7.5.10 Related Roads

(1) Airport Access Road

1) Route

The route of the access road is determined based on the discussions in Chapter 5 as shown in Fig. 7-10 together with the detailed configurations. The radius of curvature is set at 1,000m which is sufficient for a first class road standard, meaning that the road can be raised to a first class road without modifying the configuration of the centre-line.

2) Longitudinal Slope

The maximum longitudinal slope is set at 0.5% which is also sufficient for a first class road standard. The longitudinal section of the access road is shown in Appendix 7-15(1), which takes into consideration the elevation of the terminal area and the underpass of the relocated roads.

3) Typical Cross Section

The transverse slope is set at 2% according to that of Dai Huang Road, and the typical cross section is shown in Appendix 7-15(2). Channels are to be provided at both sides of the road so as to protect the embankment slope and the pavement.

4) Interchange

The configuration of the interchange is determined as shown in Appendix 7-15(3) based on the CAAC plan with necessary modifications. The lengths of the acceleration lane and the deceleration lane are determined based on the Japanese Road Standard which is much longer than the Chinese one as shown in Table 7-6.

Table 7-6 Standard of Acceleration and Deceleration Lane

	Portion connecting to Dai Huang Road	Portion connecting to Access Road
Design Speed (km/h)	120	80
Length of Acceleration Lane except for Taper Portion(m)	100	80
Length of Deceleration Lane except for Taper Portion(m)	200	160
Length of Taper(m)	70	50

The ramps to and from the access road are to pass under Dai Huang Road by box culverts as shown in Appendix 7-15(4).

5) Structures

Three types of structures for several channels flowing across the access road are planned as shown in Table 7-7 with the typical section and the positions as shown in Appendix 7-15(4) and Appendix 7-15(1), respectively.

Table 7-7 Structure Type for Each Channel Size

Channels	Structures
Large-size Channels	P.C. T-shaped beam
Middle-size Channels	R.C. box culvert
Small-size Channels	Pipe culvert

6) Pavement

The pavement structure of the access road is designed identical to that of the roads and car park as described in Section 7.3.5 which is based on that of Dai Hiang Road, as shown in Fig. 7-10.

(2) Relocation of Existing Road

1) Route and Configuration

The route and configuration of the existing road as determined in Chapter 5 is planned as shown in Fig. 7-10, in which the radius of curvature satisfies the standard for third class roads according to the Chinese Road Standard.

2) Typical Section

The typical section of the relocated road is planned as shown in Appendix 7-15(5), in which the width of the road is designed to be identical to that of the existing one.

3) Pavement

The pavement of the relocated road is determined at the thickness of 15 cm with crushed stones.

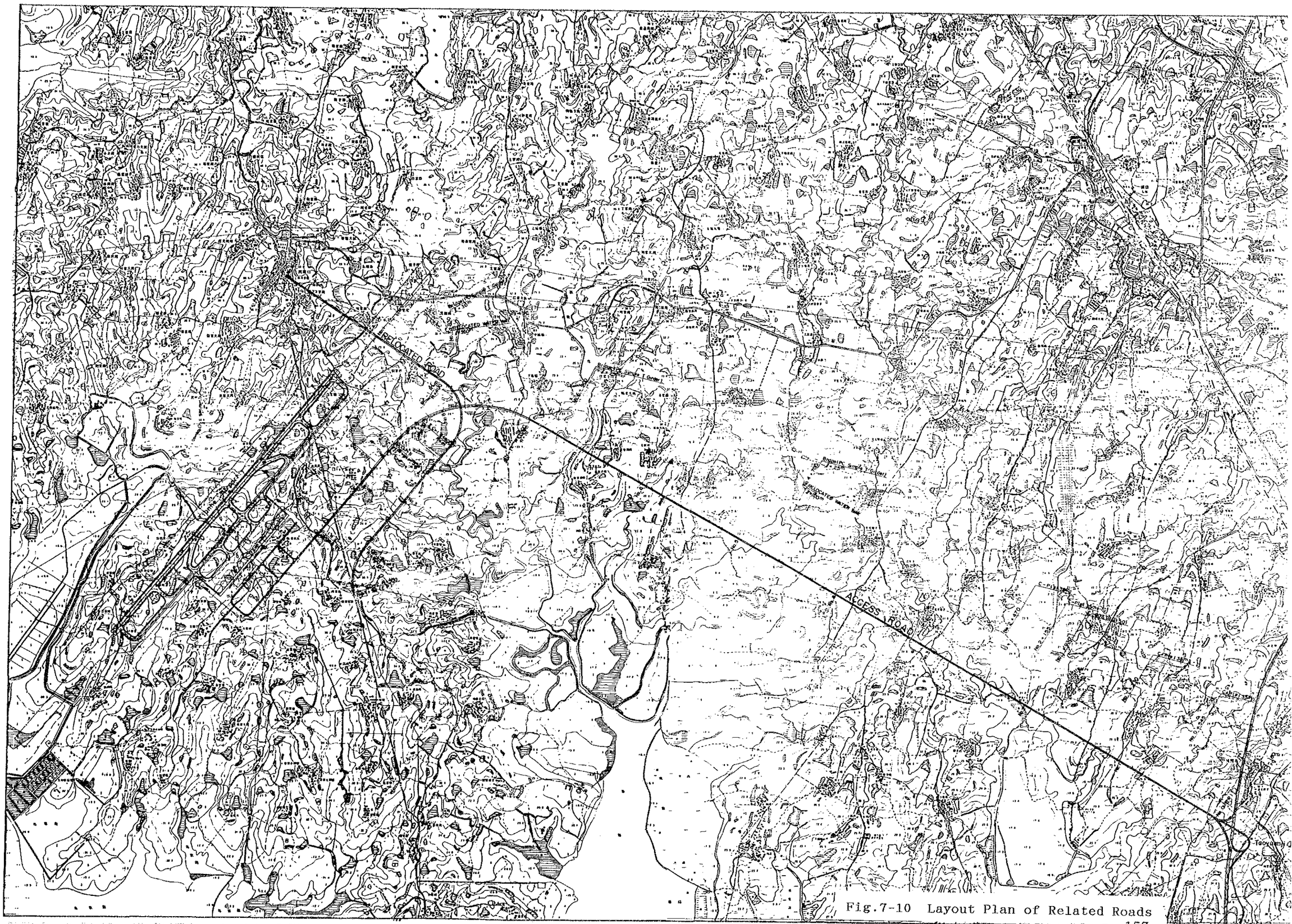
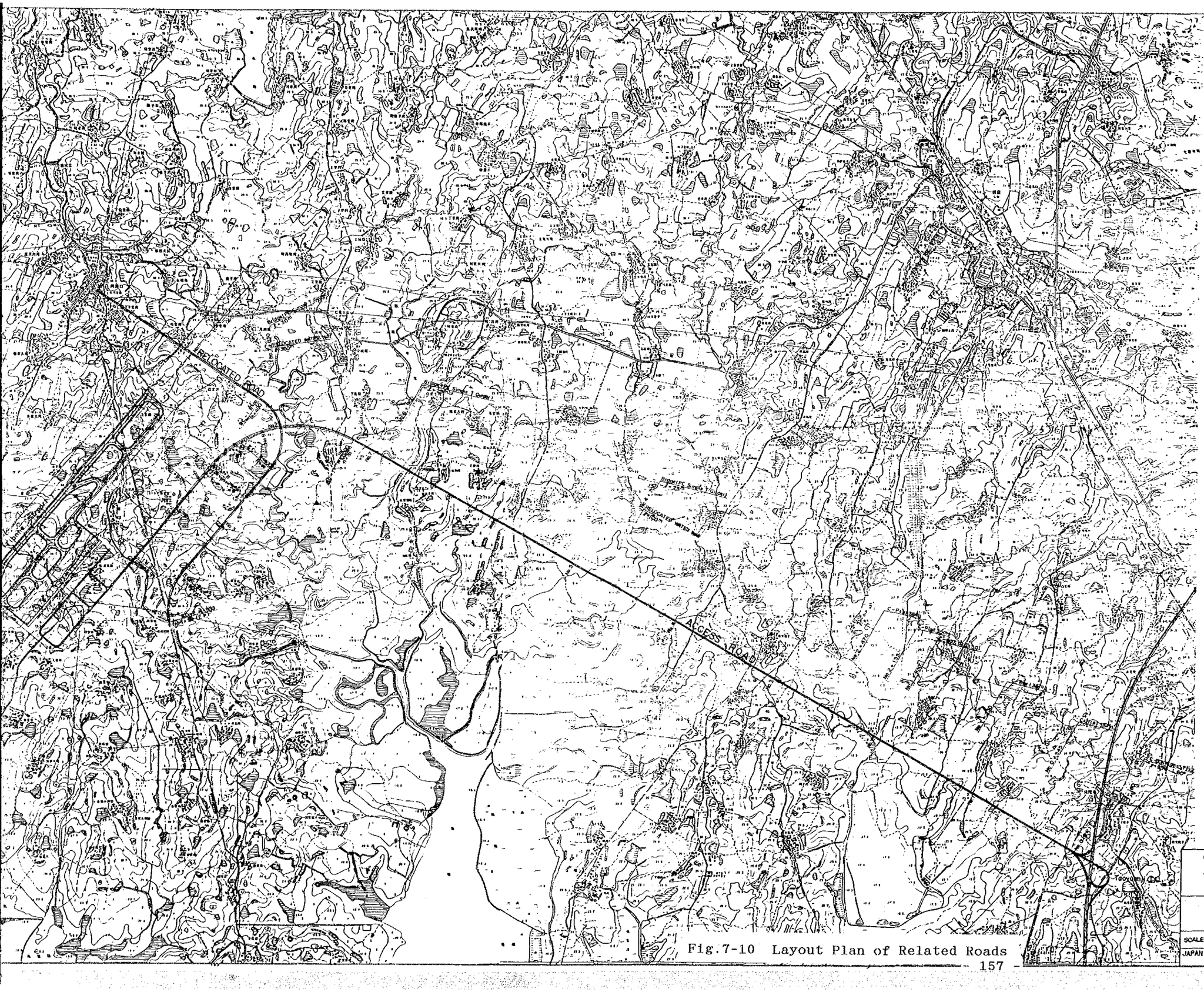


Fig.7-10 Layout Plan of Related Roads

Fig.7-10



PEOPLE'S REPUBLIC OF CHINA
FEASIBILITY STUDY
ON
THE CONSTRUCTION PROJECT
OF
WUHAN/TIANHE AIRPORT

LAYOUT PLAN

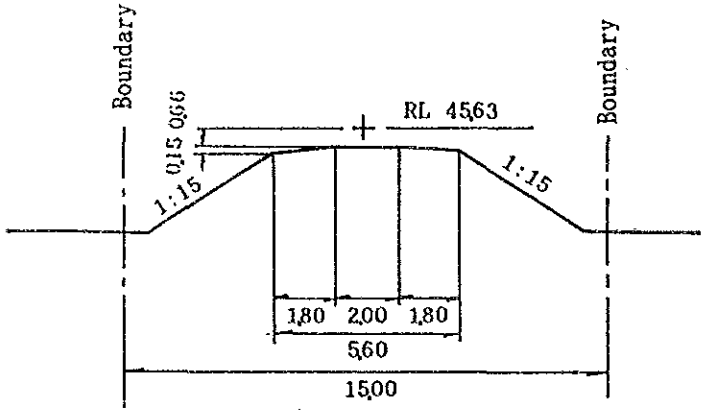
SCALE: | No. 17 | MAR. 1990

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

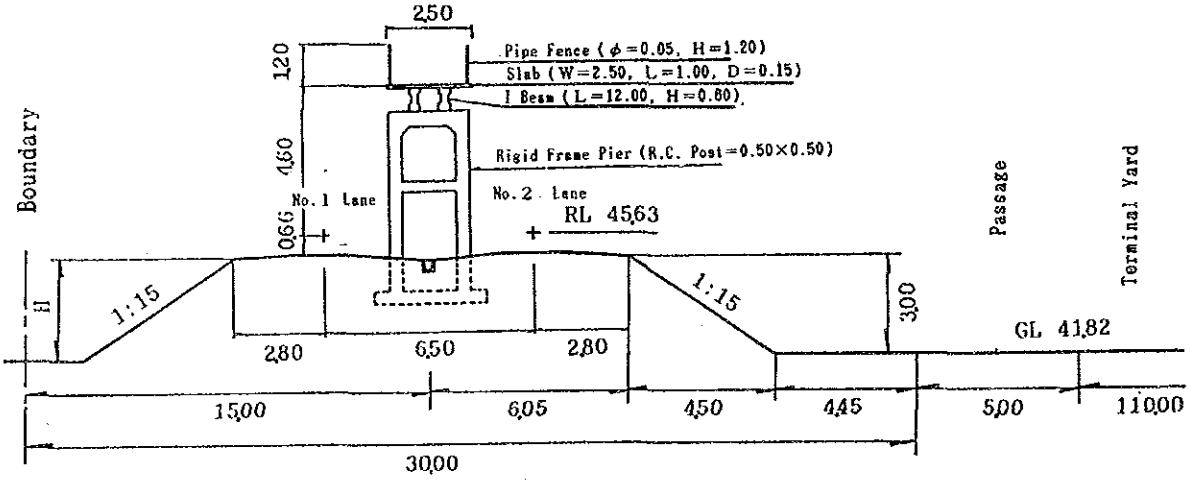
Fig.7-10 Layout Plan of Related Roads

7.5.11 Exclusive Railway

The preliminary design of the exclusive railway is made based on the facility requirements as described in Section 5.5.11 of Chapter 5, with the cross sections of the exclusive railway and the oil terminal at Heng Dian Station as shown in Fig.7-11 and the layout of the private siding as shown in Appendix 7-16.



Typical Section of Private Siding



Typical Section of Oil Terminal

Fig.7-11 Typical Cross Section

CHAPTER 8 CONSTRUCTION SCHEDULE AND COST ESTIMATE

CHAPTER 8 CONSTRUCTION SCHEDULE AND COST ESTIMATE

8.1 General

Construction schedule and cost estimate are made based on the study results of the preceding chapters as well as the data and information collected in the field survey conducted in 1989.

8.2 Construction Conditions

8.2.1 Site Condition

The proposed site of Wuhan Tianhe Airport is situated about 30 km north-northwest of Wuhan City in a hilly area of agricultural land near Tianhe Town, and there exists no topographical problem for the construction schedule.

The existing road connecting the site with Wuhan City is not in good condition, but Dai Huang Road, a first-class road leading to Huangpi, is now under construction and the interconnecting airport access road is to be constructed at an earlier stage of the airport construction, which will alleviate transport problems.

