.4.1 Promotion of Urban development along the Subway line

The subway line constructed under the project extends to East Chang'an Street and its extension, running through the shopping districts of Xidan and Wangfujing, Fuxingmen financial district, Guomao business district and the tourist area of Tiananmen and the Forbidden City. It is considered to be one of the factors that has boosted real estate development and economic growth in the surrounding areas.

The population of Beijing increased from 11.7 million in 1995 to 13.66 million in 2001, achieving a 16% increase during the 6-year period around the project completion. According to BMTRC, the project subway helped facilitate migration from the central city to the suburbs. Housing lots in Xiandaicheng and Tonghuijiayuan located at the east end of Chang'an Street have sold well because these areas are convenient for subway stations.

2.4.2 Environmental Impact

Beijing suffers from serious air pollution. Traffic congestion is listed among the major sources of pollution, along with discharge of pollutants from plants, etc. The Chinese Government has been actively taking measures to control air pollution as an important policy. As a result, the air pollution situation in Beijing is improving. As stated above, the project's effects towards alleviating traffic congestion have been limited, and it is impossible to measure its environmental impact specifically and quantitatively.

2.4.3 Social Impact

For the implementation of the project, 526 households and plants were relocated, and the residents were compensated for relocation. No particular problem has been reported by the

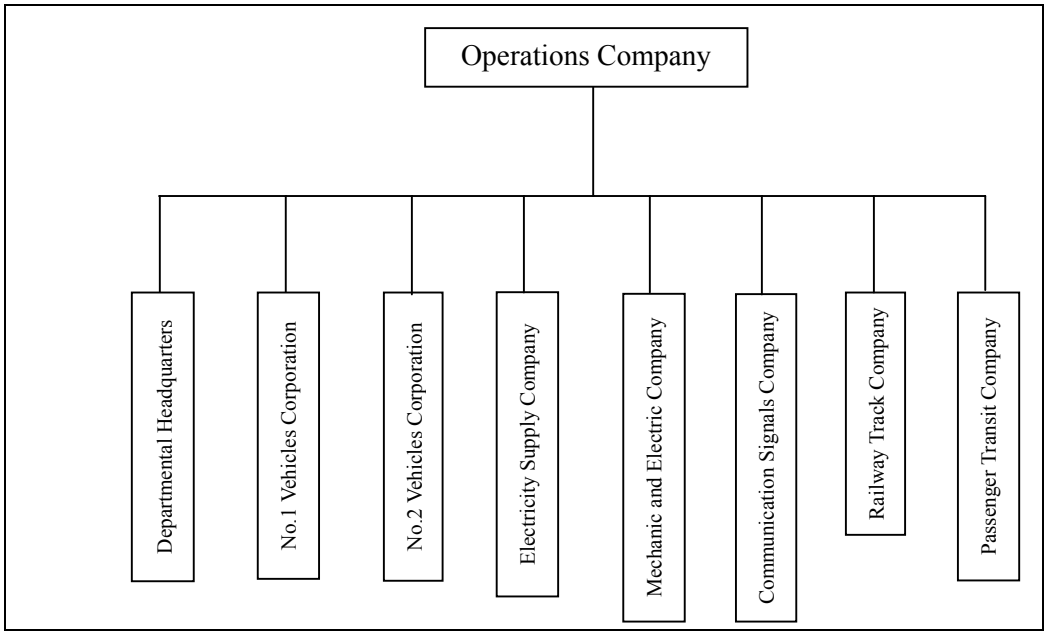
executing agency in connection with the relocations.

2.5 Sustainability

2.5.1 Organization

At appraisal, it was planned that operations and maintenance of the project would be carried out by BMTRC. After the reorganization of BMTRC last year, the Beijing Mass Transit Railway Group Co., Ltd. (operations company), which was separated from BMTRC, became responsible for operations and maintenance. Maintenance of equipment is conducted by each specialized subsidiary (see Figure 3: Organizational Chart for Operations and Maintenance). The number of employees is not known accurately. According to a report from BMTRC, a total of 13,000 employees are working at the companies shown in the chart.