The meteorological condition of the site will seldom or never affect the construction schedule according to the weather records and the experiences of other construction works around the site.

8.2.2 Construction Materials

(1) Aggregate

Crushed stones can be supplied from both Tieshan (Henansheng) located about 200 km south of the site and Shimen (Huangpi Prefecture) about 65 km north of the site. About one thousand tons of supply a day from Tieshan for the Project will be possible due to the availability of railway transport, according to the CAAC Hubei. Several small crushing plants exist at Shimen, each of which having the capacity of 300 to 400 tons a day, thus, being able to supply about 500 tons a day for the Project. The quality of these crushed stones basically made of limestones is considered to be good for use in cement concrete and as subbase material.

Sand of good quality can be obtained in sufficient quantities from the Wangjia River about 25 km north of the site.

(2) Cement

Cement of good quality can be provided from several factories located in Wuhan City and in Hubeisheng Huanshi.

(3) Steel Products

Steel products can be locally procured except for those for aircraft fuel pipelines that are to be imported.

(4) Building Materials

Most of the building materials are locally obtainable except for some of the building exterior and interior finishing materials.

8.2.3 Labour

All the unskilled and most of skilled labour are locally procurable, with the exception of skilled labour for some of the installation works of air navigation facilities, special terminal building equipment and aircraft fuel supply facility.

8.2.4 Construction Method

The construction method applied to civil works, particularly to earthworks and pavement works, of the Project is of a standard combination of man power and mechanical power prevailing in Wuhan City. As regards building works, reinforced concrete structures very common both in the country and in Wuhan City are adopted, so the said construction method can be applied.

8.3 Construction Schedule

The construction schedule is made as shown in Table 8-1 based on the following conditions for civil works which are the most critical ones in the Project, with the details as shown in Appendix 8-1.

a. The ratio of working days to the total calendar days;

- Earth works : 70.4%
- Subbase works : 73.7%
- Concrete works : 77.0%

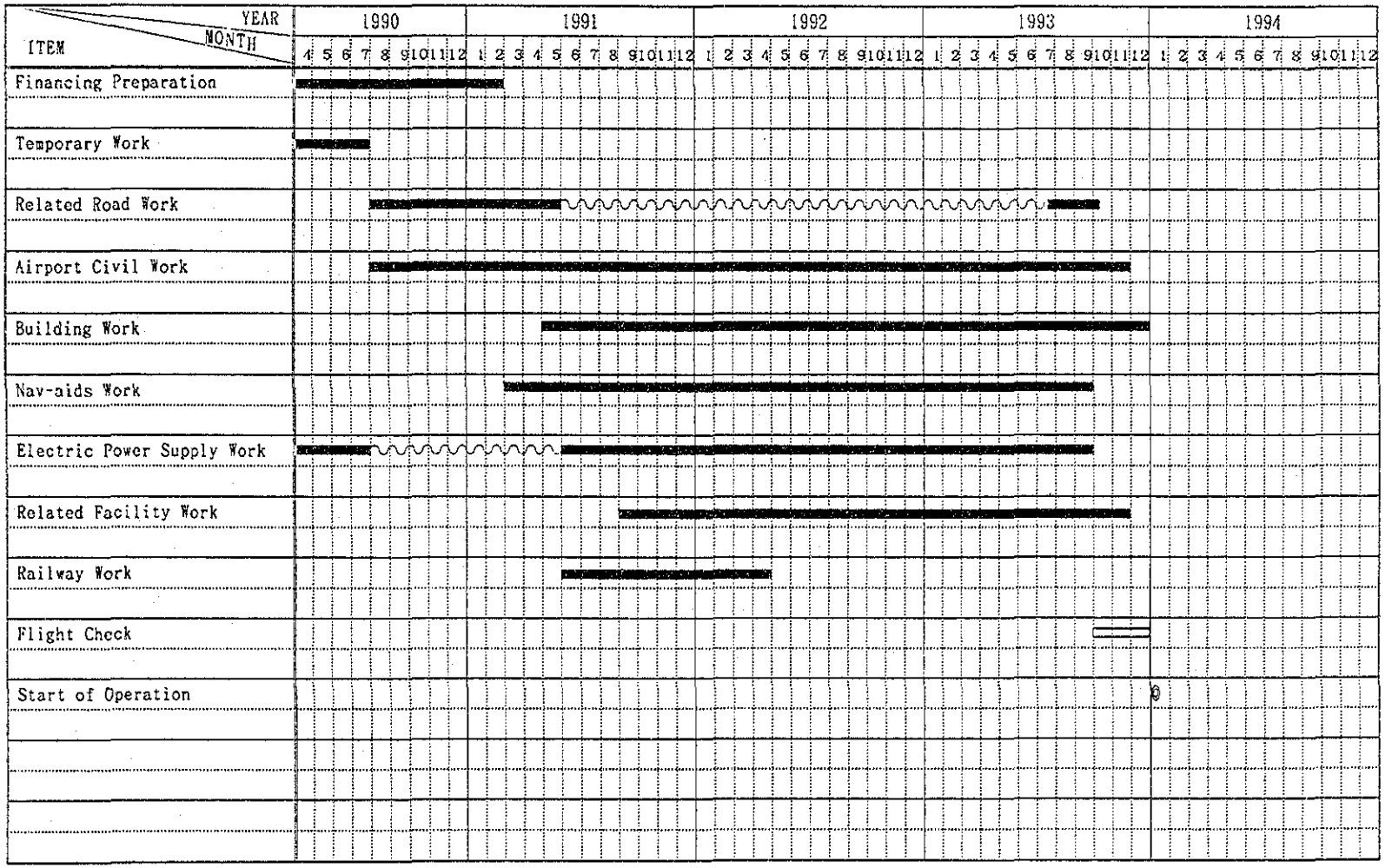
b. Performance of earthworks per day ;

- Airport construction : 15,000 m^3
- Road construction : 5,000 m^3

c. Supply of crushed stones per day : 1,350 tons

It can be, however, possible to shorten the said construction schedule and eventually to advance the dates of the completion and opening of the Airport if the Chinese side exerts all possible efforts in improving the above-mentioned conditions as well as the procurement and construction methods.

Table.8-1 Construction Schedule for Wuhan/Tianhe Airport (Summary)



8.4 Construction Cost Estimate

The construction cost of the Project is estimated based on the following conditions, as shown in Table 8-2 with the annual disbursement schedule as shown in Table 8-3.

(1) Unit prices used in this study are based on the data and information collected in the field survey conducted in October 1989.

(2) The foreign portion of the construction cost includes the following items which are not available in China in adequate quality to meet the requirements of the Project:

a. Steel pipes for aircraft fuel facilities and some building exterior and interior finishing materials;

b. A large portion of equipment, instruments and materials for air navigation facilities as well as special terminal building equipment;

c. A part of aircraft fuel supply and electric power supply facilities;

d. All the ground support equipment; and

e. Wages for skilled labour for the installation of special equipment.

(3) The local portion includes all the rest of the items needed for the Project as follows:

a. Wages of locally procured labour;

b. Construction materials procured in China;

c. Operation cost of construction equipment; and

d. Tax and Customs payment.

The costs of some items which can be locally procured but considered to have the production limitation such as cement, steel and timber, etc. are marked in parentheses in Table 8-2 for reference.

(4) Engineering fee is estimated at 5% of the costs for the construction works excluding land purchase cost.

(5) Physical contingency as provision for technical changes is estimated at 10% of the sum of the construction works, engineering fees and the purchase cost of GSE.

(6) The following exchange rate as of October 1989 is adopted:

1 Yuan = 0.268 US Dollar = 38 Yen

Table.8-2 Construction Cost Estimation for Wuhan/Tianhe Airport

(in 1989 price)

Item	Local Portion		Foreign Portion		Total
	Thousand Yuan		Thousand Yuan	Thousand Yen▲	Thousand Yuan
Land Acquisition Cost	30,143		0	(0)	30,143
Airfield Facility	73,389	<19,637>*	0	(0)	73,389
Terminal Facility	53,228	<10,645>*	29,516	(1,121,608)	82,744
Passenger Terminal Building	32,195	< 5,351>*	29,516	(1,121,608)	61,711
Cargo Terminal Building	2,876	< 477>*	0	(0)	2,876
Aircraft Maintenance Facility	13,598	< 4,082>*	0	(0)	13,598
G.S.E. Facility	1,155	< 192>*	0	(0)	1,155
Roads and Car Park	3,404	< 543>*	0	(0)	3,404
Air Navigation Facility	7,455		77,072	(2,928,736)	84,527
Airport-Related Facility	141,545	<16,802>*	30,925	(1,175,150)	172,470
Drainage Facility	11,851	< 816>*	0	(0)	11,851
Water Supply Facility	2,266		0	(0)	2,266
Sewage Disposal Facility	3,765		0	(0)	3,765
Electric Power Supply Facility	20,171		9,578	(363,964)	29,749
Fuel Supply Facility	23,238		21,209	(805,942)	44,447
Air-conditioning Facility	1,484		0	(0)	1,484
Rescue and Fire-fighting Facility	1,378	< 227>*	0	(0)	1,378
Control Tower	2,571	< 530>*	138	(5,244)	2,709
Related Buildings	58,209	<12,013>*	0	(0)	58,209
Downtown Staff Housing *	37,000	< 7,636>*	0	(0)	37,000
Downtown Ticketing office*	5,000	< 1,032>*	0	(0)	5,000
Another Related Buildings	16,209	< 3,345>*	0	(0)	16,209
Related Road	14,842	< 3,216>*	0	(0)	14,842
Exclusive Railway	1,770		0	(0)	1,770
Sub Total of Construction Work	275,617	<47,084>*	137,513	(5,255,494)	413,130
Engineering	13,781		6,876	(261,288)	20,657
G.S.E/Rescue and Fire-fighting Vehicles	0		18,158	(690,004)	18,158
Sub Total	319,541	<47,084>*	162,547	(6,176,786)	482,088
Contingency	31,954	< 4,708>*	16,255	(617,690)	48,209
Total Airport Construction Cost	351,495	<51,792>*	178,802	(6,794,476)	530,297
Construction Cost of Bridge across Fuhe River*	40,000		0	0	40,000
Grand Total	391,495		178,802	(6,794,476)	570,297

* Based on the estimation by the Chinese side.

< >* Cost of locally procured but restrictedly supplied materials.

▲ 1Yuan=0.268U.S.Dollar=38Yen

Table.8-3 Annual Breakdown of Construction Cost

(in 1989 Thousand Yuan)

ITEM \ YEAR / PORTION	1990		1991		1992		1993		Total	
	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN
Land Cost	30,143		0		0		0		30,143	
	30,143	0	0	0	0	0	0	0	30,143	0
Airfield Facility	11,715		24,595		23,619		13,460		73,389	
	11,715	0	24,595	0	23,619	0	13,460	0	73,389	0
Terminal Facility	0		5,440		35,719		41,585		82,744	
	0	0	5,440	0	23,912	11,807	23,876	17,709	53,228	29,516
Passenger Terminal Building	0		0		24,685		37,026		61,711	
	0	0	0	0	12,878	11,807	19,317	17,709	32,195	29,516
Cargo Terminal Building	0		0		2,876		0		2,876	
	0	0	0	0	2,876	0	0	0	2,876	0
Aircraft Maintenance Facility	0		5,440		8,158		0		13,598	
	0	0	5,440	0	8,158	0	0	0	13,598	0
G.S.E Facility	0		0		0		1,155		1,155	
	0	0	0	0	0	0	1,155	0	1,155	0
Roads and Carpark	0		0		0		3,404		3,404	
	0	0	0	0	0	0	3,404	0	3,404	0
Air Navigation Facility	0		10,046		59,954		14,527		84,527	
	0	0	0	10,046	1,238	58,716	6,217	8,310	7,455	77,072
Airport Related Facility	13,959		13,309		50,328		94,874		172,470	
	13,959	0	10,979	2,330	28,535	21,793	88,072	6,802	141,545	30,925

Table.8-3 Annual Breakdown of Construction Cost (Countinue)

(in 1989 Thousand Yuan)

ITEM \ YEAR / PORTION	1990		1991		1992		1993		Total	
	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN
Drainage Facility	0		927		2,004		8,920		11,851	
	0	0	927	0	2,004	0	8,920	0	11,851	0
Water Supply Facility	0		0		605		1,661		2,266	
	0	0	0	0	605	0	1,661	0	2,266	0
Sewage Disposal Facility	0		0		773		2,992		3,765	
	0	0	0	0	773	0	2,992	0	3,765	0
Electric Power Supply Facility	9,761		132		9,701		10,155		29,749	
	9,761	0	132	0	176	9,525	10,102	53	20,171	9,578
Fuel Supply Facility	0		4,064		24,366		16,017		44,447	
	0	0	1,734	2,330	12,236	12,130	9,268	6,749	23,238	21,209
Air-conditioning Facility	0		0		463		1,021		1,484	
	0	0	0	0	463	0	1,021	0	1,484	0
Rescue and Fire-figting Facility	0		0		0		1,378		1,378	
	0	0	0	0	0	0	1,378	0	1,378	0
Control Tower	0		1,715		994		0		2,709	
	0	0	1,715	0	856	138	0	0	2,571	138
Related Building	0		0		10,714		47,495		58,209	
	0	0	0	0	10,714	0	47,495	0	58,209	0
Housing in Wuhan City	0		0		0		37,000		37,000	
	0	0	0	0	0	0	37,000	0	37,000	0
Ticketing office	0		0		0		5,000		5,000	
	0	0	0	0	0	0	5,000	0	5,000	0

Table.8－3　Annual Breakdown of Construction Cost (Countinue)

(in 1989 Thousand Yuan)

ITEM \ YEAR / PORTION	1990		1991		1992		1993		Total	
	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN
Another Related Buildings	0		0		10,714		5,495		16,209	
	0	0	0	0	10,714	0	5,495	0	16,209	0
Related Road	4,198		5,409		0		5,235		14,842	
	4,198	0	5,409	0	0	0	5,235	0	14,842	0
Exclusive Railway	0		1,062		708		0		1,770	
	0	0	1,062	0	708	0	0	0	1,770	0
Sub Total of Construction Work	25,674		53,390		169,620		164,446		413,130	
	25,674	0	41,014	12,376	77,304	92,316	131,625	32,821	275,617	137,513
Tax involring in above Cost	543		1,326		2,545		3,998		8,412	
	543	0	1,326	0	2,545	0	3,998	0	8,412	0
Engineering	1,284		2,670		8,481		8,222		20,657	
	1,284	0	2,051	619	3,865	4,616	6,581	1,641	13,781	6,876
G.S.E	0		0		0		18,158		18,158	
	0	0	0	0	0	0	0	18,158	0	18,158
Sub Total	57,101		69,841		178,101		190,826		482,088	
	57,101	0	43,065	12,995	81,169	96,932	138,206	52,620	319,541	162,547

Table. 8－3 Annual Breakdown of Construction Cost (Countinue)

(in 1989 Thousand Yuan)

ITEM \ YEAR / PORTION	1990		1991		1992		1993		Total	
	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN	LOCAL	FOREIGN
Contingency	5,710		5,606		17,810		19,083		48,209	
	5,710	0	4,306	1,300	8,117	9,693	13,821	5,262	31,954	16,255
Total	62,811		61,666		195,911		209,909		530,297	
	62,811	0	47,371	14,295	89,286	106,625	152,027	57,882	351,495	178,802

CHAPTER 9 FINANCIAL ANALYSIS

CHAPTER 9 FINANCIAL ANALYSIS

9.1 General

The purpose of the financial analysis is to examine the financial viability of the Wuhan/Tianhe Airport Construction Project which will be administered by the Airport Authority on the basis of a self-supporting accounting principle.

The evaluation is made in terms of the financial internal rate of return (FIRR) derived from the financial cost-benefit analysis which is made with the cash flow of the financial costs and the financial benefits of the Project for the assumed project life.

The project life is assumed to be 20 years following the opening of Wuhan/Tianhe Airport in 1994 based on the economic and functional life of terminal facilities and for the computational purposes. The costs and benefits of the Project are measured in Yuan for the period 1990 - 2013 including both the construction period and the said project life on the basis of the actual prices prevailing in October 1989.

9.2 Estimate of Financial Costs

9.2.1 Construction Costs

The total airport construction costs estimated in Chapter 8 hereinabove are based on the market prices, and are, therefore, used as the financial costs of the Project.

9.2.2 Maintenance and Operation Costs

Estimates of the financial costs of the annual maintenance and operation of Wuhan/Tianhe Airport are made on the basis of the current operating practices at Wuhan/Nanhu Airport.

(1) Administration costs

These are the costs for administration-related departments such as General Affairs Department, Planning & Financial Department, Labour Management Department, Airport Office and Committee of Communist Party.

(2) Airport operation costs

These are the costs for departments in charge of airport operating services such as Field Service Department and Airport Maintenance Department.

(3) Aircraft fuel management costs

These are the costs for Procurement Department which is in charge of aircraft fuel control and fuelling services.

(4) Air traffic control service costs

These are the costs for Air Traffic Control Service Department which is in charge of air traffic control services.

(5) Passenger service costs

These are the costs for operation of ticket sales and terminal facility services, etc.

(6) Non-operating expenses

These are costs for expenditures on medical care, sanitation, retirement allowances, etc. and Airport Police Department.

Estimates are made on the above items from 1) to 6) by multiplying the planned number of staffs for related departments at Wuhan/Tianhe Airport in 2000 by the forecast expenditures per person in 1989 price on the basis of the records at the Wuhan/Nanhu Airport in 1987, considering the annual increase rate of 10%, with the results as shown in Table 9-1.

(7) Tax expenditures

30% of the forecast operating revenues in the following section 9.3 is assumed as shown in Table 9-1.

(8) Wasted fuel costs

3% of aircraft fuel consumption per ton is currently counted as wasted fuel cost at Wuhan/Nanhu Airport; however, the figure is reduced to 0.1% in this analysis because the hydrant system is planned at Wuhan/Tianhe Airport and wasted fuel would be minimal. The result is as shown in Table 9-1.

(9) Depreciation costs on major repair works

Major repair work costs are reserved annually as part of the maintenance costs excluding those of access roads and railways which will not be operated by the Airport Authority, according to the following rates with the results as shown in Table 9-1:

a. Building facilities: 0.8% of construction costs.
b. Vehicles and equipment: 1.5% of construction costs.
c. Other facilities: 0.8% of construction costs.

(10) Basic depreciation costs

Depreciation costs are counted according to the following standard; however, these are not included in the Financial Analysis.

a. Productive buildings: 30 years
b. Non-productive buildings: 40 years
c. Cargo transporting vehicles: 15 years
d. Passenger transporting vehicles: 12 years
e. Communication facilities: 20 years
f. Other facilities: 15 years.
(Note: Airfield facilities are excluded)

Estimates are made on the above items 9) and 10) as shown below:

(in 1989 thousand Yuan)

Items	Construction Costs	Major Repair Work Costs	(Ratio:%)	Basic Depreciation	(Years)
Airfield Facilities	88,644	709	(0.8)	---	---
Terminal Facilities	141,636	1,133	(0.8)	4,721	(30)
Nav-aids Facilities	114,276	1,714	(1.5)	5,715	(20)
Related Facilities	51,962	416	(0.8)	1,299	(40)
Ground Support Equipment	18,158	273	(1.5)	1,211	(15)
Total	(414,676)	4,245		12,945	

Table 9-1 Estimates on Maintenance and Operation Costs of the Project in 2000

Item \ Year	Records at Nanhu in 1987	Estimates at Tianhe in 2000
1 Administration Costs (in '000 Yuan)	665	1,466
a) Number of Staff	(118)	(215)
b) Expenditures per Person (in Yuan)	(5,636)	(6,819)
2 Airport Operation Costs (in '000 Yuan)	604	5,339
a) Number of Staff	(36)	(263)
b) Expenditures per Person (in Yuan)	(16,778)	(20,301)
3 Aircraft Fuel Management Costs (in '000 Yuan)	584	3,558
a) Number of Staff	(57)	(287)
b) Expenditures per Person (in Yuan)	(10,245)	(12,397)
4 Air Traffic Control Service Costs (in '000 Yuan)	430	1,044
a) Number of Staff	(162)	(325)
b) Expenditures per Person (in Yuan)	(2,654)	(3,212)
5 Passenger Service Costs (in '000 Yuan)	954	1,612
a) Number of Staff	(106)	(148)
b) Expenditures per Person (in Yuan)	(9,000)	(10,890)
6 Non-operating Expenses (in '000 Yuan)	264	284
a) Number of Staff	(90)	(80)
b) Expenditures per Person (in Yuan)	(2,933)	(3,549)
7 Tax Expenditures (in '000 Yuan)	743	8,114#1
8 Wasted Fuel Costs (in '000 Yuan)	256	87#2
9 Depreciation Costs on Major Repair Works (in '000 Yuan)	333	4,245
Working Expenditures (in '000 Yuan)	4,833	25,749
10 Basic Depreciation Costs (in '000 Yuan)	(973)	(12,945)
Operating Expenditures (in '000 Yuan)	(5,806)	(38,694)

Notes : #1 27,048 thousand Yuan * 30/100
#2 100,800 kl * 865 Yuan * 0.1/1000

9.3 Estimate of Financial Benefits

9.3.1 Current Airport Tariff Structure

The current airport tariff levied at Wuhan/Nanhu Airport is as follows:

(1) Commissions

Commissions are charged for a) the ticket sales services of passengers, cargoes and baggages, and for b) the services of the procedures of cancellations, changes and transfers on those tickets, which the Airport Authority performs on behalf of the airlines, as follows:

a) 10% of the total sales amount.

b) Depending on the actual number of passengers and shippers handled.

(2) Landing and Parking Charges

These charges are levied on airlines for the use of landing facilities and for the ground support services provided by the Airport Authority. The bases for the charges are as follows:

a) Landing Charges:

Aircraft maximum take-off weight (tons)	Charge per ton (Yuan)
Up to 25	3
26 - 100	4
101 - 200	5
201 - 300	5.5
Over 300	6

Note: The charge less than ten Yuan is raised to ten Yuan.

b) Maintenance Cost for the Runway: 15% of the landing charge.

c) Night Lighting Charges: 10% of the landing charge.

d) Parking Charges:

Parking hours (hour)	Charge (Yuan)
Up to 8	-
8 - 24	10% of the landing charge
Over 24	15% of the landing charge

e) Aircraft Cleaning Charges:

Passenger aircraft: & cargo freighter	Maximum take-off weight (tons) x 0.5 Yuan per ton
Special cargo: freighter*	Maximum take-off weight (tons) x 0.75 Yuan per ton

* Meaning freighter transporting livestock, fish, poultry and so on.

f) Transport-related Service Charges (e.g. for security inspection and flight information services):

Aircraft maximum take-off weight (tons)	Charge per ton (Yuan)
Up to 10	10
Over 11	25

Note: For international flights, the charges are increased by 20%.

(3) Air Navigation Facility Charges

These charges are levied on airlines for the use of air navigation facilities and the air traffic control services thereof provided by the Airport Authority depending on aircraft weight as follows:

Aircraft maximum landing weight (tons)	Charges per km flown (Yuan)
Up to 50	0.12
51 - 100	0.18
Over 101	0.24

(4) Aircraft Fuelling Charges

These charges are levied on airlines as follows for the charges of the aircraft fuel storage and for the fuelling services provided by the Airport Authority excluding aircraft fuel costs which are paid at cost to the Authority.

a) Fuel storage charges: 100 Yuan per ton
b) Fuelling services: 5 Yuan per ton

(5) Passenger Facility Service Charges

These are the net operating profits which are earned by the Passenger Service Corporation running such facilities as restaurants, hotels, shops and offices on a self-supporting principle to provide facility services for airport users, and payed to the Airport Authority.

9.3.2 Financial Benefits of the Project

Estimate is made on the financial benefits of the Project on the basis of the above-mentioned current airport tariff and the air transport demand forecast at Wuhan/Tianhe Airport. Those which are not closely linked with air transport demand are estimated based on the financial performances at the existing Wuhan/Nanhu Airport, using a concept of Traffic Unit which is defined as a sum of one thousand departing passengers and one thousand tons of loading cargoes.

(1) Commissions

Estimates are made on the basis of commissions per one Traffic Unit in 1989 price which is calculated based on the record in 1987 by considering the annual increase rate of 14.86% as shown in Table 9-2.

(2) Landing and Parking Charges

Estimates are made based on the current airport tariff and the air transport demand forecast in 2000 as shown below.

(in 1989 thousand Yuan)

Aircraft Type	50S	100S	150S	200S	Total
Weight (tons)	17	45	79	120	***
Number of Landings	1,702	1,407	5,317	7,406	15,832
Number of Night Landings	608	608	1,824	1,520	4,560
Number of Night Stay	608	608	1,520	608	3,344
Landing Charges	87	253	1,680	4,443	6,463
Maintenance Cost for the Runway	13	38	252	667	970
Night Lighting Charges	3	11	58	91	163
Parking Charges	3	11	48	37	99
Aircraft Cleaning Charges	15	32	210	444	701
Transport-related Service Charges	723	1,583	10,501	22,218	35,025
Total	844	1,928	12,749	27,900	43,421

(3) Air Navigation Facility Charges

Estimates are made on the basis of air navigation facility charges per flight in 1989 price which is calculated based on the record in 1987 by considering the annual increase rate of 7.17% as shown in Table 9-2.

(4) Aircraft Fuelling Charges

Estimate is made on the basis of the forecast aircraft fuel consumption in 2000 of 100,800 tons by multiplying 105 Yuan of aircraft fuelling charges per ton as shown in Table 9-2.

(5) Passenger Facility Service Charges

Estimates are made on the basis of passenger facility service charges per Traffic Unit in 1989 price which is calculated based on the record in 1987 by considering the annual increase rate of 2.45% as shown in Table 9-2.

Table 9-2 Estimates on Financial Benefits of the Project in 2000

Item \ Year	Records at Nanhu in 1987	Estimates at Tianhe in 2000
1 Commissions (in thousand Yuan)	2,478	27,048
(per one: in Yuan)	(9.892)	(13.051)
2 Landing and Parking Charges (in thousand Yuan)	1,230	43,421
3 Air Navigation Facility Charges (in thousand Yuan)	2,557	17,689
(per flight: in Yuan)	(486.40)	(558.65)
4 Aircraft Fuelling Charges (in thousand Yuan)	1,035	10,584
5 Passenger Service Charges (in thousand Yuan)	350	3,039
(per TU: in Yuan)	(1.3972)	(1.4665)
Total Operating Revenues (in thousand Yuan)	7,650	101,781
Number of Passengers (thousand)	246	2,050
Cargo Tonnage (thousand tons)	4.5	22.5
Traffic Unit	250.5	2,072.5
Number of Flights	5,257	31,664

TU: Traffic Unit

9.4 Financial Evaluation

9.4.1 Cash Flow of Financial Costs and Benefits

The cash flow of annual financial costs and benefits of the Project is calculated for the period from 1990 to 2013 based on the above results as shown in Table 9-3.

The annual maintenance and operation costs for the period from 1994 to 1999 are calculated based on the estimates for the year 2000 by interpolation with the assumed annual increase rate of the number of staff of 5%. Those costs after the year 2000 are assumed to be constant because the Project is planned to meet the air transport demand of the year 2000.

The annual financial benefits for the period from 1994 to 1999 are calculated on the basis of the estimates for the year 2000 by interpolation with the annual increase rate of air passengers of 17.8% for the period. Those benefits after the year 2000 are assumed to be constant for the above-mentioned reason.

9.4.2 Result of Financial Cost-Benefit Analysis

Financial cost-benefit analysis is made on the basis of the cash flow of the financial costs and the financial benefits as shown in Table 9-3 with the result that the financial internal rate of return (FIRR) for the Project is 7.8%.

It is concluded, therefore, that the Project is financially feasible on condition that the Airport is to be run on a self-supporting accounting principle under the current airport tariff structure and that the foreign portion of the construction costs of the Project is to be financed by foreign soft loans of which the average interest rate is understood to be below 7%.

Table 9-3 Cash Flow of Financial Costs and Benefits of the Project

(in 1989 thousand Yuan)

Year	Financial Costs			Financial Benefits						Net Financial Benefits
	Construction Cost (A)	Maint. & Operation (B)	Total Costs (C=A+B)	Commissions (D)	Landing & Parking Charges (E)	Air Nav. Facility Charges (F)	Aircraft Fuelling Charges (G)	Passenger Facility Service Charges (H)	Total Benefits (I=D+E+F+G+H)	(J=I-C)
1990	62811	0	62811	0	0	0	0	0	0	-62811
1991	61666	0	61666	0	0	0	0	0	0	-61666
1992	195911	0	195911	0	0	0	0	0	0	-195911
1993	209909	0	209909	0	0	0	0	0	0	-209909
1994	0	19214	19214	10174	16332	6653	3981	1143	38283	19069
1995	0	20175	20175	11974	19223	7831	4686	1345	45059	24884
1996	0	21184	21184	14094	22625	9217	5515	1584	53035	31851
1997	0	22243	22243	16588	26630	10849	6491	1864	62422	40179
1998	0	23355	23355	19525	31343	12769	7640	2194	73471	50116
1999	0	24523	24523	22980	36891	15029	8992	2582	86475	61952
2000	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2001	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2002	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2003	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2004	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2005	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2006	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2007	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2008	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2009	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2010	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2011	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2012	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
2013	0	25749	25749	27048	43421	17689	10584	3039	101781	76032
TOTAL	530297	491180	1021477	474007	760939	309994	185481	53257	1783679	762202

FIRR = 7.8%

CHAPTER 10 ECONOMIC ANALYSIS

CHAPTER 10 ECONOMIC ANALYSIS

10.1 General

The purpose of the economic analysis is to make a comprehensive evaluation of the economic worth brought about in the People's Republic of China by the implementation of the Wuhan/Tianhe Airport Construction Project.