Figure 3: Organizational Chart for Operations and Maintenance



2.5.2 Technical Capability

Equipment is operated and maintained in accordance with the technical standards under the established maintenance system. With respect to traffic signals equipment, where some problems were initially pointed out, it was confirmed in this survey that they are properly operated and maintained thanks to the supplier's after-sales support. No major problem has been reported.

Employees are furnished with opportunities to learn about subway services at home and abroad. Japan's Teito Rapid Transit Authority is providing cooperation in the training of the staff. Efforts towards further technical development appear set to continue into the future.

2.5.3 Financial Status

We requested BMTRC, the executing agency, to submit financial statements at the time of the field survey and the subsequent supplementary survey. However, they have not submitted the financial statements for the latest project year (1999-2001), because the new organization has not

been fixed yet after the reorganization, according to their explanation. Therefore, the financial status for recent years is not known at present.

As shown in Table 6, the executing agency had been in the red from FY 1994 to FY 1998, and the deficits were made up for by government subsidies. Among the causes of the deficits were huge depreciation allowance due to the huge initial investment, and the fact that subway users did not increase as expected (due to competition with bus services and relatively expensive subway fares). It seems that this situation has continued into recent years.

Although the finances of the executing agency will be secure as long as it is subsidized by the government, the agency needs to make an effort to stand on its own financially. The executing agency is currently considering or preparing for the introduction of automatic ticket gates and revision of fares in an effort to establish a financially viable operation.

Table 6: Profit and Loss Statement of BMTRC (unit: thousand RMB)

Item	1994	1995	1996	1997	1998
Sales	108,469	119,744	263,821	288,642	317,746
Cost of sales	290,360	410,944	534,825	586,665	603,721
Administrative cost	76,106	93,447	115,525	133,115	147,617
Operating profit	-257,997	-384,647	-386,529	-431,138	-433,592
Non-operating profit	23,979	36,466	46,901	31,757	8,104
Non-operating cost	34,840	41,497	45,982	34,156	11,762
Ordinary profit	-268,858	-389,678	-385,610	-433,537	-437,250
Extraordinary profit	256,758	474,222	414,630	466,219	479,780
(subsidies)	(255,000)	(415,555)	(410,000)	(460,000)	(470,000)
Extraordinary loss	8,943	14,023	17,458	19,297	25,449
Current net profit	-21,043	70,521	11,562	13,385	17,081

Source: Data of BMTRC

3. Feedback

3.1 Recommendations (to the Beijing Municipal Government and the Executing Agency)

The road traffic on Chang'an Street in Beijing is always heavily congested due to heavy traffic volumes, and there is thought to be a great need for a subway which is superior in travel time reduction effects and punctuality. In order to develop this potential and further enhance the effectiveness of the project, the following measures should be considered.

(1) Take measures to improve the convenience of connections between the subway and the existing modes of ground transport
(2) Reexamine the operations and the fare systems of the bus services (the bus fare in the city is 5 jiao while that of subway is 3 yuan) whose routes overlap with subway lines in order to induce bus users to use the subway
(3) Introduce bus routes which start from and end at subway stations via residential and commercial areas developed along subway lines
(4) Develop an urban plan to promote housing development along subway lines and ensure its implementation
(5) Reduce maintenance costs by introducing automatic ticket gates (now under preparation), etc.

Comparison of Original and Actual Scope

First Phase Phase 1 (Fuxingmen-Xidan)