The economic evaluation is generally made in terms of the economic internal rate of return (EIRR) or the net present value (NPV) of the project derived from the cost-benefit analysis made from the viewpoint of the national economy. It is a general practice to make cost-benefit analysis on the "with and without principle", that is to say, comparing the case where the project is implemented with the case where the project is not implemented as defined in the following section.

10.2 Assumptions

10.2.1 Period of Analysis

The economic analysis is made for the period of 24 years comprising the construction period of 4 years from 1990 to 1993 and the project life of 20 years from 1994 to 2013 as defined in the preceding section 9.1.

10.2.2 With and Without Cases

The Base Case, which is defined as the "without project case" in the present study, is one in which Wuhan/Nanhu Airport is to continue operating at the present facility level with minimum maintenance costs being made just enough for maintaining the present level of service throughout the project life.

Airport capacity is usually determined by runway capacity and terminal capacity. In the Base Case, the existing runway with the length of 1,800m can cater for B737 type aircraft and can be used for more than 20 years with annual maintenance. The existing terminal building with the area of 4,000m^2, however, will exceed the efficient capacity limitation in 1990 as it falls below a terminal area of 15m^2 per passenger at peak hour which is the Japanese Airport Planning Standard and eventually reach the theoretically physical capacity limitation in 1992 if air traffic increases as forecast in Chapter 4, as shown in Table 10-1. The air traffic in the Base Case, therefore, is assumed to be unchanged after 1992 throughout the project life.

If the Project is implemented, which is defined as the Project Case, it can accommodate the overflowing air transport demand up to the year 2000 as forecast in Table 10-2 after the completion of the Airport in 1993. Fig.10-1 presents the above situation in a graphic form.

Table 10-1 Estimation of Saturation Year

Year	Forecast Annual Passenger*1 ('0000)	Peak Hour Passenger*2 (person)	Peak Hour Area per passenger*3 (m^2)	
1987	492	186	21.5	
1988	579	219	18.3	
1989	682	258	15.5	
1990	803	304	13.2	*4
1991	945	357	11.2	
1992	1,112	420	9.5	*5
1993	1,309	495	8.1	
1994	1,541	583	6.9	
1995	1,814	686	5.8	
1996	2,135	807	5.0	
1997	2,514	951	4.2	
1998	2,959	1,119	3.6	
1999	3,483	1,317	3.0	
2000	4,100	1,550	2.6	

*1 Interpolated with the annual average increase rate of 17.7% for the period between 1987 and 2000.
*2 Annual passenger*1.2/365*1,550/13,480
*3 4,000m^2 / peak hour passenger
*4 Efficient limitation
*5 Physical limitation

Table 10-2 *Forecast of Overflowing Passengers*

('000)

Year	Forecast Annual Passenger	Overflowing Passenger	Chinese Passenger *1	Foreign Passenger *2
1992	1,112	0	0	0
1993	1,309	197	167	30
1994	1,541	429	365	64
1995	1,814	702	597	105
1996	2,135	1,023	870	153
1997	2,514	1,402	1,192	210
1998	2,959	1,814	1,570	277
1999	3,483	2,371	2,015	356
2000	4,100	2,988	2,540	448

*1 Assumed to be 85% based on the tourism statistics of Wuhan City.
*2 Assumed to be 15% based on the tourism statistics of Wuhan City.

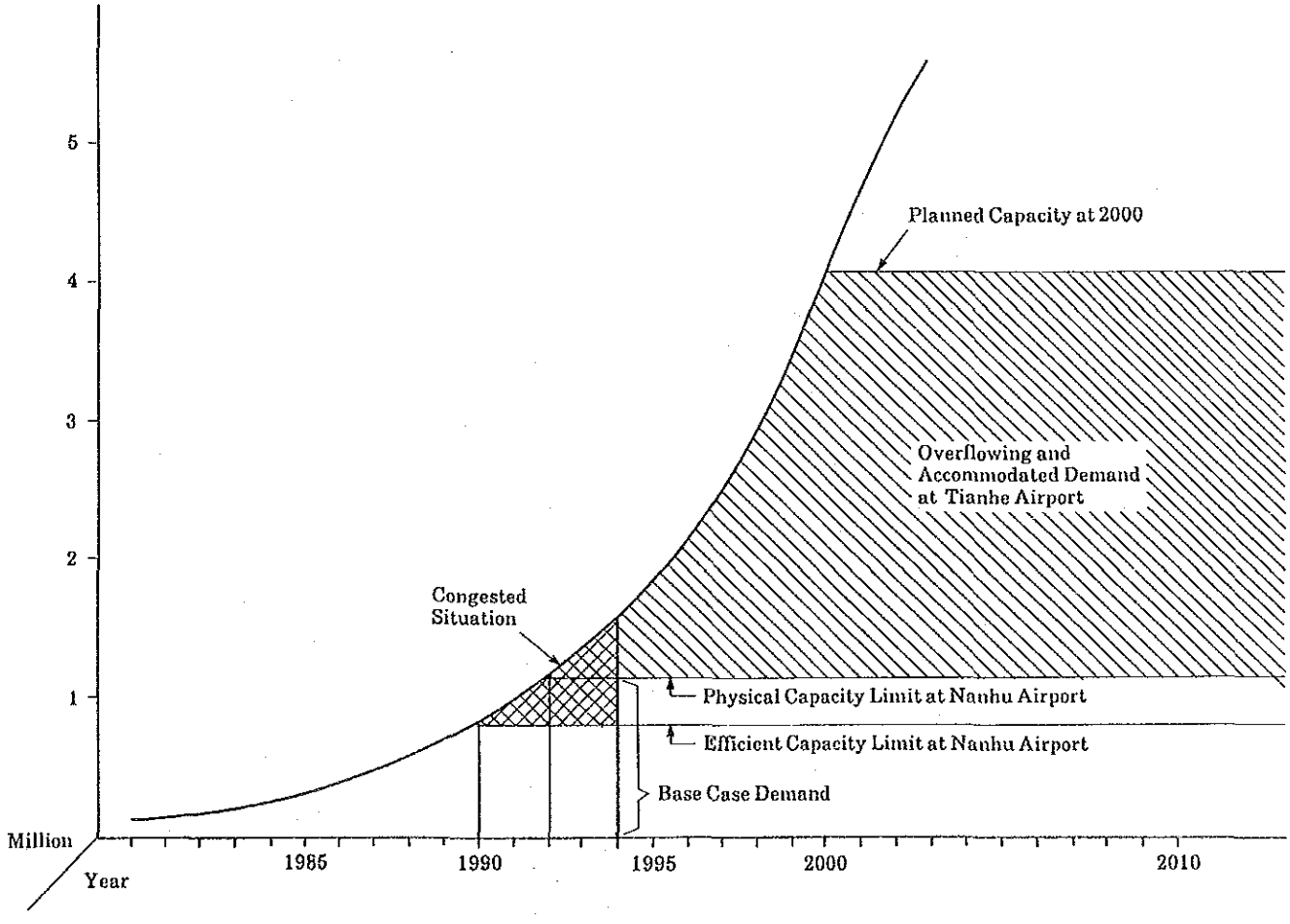


Fig. 10-1 Base Case and Overflowing Demand

10.2.3 Shadow Pricing

The application of shadow prices is generally desirable in the cost-benefit analysis of development projects in developing countries where market mechanisms are often distorted by various factors such as monopolies, strict import and export quotas, government subsidies, unemployment situations and so on.

However, reliable data are not available for applying shadow pricing for the Project and therefore shadow pricing is not applied in the present study.

10.3 Estimate of Economic Costs

10.3.1 Construction Costs

In cost-benefit analysis taxes and Customs duties are regarded as transfer payments to the Government from the viewpoint of the national economy. The annual total airport construction costs of the Project estimated in Chapter 8 hereinabove are based on the market prices and, therefore, taxes and Customs duties estimated separately are deducted from those costs to obtain the economic costs in this analysis, as shown in Table 10-3.

10.3.2 Maintenance and Operation Costs

For the same reason as mentioned above, tax expenditures are deducted from the annual maintenance and operation costs of the Project estimated in Chapter 9 to obtain the economic costs in this analysis, as shown in Table 10-3 in which the costs after the year 2000 up to 2013 are assumed to be constant for the same reason as mentioned in Chapter 9.

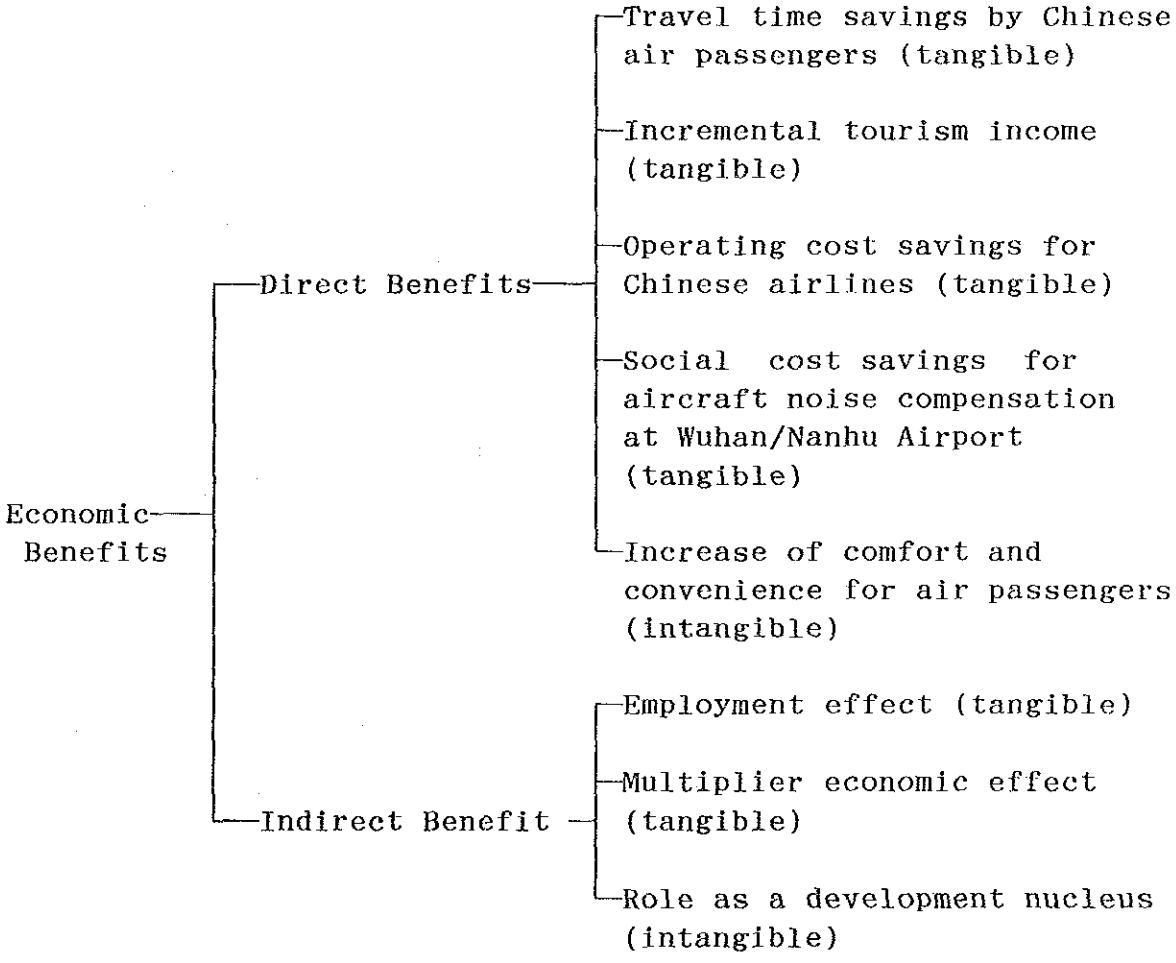
Table 10-3 Estimate of Economic Costs of Construction, Maintenance and Operation of the Project
(in 1989 thousand Yuan)

Year	Construction Costs	Maintenance & Operation Costs	Total Costs
1990	62,268	0	62,268
1991	60,340	0	60,340
1992	193,366	0	193,366
1993	205,911	0	205,911
1994	0	13,160	13,160
1995	0	13,818	13,818
1996	0	14,508	14,508
1997	0	15,234	15,234
1998	0	15,996	15,996
1999	0	16,795	16,795
2000	0	17,635	17,635

10.4 Estimate of Economic Benefits

10.4.1 Classification of Economic Benefits

The economic benefits considered attributable to the Project from the viewpoint of the national economy of China comprise the direct (primary) benefits and the indirect (secondary) benefits, each of which consisting of the tangible benefits and the intangible benefits as shown below.



10.4.2 Direct Benefits

(1) Travel Time Savings by Chinese Air Passengers

As stated in Subsection 10.2.1 above, the overflowing Chinese air passengers who would continue their trips would have to switch to surface transport modes such as railways or roads in order to reach their destinations. Those passengers would be able to save their trip time by the implementation of the Project.

As regards the Base Case passengers going to make their trips by using Wuhan/Tianhe Airport would be able to save travel time derived from the operation of larger aircraft than those being used at Wuhan/Nanhu Airport on the existing routes.

Such travel time savings by Chinese air passengers realized by the implementation of the Project are considered to comprise economic benefits to the national economy as contributing to the increase of productivity of gross social product of China and can be estimated in monetary terms by using the concept of time value.

1) Estimate of Time Value

The time value of Chinese air passengers using Wuhan/Nanhu Airport is estimated to be one Yuan in 1989 price based on the average annual incomes by job classification of the residents of Wuhan City accounting for 32.3% of the air passengers and the average annual working hours of 2,400 hours prevailing in China, as shown in Table 10-4.

Table 10-4 Estimate of Time Value of Chinese Air Passengers

(in 1988 price)

Occupation	Annual Income*1 (Yuan)	Time Value*2 (Yuan)	Share*3 (%)
Agriculture and Fishery	1,852	1	3
Manufacture	1,852	1	19
Commerce & Services	1,607	1	31
Civil Servant	1,628	1	27
Miscellaneous	1,833	1	18
Unemployed	---	---	2
(Total)			(100)
Weighted Average of Time Value		1*4	

*1 Source:The People's Government of Wuhan City
*2 Annual income divided by 2,400 (hours)
*3 Based on the air passenger survey conducted in December 1988 at the Wuhan/Nanhu Airport.
*4 Weighted by each share(%).

2) Estimate of Travel Time Savings by route

Estimate is made on travel time savings by route in monetary terms both for the overflowing Chinese passengers and the Base Case Chinese passengers excluding 2% of unemployed passengers based on the following equations with the results as shown in Table 10-5.

a. Overflowing passengers

$$Bi = (RTi - ATi) * V * Pi$$

where,

Bi : Travel time savings in 1989 Yuan for i route
RTi: Travel time by railway for i route from Wuchang Station including access time of 10 minutes
ATi: Travel time by air for i route from Wuhan/Tianhe Airport including access time of 60 minutes
V : Time value
Pi : Number of passengers for i route

b. Base Case passengers

$$Bi = (ATNi - ATWi) * V * Pi$$

where,

Bi : Travel time savings in 1989 Yuan for i route
ATNi: Travel time by air for i route from Wuhan/Nanhu Airport including access time of 20 minutes
ATWi: Travel time by air for i route from Wuhan/Tianhe Airport including access time of 60 minutes
V : Time value
Pi : Number of passengers for i route

Table 10-5 Estimate of Time Saving Benefits in 2000

(in 1989 price)

Destination	Gravity Share	Base Case			Project Case			Total
		Number of Passenger	Time Saving	Time Saving Benefit	Number of Passenger	Time Saving	Time Saving Benefit	Time Saving Benefits
	(%)	('000)	(hour)	('000Yuan) (A)	('000)	('000)	('000Yuan) (B)	('000Yuan) (C=A+B)
1 GUANGZHOU	24	223	0	-60	598	18	10569	10509
2 SHANGHAI	16	151	0	-71	406	23	9143	9072
3 BEIJING	12	115	0	-51	310	14	4329	4279
4 FUZHOU	5	45	1	50	120	37	4421	4471
5 NANJING	4	40	0	-8	109	18	1961	1953
6 HANGZHOU	3	24	-1	-14	64	23	1457	1443
7 HEFEI	2	21	-1	-12	57	20	1145	1133
8 XIAN	2	18	0	4	50	25	1257	1260
9 XIAMEN	1	9	1	9	23	31	714	722
10 SHENYANG	1	12	3	39	31	24	740	778
11 CHENGDU	1	11	1	7	31	28	856	864
12 DALIAN	1	7	2	13	20	32	647	660
13 GUILIN	1	12	0	0	33	12	396	396
14 CHONQING	2	16	0	4	44	19	849	853
15 NANCHANG	2	16	0	-5	43	14	596	591
16 JINAN	1	12	0	4	33	18	605	609
17 ZHENGZHOU	2	15	0	0	40	6	246	246
18 TIANJIN	3	23	2	40	62	23	1405	1445
19 HARBIN	1	6	5	33	16	38	627	660
20 CHANGSHA	2	16	0	-8	44	4	159	152
21 TAIYUAN	1	11	0	1	30	16	486	487
22 YICHANG	1	8	0	0	21	10	214	214
23 SHASHI	1	8	0	0	20	4	89	89
Total	89	821		-24	2205		42910	42886

(2) Incremental Tourism Income

As mentioned in Section 10.2.1 overflowing foreign air passengers after 1993 would either be forced to give up their trip, or transfer to surface transport such as railway and road for their intended trip of visiting Wuhan City. According to the tourism statistics of Wuhan City in 1988, 75% of foreign tourists visit the City by air and 25% by other transport mode. In the Base Case, it is assumed that 50% of overflowing foreign air passengers would give up their trip to China, 25% would visit the City by other transport mode and the rest would change their destinations to other cities in China.

Those who would give up their trip, however, can be accommodated by the implementation of the Project and their expenditures are assumed to be economic benefits to the national economy, 30% of which is assumed to be attributable to the Project. The incremental tourism incomes brought about by the overflowing foreign passengers are estimated based on the average expenditures per tourist in Wuhan City of 830 Yuan in 1988 price, according to the following formula with the result as shown in Table 10-6.

Incremental tourism income
= Overflowing foreign passengers
x Ratio of arriving passengers (50%)
x Ratio of passengers who would give up their trip (50%)
x Average expenditures per tourist(830 Yuan in 1988 price)
x Annual increase rate (10%)
x Ratio of benefits attributable to the Project (30%)

Table 10-6 Estimate of Incremental Tourism Income

(in 1989 price)

Year	Overflowing Foreign Passenger ('000)	Incremental Tourism Income (thousand Yuan)
1994	64	4,382
1995	105	7,190
1996	154	10,545
1997	210	14,380
1998	277	18,968
1999	356	24,377
2000	448	30,677

(3) Operating Cost Savings for Chinese Airlines

After the opening of Wuhan/Tianhe Airport, the Chinese airlines going to use the Airport will be able to operate directly to the destinations as planned in Table 4-8 in Chapter 4 with larger and more economical aircraft than those being used at Wuhan/Nanhu Airport on both the existing and the new routes. As a result, the airlines will be able to save direct operating costs which are regarded as economic benefits to the national economy.

Estimate is made on the airline operating cost savings as the difference of the total operating costs between those of the Base Case in which the current aircraft are to be used and those of the Project Case in which the planned aircraft are to be used on the existing routes, according to the following equations with the results as shown in Table 10-7.

$$Bi = OCbi - OCpi$$

where,

Bi : Net operating cost savings for i route
OCbi: Operating cost by current aircraft for i route
OCpi: Operating cost by planned aircraft for i route
Operating cost = Operating cost per km. (Yuan)
x Number of flight
x Distance for i route (km.)

Table 10-7 Operating Cost Savings by Chinese Airlines

(in 1989 thousand Yuan)

Destination	Distance (km)	Forecast Passenger ('000)	Project Case				Base Case				Total Operating Cost Saving ('000Yuan) (C=B-A)
			Number of Flight	Aircraft Type (Seater)	Operating Cost/km (Yuan)	Total Operating Cost ('000Yuan) (A)	Number of Flight	Aircraft Type (Seater)	Operating Cost/km (Yuan)	Total Operating Cost ('000Yuan) (B)	
1 GUANGZHOU	850	985	6158	200	30	157029	12316	100	15	157029	0
2 SHANGHAI	745	669	4180	200	30	93423	8360	100	15	93423	0
3 BEIJING	1068	511	3192	200	30	102272	6384	100	15	102272	0
4 FUZHOU	767	198	818	150	15	9411	4950	50	7	26577	17165
5 NANJING	493	179	1490	150	15	11019	4470	50	7	15426	4407
6 HANGZHOU	781	105	878	150	15	10286	1318	100	15	15440	5155
7 HEFEI	349	93	776	150	15	4062	2328	50	7	5687	1625
8 XIAN	685	82	680	150	15	6987	2040	50	7	9782	2795
9 XIAMEN	1167	38	472	100	15	8262	944	50	7	7712	-551
10 SHENYANG	1671	51	428	150	15	10728	1284	50	7	15019	4291
11 CHENGDU	1072	50	420	150	15	6754	1260	50	7	9455	2701
12 DALIAN	1433	33	278	150	15	5976	830	50	7	8326	2350
13 GUILIN	710	55	458	150	15	4878	1374	50	7	6829	1951
14 CHONQING	773	73	606	150	15	7027	1816	50	7	9826	2800
15 NANCHANG	348	71	596	150	15	3111	1784	50	7	4346	1235
16 JINAN	780	55	456	150	15	5335	1364	50	7	7447	2112
17 ZHENGZHOU	477	66	548	150	15	3921	1640	50	7	5476	1555
18 TIANJIN	1000	103	856	150	15	12840	2564	50	7	17948	5108
19 HARBIN	2137	27	226	150	15	7244	678	50	7	10142	2898
20 CHANGSHA	334	82	606	150	15	3036	2040	50	7	4770	1733
21 TAIYUAN	814	49	410	150	15	5006	1230	50	7	7009	2002
Total			24532			478606	60974			539940	61334

(4) Social Cost Savings for Aircraft Noise Compensation at Wuhan/Nanhu Airport

As discussed in Chapter 2, the existing Wuhan/Nanhu Airport is surrounded by houses, colleges and other buildings. In the case of the continued use of the airport, the people living in the surrounding area are expected to suffer from aircraft noise physically and mentally more than at present as aircraft operations increase in future, and compensation will become necessary. If the Project is implemented, such environmental problems at Wuhan/Nanhu Airport will be alleviated, and consequently, the social cost of aircraft noise compensation will be saved as compared with the cost required for Wuhan/Tianhe Airport where the number of people living around the new airport site is far smaller.

Such social cost savings could be measured, but are not counted in this analysis because there is no standard for aircraft noise-related compensation in China and also it is very difficult to define the area to be compensated.

(5) Increase of Comfort and Convenience

Bigger and more comfortable aircraft will be served and the service level of the terminal area facilities will particularly be much improved by the implementation of the Project as compared with those of the Base Case. Air passengers will derive increased comfort and convenience from the new airport facilities. These advantages may well be termed direct benefits enjoyed by the airport users, but are not counted in the present study because of the difficulty in their quantification.

10.4.3 Indirect Benefits

(1) Employment Effect

The Wuhan/Tianhe Airport Construction Project is expected to contribute to increasing the national income of China by providing increased employment opportunities both during and after the construction of the airport and airport-related facilities. These benefits are quantifiable, but have been treated as indirect benefits as is generally practiced, and consequently no calculation thereof is made in the present study.

(2) Multiplier Economic Effect

The Project will cause multiplier effects on the economy as a whole through increased procurement of goods and services related to the construction and maintenance of the airport and airport-related facilities. These effects could be quantitatively identified through the input-output analysis, which, however, is considered outside the scope of the present study.

(3) Role as a development nucleus

Wuhan/Tianhe Airport will play the role as a development nucleus for Wuhan City and its surrounding areas in terms of economic and cultural development of the region, by virtue of its geological advantage of being the gateway to the central China.

10.5 Economic Evaluation

10.5.1 Results of Economic Cost-Benefit analysis

Cost-benefit analysis is made on the basis of the cash flow of the economic costs and the direct and tangible economic benefits in monetary terms obtained through the comparison between the Base Case and the Project case as discussed above.

The economic internal rate of return (EIRR) is 12.1 % for the Project as shown in Table 10-8. It is concluded, therefore, that the Project is economically feasible from the viewpoint of the national economy of China where the social discount rate is said to be 12%. If the intangible benefits are taken into consideration, then the Project will show a much better EIRR figure.

10.5.2 Sensitivity Analysis

Sensitivity analysis is made of the EIRR value for certain fluctuations of the key factors of the economic costs and the direct tangible economic benefits, with the results as shown below.

	Fluctuations	EIRR
(1)	10% increase in costs	10.9%
(2)	20% increase in costs	9.8%
(3)	10% decrease in costs	13.5%
(4)	10% decrease in demand	10.7%
(5)	20% decrease in demand	9.2%
(6)	10% decrease in demand and 10% increase in costs	9.5%

Table 10-8 Cash Flow of Economic Cost and Benefits

(in 1989 thousand Yuan)

Year	Economic Costs			Economic Benefits				Net Economic Benefits	Discounted Cash Flow at 12%
	Construction Cost	Maint. & Operation Cost	Total Costs	Time Saving Benefit	Increment Tourism Income	Operating Cost Saving	Total Benefits		
	(A)	(B)	(C=A+B)	(D)	(E)	(F)	(G=D+E+F)	(H=G-C)	
1990	62268	0	62268	0	0	0	0	-62268	-62268
1991	60340	0	60340	0	0	0	0	-60340	-53875
1992	193366	0	193366	0	0	0	0	-193366	-154150
1993	205911	0	205911	0	0	0	0	-205911	-146563
1994	0	13160	13160	6157	4382	23070	33608	20449	12996
1995	0	13817	13817	10075	7190	27153	44418	30600	17363
1996	0	14508	14508	14682	10545	31959	57186	42678	21622
1997	0	15234	15234	20121	14380	37616	72116	56883	25731
1998	0	15995	15995	26510	18968	44274	89751	73756	29789
1999	0	16795	16795	34030	24377	52110	110517	93722	33797
2000	0	17635	17635	42886	30677	61334	134897	117262	37755
2001	0	17635	17635	42886	30677	61334	134897	117262	33710
2002	0	17635	17635	42886	30677	61334	134897	117262	30098
2003	0	17635	17635	42886	30677	61334	134897	117262	26873
2004	0	17635	17635	42886	30677	61334	134897	117262	23994
2005	0	17635	17635	42886	30677	61334	134897	117262	21423
2006	0	17635	17635	42886	30677	61334	134897	117262	19128
2007	0	17635	17635	42886	30677	61334	134897	117262	17079
2008	0	17635	17635	42886	30677	61334	134897	117262	15249
2009	0	17635	17635	42886	30677	61334	134897	117262	13615
2010	0	17635	17635	42886	30677	61334	134897	117262	12156
2011	0	17635	17635	42886	30677	61334	134897	117262	10854
2012	0	17635	17635	42886	30677	61334	134897	117262	9691
2013	0	17635	17635	42886	30677	61334	134897	117262	8653
Total	521885	336400	858285	711982	509320	1074851	2296153	1437868	4718

EIRR = 12.1%

CHAPTER 11 FORECAST OF AIRCRAFT NOISE CONTOUR

CHAPTER 11 FORECAST OF AIRCRAFT NOISE CONTOUR

11.1 General

According to the Chinese Standard of Aircraft Noise of Area Around Airport established in June 1987, it is set forth that noise contours be calculated and shown by Weighted Equivalent Continuous Perceived Noise Level (WECPNL) method based on units of Decibel (dB). Forecast is made on aircraft noise contours around the area of Wuhan/Tianhe Airport based on the air transport demand forecast for the year 2000 in compliance with the above-mentioned standard.