Item	Initial Plan (Stage 1)	Revised Plan (Stage 2)	Actual
(1) Project Scope			
1) Extension of the east-west subway line	1) Fuxingmen-Xidan 1.4km	1) Fuxingmen-Xidan 1.4km	1) Fuxingmen-Xidan 1.8km
2) Construction of subway stations	2) Xidan Station	2) Xidan Station	2) Xidan Station
3) Procurement of subway cars	3) 30 cars (including 15 cars financed by JBIC)	3) 30 cars (including 18 cars financed by JBIC)	3)Postponed to Second Phase
4) Consulting services	4) Guidance on designing, bidding assistance, guidance on construction techniques, etc.	4) Guidance on designing, bidding assistance, guidance on construction techniques, etc.	4)Cancelled
(2) Implementation Schedule			
1.Preparatory works	Jan. 1988 – Sep. 1988	Jan. 1988 – Jun. 1989	Jan. 1988 – Dec. 1989
2.Civil engineering	May 1988 – Jun. 1990	May 1988 – Mar. 1991	Jul. 1989 – Sep. 1992
3.Communication and signals	May 1989 – Dec. 1989	Jan. 1990 – Jun. 1991	Jun. 1992 – Sep. 1992
4.Electric equipment	May 1989 – Dec. 1989	May 1989 – Jun. 1991	Jun. 1992 – Sep. 1992
5.Disaster prevention control	May 1989 – Dec. 1989	Jan. 1990 – Jun. 1991	Jun. 1992 – Sep. 1992
6.Procurement of subway cars	May 1989 – Jun. 1990	Jan. 1990 – Jun. 1991	—
7.Completion	—	—	Sep. 25, 1992
8.Start of operation	—	—	Oct. 12, 1992
(3) Project Cost			
Foreign currency	4,000 million yen	As left	3,995 million yen
Local currency	5,642 million yen (164 million RMB)		11,859 million yen (402 million RMB)
Total	9,642 million yen		15,854 million yen
ODA loan portion	4,000 million yen		3,995 million yen
Exchange rate	1 RMB = 34.4 yen (As of Jul. 1988)		1 RMB = 29.5 yen (Average for 1989-1992)

Second Phase (Xidan-Sihuidong)

Item	Initial plan (at the start of the first phase construction)	Revised Plan (Stage 1)	Revised Plan (Stage 2)	Revised Plan (Stage 3)	Revised Plan (Stage 4)	Actual
(1) Project Scope						
1) Extension of the east-west subway line	1) Xidan-Sihuidong approx.11km	1) Xidan-Sihuidong approx.11km	1) Xidan-Sihuidong approx.11km	1) Xidan-Sihuidong approx.11km	1) Xidan-Sihuidong approx.11km	1) Xidan-Sihuidong approx.11km
2) Construction of subway stations	2) 9 stations from South Chang'an Street to Shihuidong	2) 9 stations from South Chang'an Street to Shihuidong	2) 9 stations from Xidan to Shihuidong	2) 9 stations from Xidan to Shihuidong	2) 10 stations from Xidan to Shihuidong	2) 10 stations from Xidan to Shihuidong
3) Construction of a subway car depot	3) Bawangfen Car Depot 225,000 m^2	3) Bawangfen Car Depot 225,000 m^2	3) Bawangfen Car Depot 225,000 m^2	3) Bawangfen Car Depot 225,000 m^2	3) Bawangfen Car Depot 225,000 m^2	3) Bawangfen Car Depot 274,000 m^2
4) Procurement of subway cars	4) 156 cars	4) 156 cars	4) 156 cars	4) 156 cars	4) 156 cars	4) 174 cars
(2) Implementation Schedule						
1.Preparatory works	Sep. 1988 – Jun. 1989	Jul. 1991 – Dec. 1992	Jan. 1992 – Dec. 1992	Jan. 1992 – Jun. 1993	Jan. 1992 – Jun. 1994	Jan. 1992 – Sep. 1995
2.Civil engineering	Dec. 1989 – Mar. 1993	Oct. 1991 – Sep. 1995	Jul. 1992 – Apr. 1995	Jun. 1992 – Sep. 1995	Jun. 1992 – Jun. 1996	Jun. 1993 – Dec. 1998
3.Communication and signals	Dec. 1990 – Jul. 1993	Jun. 1992 – Sep. 1995	Jan. 1994 – Sep. 1995	Jul. 1994 – Sep. 1995	Apr. 1995 – Jun. 1996	Apr. 1995 – Sep. 1999
4.Electrici equipment	Dec. 1990 – Jul. 1993	Jun. 1992 – Sep. 1995	Jun. 1992 – Sep. 1995	Jul. 1994 – Sep. 1995	Apr. 1995 – Jun. 1996	Jun. 1995 – Sep. 1999
5.Disaster prevention control	Dec. 1990 – May 1993	Nov. 1992 – Jun. 1995	Oct. 1993 – Sep. 1995	Sep. 1994 – Sep. 1995	Apr. 1995 – Jun. 1996	Apr. 1995 – Sep. 1999
6.Procurement of subway cars	—	Oct. 1993 – Oct. 1996	Oct. 1993 – Dec. 1996	Apr. 1993 – Jan. 1998	Apr. 1993 – Jan. 1998	Apr. 1993 – Jun. 2000
7.Completion	Dec. 1995	Oct. 1996	Dec. 1995	Dec. 1996	Dec. 1996	Jun. 2000
8.Start of operation	—	—	—	—	—	Sep. 1999 (Partially opened between Tiananmenxi and Sihuidong) Jun. 2000 (Full open)
(3) Project Cost						
Foreign currency	19,473 million yen	17,338 million yen	22,301 million yen	21,830 million yen	15,678 million yen	15,189 million yen
Local currency	12,143 million yen (353 million RMB)	40,468 million yen (1,545 million RMB)	41,039 million yen (1,566 million RMB)	42,357 million yen (1,617 million RMB)	18,921 million yen (1,590 million RMB)	93,590 million yen (6,117 million RMB)
Total	31,616 million yen	57,806 million yen	63,341 million yen	64,187 million yen	34,599 million yen	108,779 million yen
ODA loan portion	19,473 million yen	17,338 million yen	22,301 million yen	15,678 million yen	15,678 million yen	15,189 million yen
Exchange rate	1 RMB = 34.4 yen (As of Jul. 1988)	1 RMB = 26.2 yen (As of Sep. 1991)	1 RMB = 26.2 yen (As of Sep. 1991)	1 RMB = 26.2 yen (As of Sep. 1991)	1 RMB = 11.9 yen (As of Dec. 1994)	1 RMB = 15.3 yen (Average for 1992 - 1999)