11.2 Premises

(1) Daily Aircraft Movements

For the purpose of calculation of decibels around the Airport, daily aircraft movements by time period forecast in Chapter 4 are summarized as shown in Table 11-1:

Table 11-1 Daily Aircraft Movements by Time Period

Time Period		Departures	Arrivals	Total
Day	(0700-1900)	42	42	84
Evening	(1900-2200)	10	9	19
Night	(2200-0700)	0	1	1
Total		52	52	104

(2) Distribution of Aircraft Movements by Runway

The runway utilization at Wuhan/Tianhe Airport is distributed as follows on the assumption that Runway 04 would be used for all the landings and takeoffs whenever wind velocity is less than 5 knots, which is based on the wind direction and velocity analysis at Wuhan/Nanhu Airport for the past three years (1986 - 1988) as follows:

- Runway 04 for landings from the southwest and takeoffs to the northeast : 94.9%
- Runway 22 for landings from the northeast and takeoffs to the southwest : 5.1%

(3) Assumed Flight Track

The flight tracks of all the landings and takeoffs are assumed to be straight courses both for Runways 04 and 22.

11.3 Aircraft Noise Contours

The noise contours computed by the Integrated Noise Model developed by FAA are shown in Fig. 11-1 for the decibel levels of 70, 75, 80, 85, 90 and 95.

The tips of the noise contours defined as the farthest points from the runway are approximately 6,280 m and 3,780 m for 70 dB and 75 dB, respectively, to the northeast from the end of Runway 04. Those to the southwest from the end of Runway 22 are approximately 7,040 m and 4,500 m for 70 dB and 75 dB, respectively.

The widest points of the noise contours are noticed in the areas adjacent to the both sides of the runway centreline at the end of Runway 04 at 820 m and 540 m for 70 dB and 75 dB, respectively.

The areas to be affected by aircraft noise around the Airport are computed as shown in Table 11-2.

Table 11-2 Areas to be affected by Aircraft Noise

WECPNL	70	75	80	85	90	95
Area (km^2)	20.89	9.50	3.95	1.75	0.86	0.41

Almost all the areas of more than 85 WECPNL are to be embraced in the Airport boundary, and the area of 80 WECPNL contains only a few villages as of October 1989. If appropriate countermeasures are taken by the Chinese side, then aircraft noise problems, if any, will not hinder the Project.

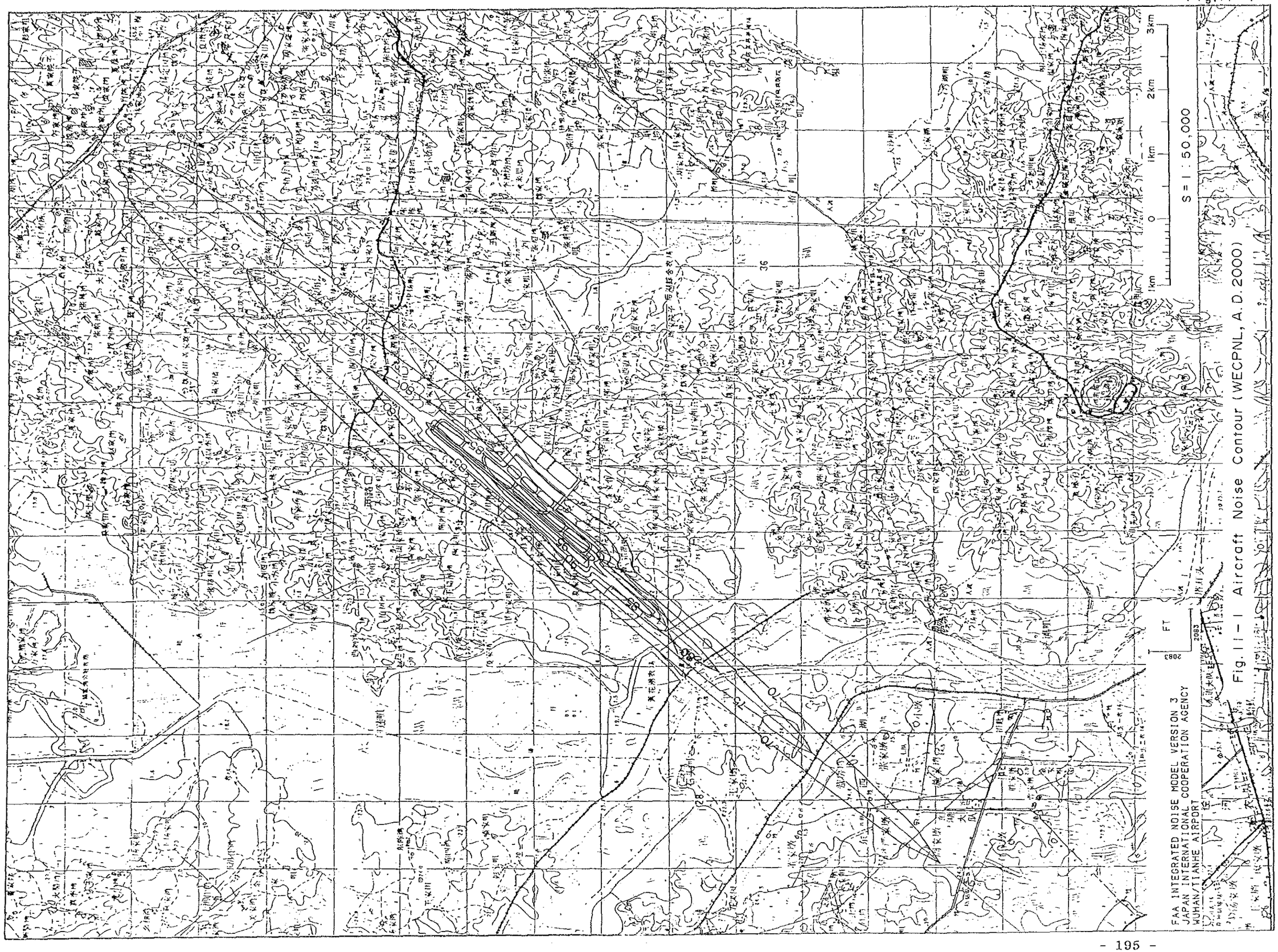


Fig. II-1 Aircraft Noi

CHAPTER 12

PROJECT IMPLEMENTATION PROGRAMME

CHAPTER 12 PROJECT IMPLEMENTATION PROGRAMME

12.1 General

The organizations, training programme and the financing plan for the implementation of the Project are studied based on the results of the preceding Chapters.

12.2 Organizations and Training Programme

12.2.1 Project Implementation Organization

In order to facilitate implementation of the Wuhan/Tianhe Airport Development Project, the Project Implementation Office has been established under the control of the Project Supervisory Committee as shown in Fig.12-1. It will be necessary to reinforce the capability of the Project Office in matters related to international bidding, management of the detailed engineering and construction works, training of the airport operation and maintenance personnel, etc.

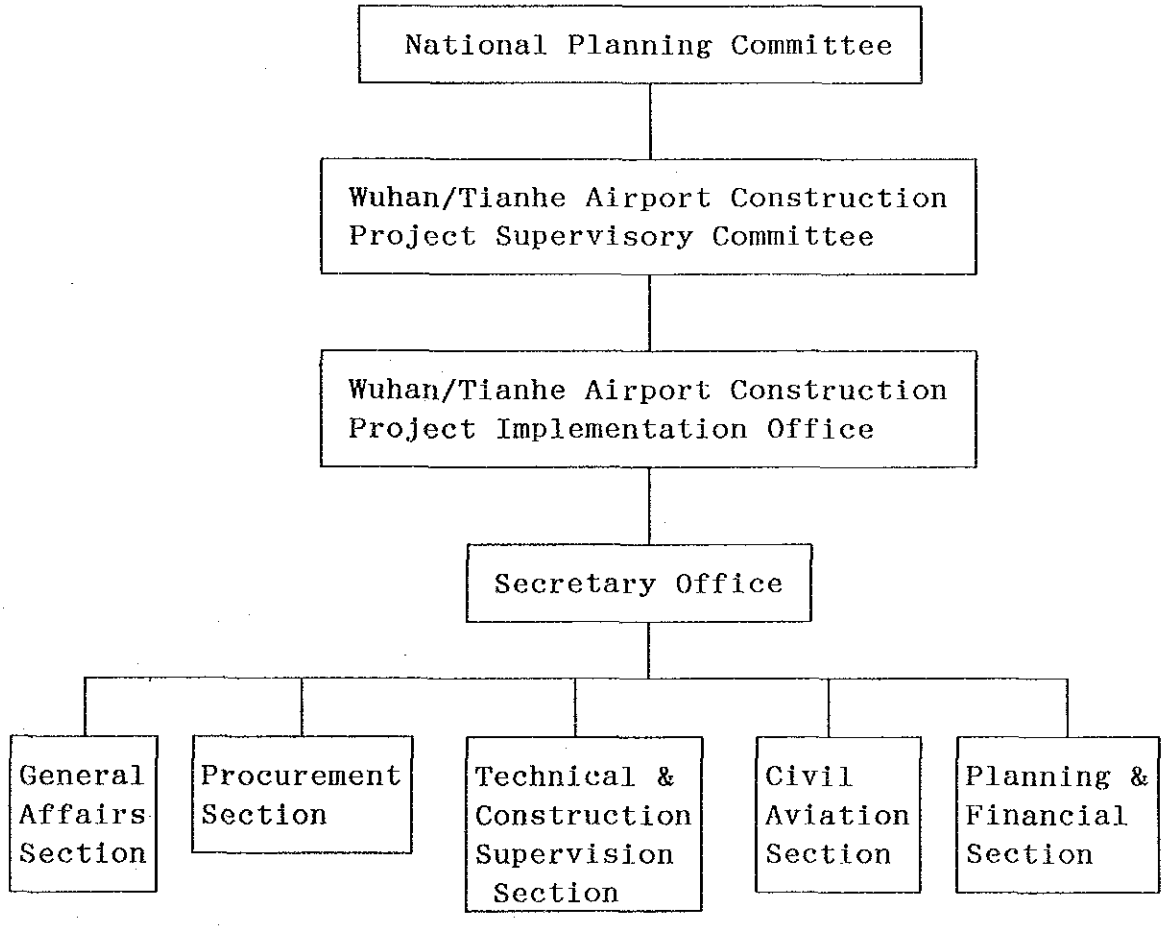
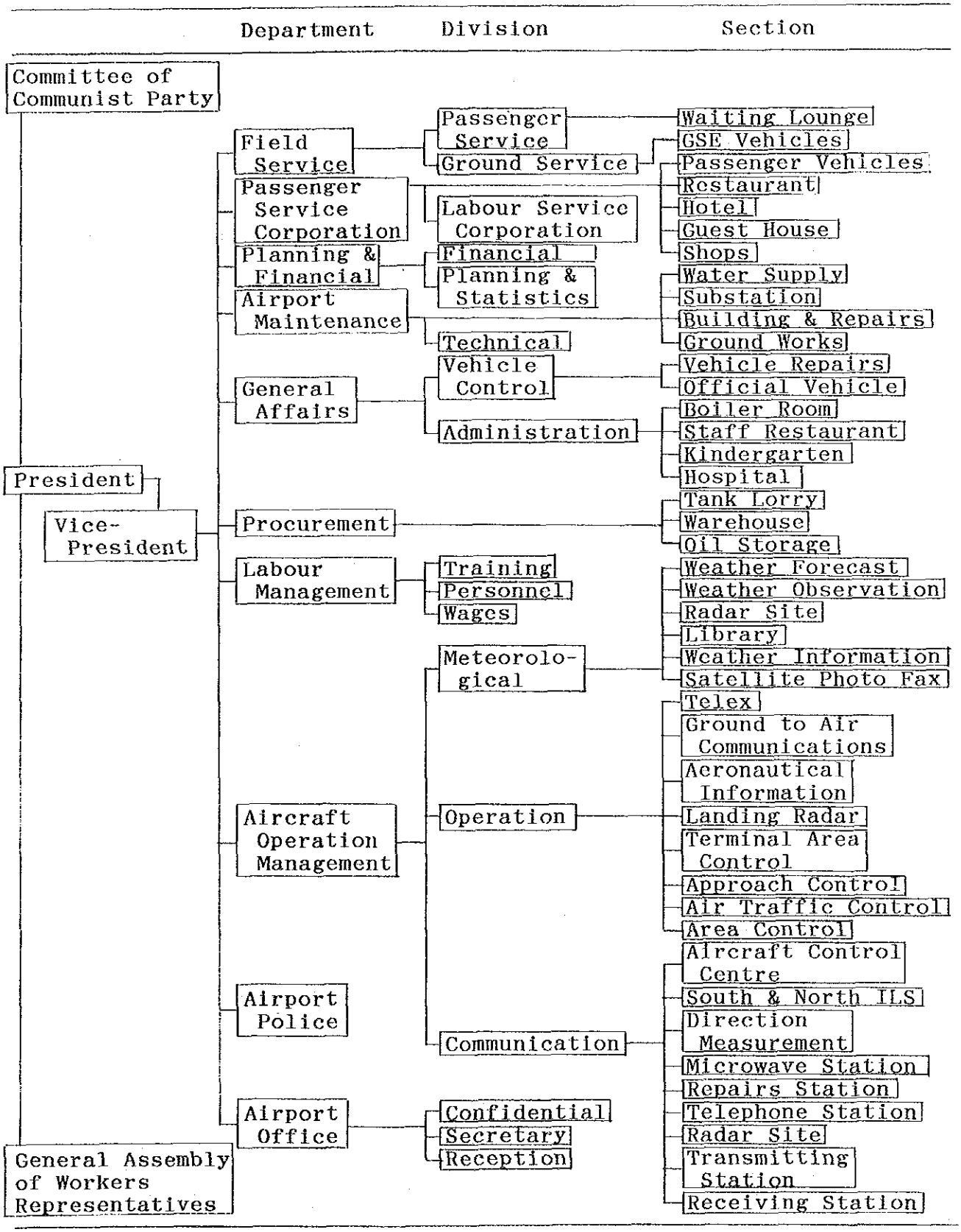


Fig.12-1 Project Implementation Organization

12.2.2 Airport Administration Organization

The existing Wuhan/Nanhu Airport is well operated, but no exclusive organization exists for the comprehensive and integrated administration of the airport. It will be absolutely necessary and is highly recommended, therefore, to have an independent administrative organization established for the Wuhan/Tianhe Airport for the sake of its effective management, operation and maintenance. The Airport Authority is to be established under the control of CAAC Hubei with a draft plan of administrative organization as shown in Fig.12-2.

Fig.12-2 Organization Chart of Wuhan/Tianhe Airport Authority
(Draft as of January 1989)



12.2.3 Personnel Training Programme

It will be necessary to establish and implement a special personnel training programme for the modernized air navigation facilities and mechanical facilities to be newly installed at the Airport.

The training is divided into two parts, one basic and the other on-the-job. In the basic training the trainees will receive the training beginning at the manufacturing stage of the equipment at the factory. On-the-job training will be given to the trainees who have completed the basic training at the manufacturer's factory. The proposed schedule of the special training programme by facility is summarized in Table 12-1.

T a b l e . 12－1　Proposed Training Schedule for Wuhan/Tianke Airport Construction Project

	1992												1993											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
AIR NAVIGATION FACILITIES																								
RADIO NAVAIDS								BASIC														OJT		
VISUAL NAVAIDS					BASIC																	OJT		
ATC								BASIC															OJT	
COMMUNICATIONS								BASIC															OJT	
METEOROLOGICAL								BASIC														OJT		
RELATED FACILITIES																								
WATER SUPPLY FACILITY																								OJT
SEWAGE DISPOSAL FACILITY																								OJT
FUEL SUPPLY FACILITIES																								OJT
AIRCONDITIONING FACILITY																								OJT

BASIC:TRAINING AT MANUFACTURE'S FACTORY
OJT　:ON THE JOB TRAINING

12.3 Financing Plan for the Project

The objective of this section is to make a forecast of the cash flow during the period 1990 - 2013 for the implementation of the Project based on the assumed conditions of the necessary financing.

12.3.1 Assumptions

The assumptions made for the forecast of the cash flow are as follows:

(1) Depreciation

Depreciation costs are taken into consideration in this analysis based on the current practice at Wuhan/Nanhu Airport as described in Chapter 9.

(2) Price Contingency

It is estimated at 10% per annum during the construction period for the local portion based on the past inflation rates in China.

(3) Conditions of Funds

The conditions of funds available are assumed as shown in Table 12-2.

Table 12-2 Conditions of Funds Available

Portion	Type of Funds	Interest Rate	Grace Period	Repayment Period
Foreign	Soft Loan	3.0%	10 years	30 years
Local	Financing by the Government	0%	---	20 years
	Financing by Wuhan City	0%	---	20 years

12.3.2 Results of Forecast

Based on the above assumptions, forecast is made of the cash flow of the Project with the results as shown in Table 12-3 and the following conclusions are derived from:

a. Subsidies from the Government or Wuhan City would be required to cover the annual deficits during the construction period 1990 - 1993 and in 1994, amounting to 129,629 thousand Yuan.

b. The cumulative cash position would turn from deficit to surplus in the year 2000 if the Government subsidies are to be compensated.

Table 12-3 Forecast of Cash Flow with Government Subsidy

(in 1989 thousand Yuan)

Item	Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1. Funds Required															
Investment	Foreign	0	14295	106625	57882	0	0	0	0	0	0	0	0	0	
	Local	62811	47371	89286	152027	0	0	0	0	0	0	0	0	0	
	Sub-total	62811	61666	195911	209909	0	0	0	0	0	0	0	0	0	
Price Contingency	Foreign	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Local	6281	9948	29554	70556	0	0	0	0	0	0	0	0	0	
	Sub-total	6281	9948	29554	70556	0	0	0	0	0	0	0	0	0	
Total	Foreign	0	14295	106625	57882	0	0	0	0	0	0	0	0	0	
	Local	69092	57319	118840	222583	0	0	0	0	0	0	0	0	0	
	Sub-total	69092	71614	225465	280465	0	0	0	0	0	0	0	0	0	
2. Debt Service															
Foreign soft Loan	Interest	0	429	3628	5364	5364	5364	5364	5364	5364	5364	5364	5096	4828	45
	Repayment	0	0	0	0	0	0	0	0	0	0	0	8940	8940	89
	Sub-total	0	429	3628	5364	5364	5364	5364	5364	5364	5364	5364	14036	13768	135
Government Finance	Interest	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Repayment	0	0	0	0	17575	17575	17575	17575	17575	17575	17575	17575	17575	175
	Sub-total	0	0	0	0	17575	17575	17575	17575	17575	17575	17575	17575	17575	175
Total	Interest	0	429	3628	5364	5364	5364	5364	5364	5364	5364	5364	5096	4828	45
	Repayment	0	0	0	0	17575	17575	17575	17575	17575	17575	17575	26515	26515	265
	Sub-total	0	429	3628	5364	22939	22939	22939	22939	22939	22939	22939	31611	31343	310
3. Total Fund Required		69092	72043	229092	285829	22939	22939	22939	22939	22939	22939	22939	31611	31343	310
4. Funds Available															
Operating Revenues		0	0	0	0	38283	45059	53035	62422	73471	86475	101781	101781	101781	1017
Working Expenses		0	0	0	0	19214	20175	21184	22243	23355	24523	25749	25749	25749	257
(Depreciation)		0	0	0	0	12945	12945	12945	12945	12945	12945	12945	12945	12945	129
(Operating Expenses)		0	0	0	0	32159	33120	34129	35188	36300	37468	38694	38694	38694	386
Net Working (Cash) Surplus		0	0	0	0	19069	24884	31851	40179	50116	61952	76032	76032	76032	760
(Net Operating Surplus)		0	0	0	0	6124	11939	18906	27234	37171	49007	63087	63087	63087	630
Borrowing: Foreign Soft Loan		0	14295	106625	57882	0	0	0	0	0	0	0	0	0	
Government Finance		62811	47371	89286	152027	0	0	0	0	0	0	0	0	0	
Sub-total		62811	61666	195911	209909	0	0	0	0	0	0	0	0	0	
Total Funds Available		62811	61666	195911	209909	19069	24884	31851	40179	50116	61952	76032	76032	76032	760
5. Annual Surplus (-Deficit)		-6281	-10377	-33181	-75920	-3870	1945	8912	17240	27177	39013	53093	44421	44689	449
6. Government Subsidy		6281	10377	33181	75920	3870	0	0	0	0	0	0	0	0	
7. Annual Cash Position		0	0	0	0	0	1945	8912	17240	27177	39013	53093	44421	44689	449
8. Cumulative Cash Position		-6281	-16658	-49839	-125759	-129629	-127684	-118772	-101531	-74354	-35341	17753	62174	106863	1518

Table 12-3

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5364	5364	5364	5364	5364	5096	4828	4559	4291	4023	3755	3487	3218	2950	2682	2414	2146	1877
0	0	0	0	0	8940	8940	8940	8940	8940	8940	8940	8940	8940	8940	8940	8940	8940
5364	5364	5364	5364	5364	14036	13768	13500	13231	12963	12695	12427	12159	11890	11622	11354	11086	10818
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575
17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575	17575
5364	5364	5364	5364	5364	5096	4828	4559	4291	4023	3755	3487	3218	2950	2682	2414	2146	1877
17575	17575	17575	17575	17575	26515	26515	26515	26515	26515	26515	26515	26515	26515	26515	26515	26515	26515
22939	22939	22939	22939	22939	31611	31343	31074	30806	30538	30270	30002	29733	29465	29197	28929	28661	28392
22939	22939	22939	22939	22939	31611	31343	31074	30806	30538	30270	30002	29733	29465	29197	28929	28661	28392
53035	62422	73471	86475	101781	101781	101781	101781	101781	101781	101781	101781	101781	101781	101781	101781	101781	101781
21184	22243	23355	24523	25749	25749	25749	25749	25749	25749	25749	25749	25749	25749	25749	25749	25749	25749
12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945	12945
34129	35188	36300	37468	38694	38694	38694	38694	38694	38694	38694	38694	38694	38694	38694	38694	38694	38694
31851	40179	50116	61952	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032
18906	27234	37171	49007	63087	63087	63087	63087	63087	63087	63087	63087	63087	63087	63087	63087	63087	63087
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31851	40179	50116	61952	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032	76032
8912	17240	27177	39013	53093	44421	44689	44958	45226	45494	45762	46030	46299	46567	46835	47103	47371	47640
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8912	17240	27177	39013	53093	44421	44689	44958	45226	45494	45762	46030	46299	46567	46835	47103	47371	47640
-118772	-101531	-74354	-35341	17753	62174	106863	151821	197047	242541	288303	334334	380632	427199	474034	521138	568509	616149

APPENDICES

APPENDIX 1

中華人民共和国
武漢天河空港建設計画調査
実施細則

日本国　国際協力事業団

中華人民共和国　中国民用航空局

この実施細則は、下記の二機関により合意されるものである。

日本国国際協力事業団

中華人民共和国中国民用航空局

この実施細則は、下記の二者の署名により確認されるものとする。

1988年8月3日

日本国	中華人民共和国
国際協力事業団	中国民用航空局
調査団団長	計画司副司長
亀甲邦敏	王道

日本国政府は、中華人民共和国政府の提案に基づき、武漢天河空港建設計画調査の実施を決定し、１９８８年８月３日、武漢天河空港建設計画調査の実施に関する口上書を中華人民共和国政府と交換した。

日本国政府による技術協力の実施機関である国際協力事業団は、日本国において施行されている法律及び規則に従い本調査を実施する。

中国民用航空局は中華人民共和国政府の本調査に関する担当機関として、中華人民共和国において施行されている法律及び規則に従い中華人民共和国関係機関の調整を行うとともに、国際協力事業団が派遣する調査団と協力して本調査の円滑な実施を図る。

１９８８年８月３日、日本国政府が中華人民共和国政府へ発した口上書５．及び中華人民共和国政府の口上書による回答に基づき、日本国国際協力事業団と中華人民共和国中国民用航空局は協力の内容、範囲及び調査日程並びに協力を進めるに当って両国政府がとるべき措置等の詳細について本実施細則を定めた。

１．協力の内容及び範囲

（１）日本側は、武漢新空港建設予定地における基本施設、ターミナル施設及びその他の関連施設（以下「調査対象施設」という。）の建設のためのフィージビィリティー調査を実施する。

（２）日本側は、本調査の期間中、調査に参画する中国側専門家に対し、現地調査業務を通じ技術移転を行う。

２．調査の内容

調査は、下記の調査事項から構成される。

（１）新空港建設予定地の評価

新空港建設予定地に関し、空域条件、自然条件及び社会条件についての既存資料の収集及び整理を行い、その適性に係る評価を行う。

（２）現地補足調査の実施

新空港建設予定地において視程に係る気象条件調査を実施する。

（３）需要予測

調査対象施設の建設計画策定に必要な需要予測を行う。なお、予測の目標年次は、西暦２０００年とする。

（４）建設計画の策定

上記（1）、（2）及び（3）の結果に基づき、西暦２０００年を計画目標年次とする調査対象施設の建設計画を策定する。なお、建設計画策定に当っては、目標年次以降における本空港の長期的発展方向についても配慮する。

（５）建設計画に係る実施の可能性の検討

（4）で策定した建設計画に関して以下の検討を行い、調査対象施設建設の実施の可能性を評価する。なお、これに係る調査項目は、以下のとおりである。

①概略設計の実施

②施工計画の策定

③概算事業費の算出

④経済分析の実施

⑤財務分析の実施

３．調査期間及び工程

調査期間及び工程は、別表－１のとおり概ね１２ヶ月間とする。

４．報告書

国際協力事業団は、下記の報告書（日本語）を作成し中国民用航空局に提出する。

（１）着手報告書（３０部）

調査実施計画及び実施工程を内容とするもので、現地調査の開始時点に提出する。

（２）中間報告書（３０部）

中間的な調査結果を内容とするもので、調査開始後６ヶ月以内に提出する。

（３）最終報告書（案）（３０部）

調査開始後９ヶ月以内に提出する。中国民用航空局は、本報告書（案）受理後１ヶ月以内に本報告書（案）に関する意見を国際協力事業団に提出する。

（４）最終報告書（５０部）

最終報告書（案）に対する意見を受けた後、２ヶ月以内に提出する。

５．中国側がとるべき措置

調査を円滑に実施するために、中国側は、中華人民共和国において施行されている法律及び規則に従い以下の措置をとる。

（１）中国側専門家、事務職員及び作業員等の提供及びそれに係る全ての経費負担
（２）現地調査を実施するに当って、別表－２「現地調査に関する業務分担」の中国側が分担する業務の実施及びそれに係る経費負担
（３）現地調査に必要な作業所及び机、椅子等備品の無償提供並びに宿舎の斡旋（但し、調査サイトにおいて通常の方法で借上げが困難な場合は、宿舎の無償提供）
（４）現地調査のために必要な通訳の無償提供
（５）現地調査のために必要な航空機、鉄道、車両及び船舶等の手配（但し、通常の方法で借上げが困難な車両及び船舶等については、運転手等を含め無償提供）
（６）現地調査のために必要な中国国内間電話設備の提供及びそれに係る経費負担
（７）現地調査に必要な諸許可の手続きの実施
（８）調査のために必要な資料及び情報の提供
（９）調査のために必要な資料の中国から日本への移送許可
（10）現地調査期間中、調査団員に病気又は怪我が発生した場合の病院の手配
（11）現地調査期間中の調査団員の安全の確保
（12）日本から持ち込む資機材の中国国内輸送費の負担
（13）日本から持ち込む資機材の輸入及び再輸出に必要な手続き
（14）その他軽微な資機材等一部経費の負担

６．日本側がとるべき措置

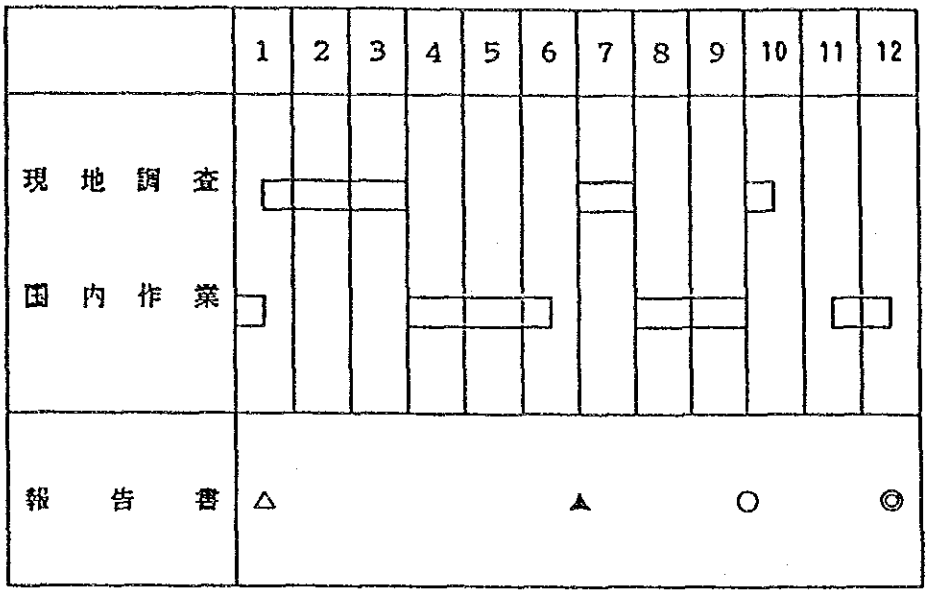
日本側は、調査に当って以下の措置をとる。

（１）日本側調査団員の技術費、渡航費、現地調査期間中の食費、旅費及び医療費等の経費負担（上記５．（３）及び（５）の中国側が負担する場合を除く。）
（２）現地調査の実施に当って、別表－２「現地調査に関する業務分担」の日本側が分担する業務の実施及びそれに係る経費の負担
（３）日本から持ち込む資機材の日本から中国の港までの往復輸送費の負担
（４）上記４．の報告書の作成