Third Party Evaluator's Opinion on
Beijing Subway Construction Project (1) (2)
Beijing Subway Second Phase Construction Project (1) (2) (3) (4)

Rong Jian
Vice director, Associate Professor
Transportation Research Center, Beijing University of Technology

Relevance

- The Chang'an Street is the east-west main street of Beijing, the capital of China. This street has always suffered traffic congestion caused by extreme traffic volumes. Traffic congestion on Chang'an Street remains ongoing because the number of automobiles is increasing and public transport remains heavily reliant on bus service. In order to alleviate road traffic congestion on Chang'an Street, it is necessary to extend the subway routes from west to east of Beijing, and share in the vast public transport volume.
- The project intentions have little responded to the public transport traveler because of two reasons: 1) the fare of bus service is much cheaper than subway service. The income of whom use public transport is very low, so they are care about the difference when they choose their transport mode. 2) the bus routes increased so much during these years, but the subway only has 2 lines. The public transport users prefer bus to subway because they can arrive their destination with less transferring by buses.
- There were no important changes in the background of the project or external factors that affected project plan and/or scope.
- There will be 40km subway construction every years before 2008 because of 2008 Olympic Games in Beijing. Beijing will organize all kinds of funds to implement the subway constructions. Currently I have not heard any project begun. Up to now, this project is the longest and popular subway construction project.
- This project achieved the project purpose in terms of effectiveness and efficiency.

Impact

- The overall goal has been achieved by the project, including part of the road commuter volume to a subway system on Chang'an Street, shortening the operation interval from 4 min to 3 min, decreasing travel time by public transport, improving the level of service for subway users.
- If the project decreased travel time and improved level of service of subways, the part of road commuters will select subway to travel. This will alleviate the congestion on Chang'an Street.
- There are 3 hindering factors affected the achievement of the overall goal. 1) bus service improved fast; 2) subway fare is more expensive than bus; 3) passenger cars increased rapidly during the near 3 years.
- The project alleviated traffic congestion, it decrease the air pollution by the cars congestion. The projects achievement disappeared because of rapid cars increasing.
- For the implementation of the project, 526 households and plants were relocated, and the residents were compensated for relocation. No particular problem has been reported by the executing agency in connection with the relocations.
- By the project, some measures will be considering: 1) to improve the transferring between public multi-mode transport; 2) Reexamine the fare systems of the bus and subway services; 3) Develop an urban plan to promote housing development along subway lines.