７．本実施細則に定めていない事項については、本調査期間中両者協議して定めるものとする。

別表－1

調査期間及び工程（暫定案）



凡例　△：着手報告書
▲：中間報告書
○：最終報告書（案）
◎：最終報告書

別表－２

現地調査に関する業務分担

作　業　項　目	国際協力事業団	中国民用航空局
１．本実施細則２．(1)に規定する既存資料の収集及び整理	①必要な資料の特定 ②資料の整理及び分析	①資料の収集及び提供 ②資料の整理及び分析作業に対する協力
２．本実施細則２．(2)に規定する視程に係る気象条件調査	①調査に必要な計画及び指導	①調査の実施
３．本実施細則２．(3)に規定する需要予測に係る調査	①調査に必要な計画及び指導 ②調査結果の解析	①調査の実施協力（調査員の提供）
４．本実施細則２．(5)に規定する概算事業費の算出	①概算事業費の算出	①概算事業費の算出のための基礎単価の提示 ②用地及び補償費の算定

中华人民共和国

武汉天河民用机场建设计划调查
实施细则

中华人民共和国中国民用航空局
日本国国际协力事业团

本实施细则由下述中、日两个部门达成协议

中华人民共和国中国民用航空局
日本国国际协力事业团

本实施细则由下述两人签署确认

1988年8月3日

中华人民共和国	日本国
中国民用航空局	国际协力事业团
计划司副司长	调查团团长
王　道	龟甲邦敏

中 华 人 民 共 和 国
武汉天河民用机场建设计划调查
实 施 细 则

日本政府根据中华人民共和国的建议，决定对武汉天河民用机场建设计划进行调查。并于1988年 8月 3日与中华人民共和国就武汉天河机场建设计划的调查的实施交换了照会。

国际协力事业团系日本政府进行技术协作的执行机构。将按日本现行法律和规章进行该项调查。

中国民用航空局为中华人民共和国政府进行调查的负责机构，将按照中华人民共和国的现行法律和规章负责与中华人民共和国内各部门间的协调工作。并与国际协力事业团派遣的调查团合作，以顺利实施本调查。

根据1988年 8月 3日日本政府致中国政府的照会，及中国政府照会的答复，中国民用航空局和日本国国际协力事业团就本项合作的内容、范围、调查日程以及两国政府为促进本项合作应采取的必要措施等，制定了本实施细则。

1．合作内容及范围

(1)． 日方将对武汉新建机场的建设用地的基本设施，航站区设施及其它有关设施进行可行性研究。

(2)． 日本在该项目调查期间内，通过现场调查，将向参与本调查的中方专家实行技术转让。

2．调查内容

调查事项如下

(1)． 对新机场建设用地的评价

收集新机场用地的空域条件，自然条件，社会条件的现成

资料，予以整理，进行可行性评价。

(2)． 现场补充条件

在新机场场址进行关于视距气象条件的调查。

(3)． 需求预测

对调查对象的建设计划进行必要的需求预测，预测的目标年度为公元2000年。

(4)． 建设计划的制定

根据上述(1)、(2)和(3)的结果，以公元2000年为该计划的目标年度，从而制定出建设计划。另在制定该建设计划时，也要考虑在目标年度后该机场的长期发展方向。

(5)． 实施建设计划可能性的研究

对(1)中所制定的建设计划做如下研究，评价实施调查对象建设的可行性。有关此项的调查项目如下：

(A)基本设计

(B)制定施工计划

(C)计算概算事业费

(D)经济分析

(E)财务分析

3．调查时间及程序

调查时间及程序如附表1所示，大致12个月。

4．书面报告

国际协力事业团将用日文向中国民用航空局提交下述书面报告：

(1) 初期书面报告(30份)

现场调查开始时提交调查实施计划和调查程序的书面报告。

(2) 中期报告(30份)

调查开始后六个月之内提交中期调查结果的书面报告。

(3) 终期书面报告(草案30份)

调查开始后九个月之内，日方提交终期书面报告。中国民用航空局受理后一个月之内，应对该报告的意见反映给日本国国际协力事业团。

(4) 终期结果书面报告(50份)

日方收到中方审理后的报告后，将在2个月之内向中方提供终期书面报告。

5．中方应具备的措施

为使调查顺利进行，中方按中华人民共和国现行法律及规章，采取下述措施：

(1) 配备中方专家、行政及工作人员并负担其所有费用。

(2) 在进行现场调查时，执行附表2--"有关现场调查业务分工"中规定的由中方承担的业务并负责其经费。

(3) 无偿提供用于现场调查所必备的工作间及桌、椅等物品，协助安排宿舍(如在当地无法以正常方式租赁宿舍时，中方则应免费提供住宿)。

(4) 免费提供现场调查的翻译人员。

(5) 负责安排现场调查必需的飞机、火车、地面车辆及船舶等交通工具(但难以以通常的办法租赁车辆、船舶等情况下，中方则应免费提供包括司机等的交通工具)。

(6) 为现场调查提供中国国内联系的电话设备，并负担其经费。

(7) 办妥现场调查所需的许可手序。

(8) 提供为调查所需的资料和信息。

(9) 允许日方将所需的资料转送日本。

(10) 负责安排在调查期间日方的伤、病人员的治疗。

(11) 保证调查成员在调查期间的安全。

(12) 负担从日本入境的资料、器材的中国国内运费。

(13) 负责办理中国入出境的资料和器材的在华的必要手续。

(14) 负担有关轻微资料和器材等部份经费。

6．日方应备措施

(1) 负责日方调查人员的技术经费、国际旅费、现场调查期间的餐费、旅费及医疗等各项经费(除上述第5条第3、5款中规定的中方负担的部份外)。

(2) 现场调查时，执行附表2--"有关现场调查业务分工"中规定日方承担的业务并负担其经费。

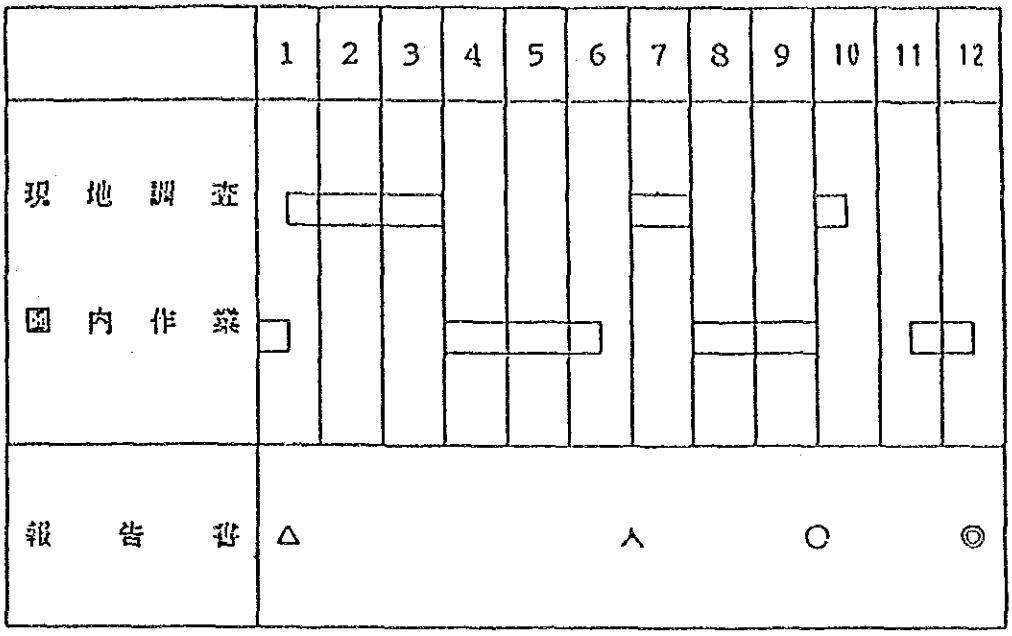
(3) 负责日方资料和器材的国际间运费。

(4) 编写上述第4条的书面报告。

7．对本实施细则中未规定的事项，则在调查期间由双方协议商定。

调查时间及程序

表1



凡例　△：着手報告書
人：中間報告書
○：最終報告書（案）
◎：最終報告書

现场调查的业务分工

表2

调查项目	国际协力事业团	中国民用航空局
1．收集和整理按本实施细则2（1）有关资料的收集和整理	1．确定所必要的资料 2．资料的整理和分析	1．收集和提供资料 2．协助整理分析资料
2．按本实施细则2（2）所规定的有关视距的气象条件调查	1．调查所需的计划和指导	1．实施调查
3．按本实施细则2（3）所规定的需求调查	1．调查所需的计划与指导 2．分析调查结果	1．协助调查 2．提供调查人员
4．按本实施细则2（5）所规定的费用的推算	估算经费	1．提供估算经费的基础单价 2．计算征用地及补偿费

中華人民共和国
武漢天河空港建設計画調査
協議議事録

日本国　国際協力事業団

中華人民共和国　中国民用航空局

中華人民共和国国家科学技術委員会の招請に応じ、武漢天河空港建設計画調査に係る日本国国際協力事業団の事前調査団は、１９８８年７月２５日から８月４日まで中華人民共和国を訪問し、同計画調査の実施について中国民用航空局及び武漢市人民政府と友好的かつ真摯な一連の協議を行った。

日中双方は、本調査に係る実施細則の署名に先立ち、調査の実施内容に係る討議を行い、以下の事項を確認した。

１．本調査に係る中国側実施機関は、中国民用航空局とする。

２．実施細則１．（１）で規定する調査対象施設とは、以下のものとする。

（１）基本施設とは、滑走路、誘導路及びエプロンをいう。

（２）ターミナル施設とは、旅客及び貨物ターミナル、整備施設、ＧＳＥ施設、構内道路並びに駐車場をいう。

（３）その他の関連施設とは、排水施設、無線施設、照明施設、航空管制施設（管制塔及び空港監視レーダー）、気象施設、通信施設、電力施設、給水施設、給油施設、専用鉄道（横店駅からオイルターミナルまでの約１ｋｍ）、汚水処理施設、冷暖房施設、消火救難施設、警備施設、関連建物（事務所、倉庫、宿舎等）及び関連道路（インターチェンジを含む空港アクセス道路約９ｋｍ及び付替道路）をいう。

（４）上記（３）の関連施設は、専ら武漢天河空港のために供せられるものに限る。

３．実施細則２．（２）に関し、中国側は、フィージビィリティー調査の際に土質調査の結果について十分な説明を行う旨表明し、それを前提として土質調査に係る現地補足調査は実施しないこととなった。

４．実施細則２．（２）に関し、中国側は、調査に必要な地形図の原図又は鮮明なコピーを提供する旨表明し、それを前提として測量に係る現地補足調査は実施しないこととなった。

５．実施細則２．（２）に関し、中国側は、視程に係る気象条件調査に必要な資機材を日本側が提供することを要請し、日本側はこれを了承した。

6．実施細則２．（５）に関し、中国側は、航空機騒音の影響予測を行うことを要請し、日本側はこれを了承した。

7．実施細則３．に関し、中国側は、調査期間の短縮を要請し、日本側は、これに対し十分な努力をする旨表明した。

また、日本側は、調査期間の短縮を図るため、本格調査に先立ち、中国側が必要な資料をすみやかに提供するとともに、中国側の経費負担となっている業務に関し、十分な予算措置を講ずるよう要請し、中国側はこれを了承した。

8．実施細則４．に関し、中国側は、報告書を中国語又は英語で作成するよう要請し、日本側は、中国の開発調査の従来の例にのっとり、日本語で作成することとしたい旨述べた。本件要請については、日中双方がそれぞれの関係機関に伝達することとなった。

この協議議事録は、日本語及び中国語で作成し、いずれも同等の効力を有するものとして、下記の二者の署名により確認されるものとする。

１９８８年８月３日

日本国	中華人民共和国
国際協力事業団	中国民用航空局
調査団団長	計画司副司長
亀甲邦敏	王道
亀甲邦敏	王道

日本側協議参加者名簿

調査団

団長		亀甲　邦敏
団員		矢島　道夫
団員		林　清實
団員		小竹　寿朗
団員		南谷　敏一
団員		根本　万里

在中華人民共和国日本国大使館

一等書記官	有野　一馬

国際協力事業団中華人民共和国事務所

所長	田口　定則
所員	鈴木　有津子

中 方 参 加 人 员

中国民用航空局计划司副司长	王　道
中国民用航空局航行司总工程师	庄　良
中国民用航空局计划司主任科员	朱丽春
中国民用航空局国际司翻译	谭作成
中国民航工程咨询公司总经理	蒋作舟
中国民航工程咨询公司副总工程师	魏绮华
中国民航广州管理局总工程师	钱仁杰
中国民航湖北省局局长	李华松
中国民航湖北省局工程师	唐绍光
武汉市计委副主任	张优瑞
武汉市计委交通处副处长	关有庆
武汉市规划局总工程师	刘美卿

中华人民共和国

武汉天河民用机场建设计划调查
会谈纪要

中华人民共和国中国民用航空局
日本国国际协力事业团

中华人民共和国
武汉天河民用机场建设计划调查
会谈纪要

应中华人民共和国国家科学技术委员会的邀请，日本国国际协力事业团武汉天河民用机场建设计划事前调查团自1988年7月25日至8月4日访问了中华人共和国，并同中国民用航空局及武汉市人民政府就实施该计划事前调查进行了友好和诚挚的协商。

中日双方在签署本调查实施细则之前，就调查实施内容进行了讨论，确认了下述事项。

1．担任本调查的中方实施机关为中国民用航空局。

2．实施细则的1(1)里规定的调查对象设施为如下内容：

(1) 基本设施为跑道、滑行道、停机坪(客机坪、货机坪、维修机坪等过夜驻场机坪)。

(2) 航站区设施为候机楼及货运站、机务维修设施地面特种车辆及设施、机场内公路、停车场。

(3) 其它有关设施为排水设施，无线导航设施，灯光设施，航空管制设施(管制塔及机场监视雷达)，气象设施，通讯设施，供电设施，供水设施，供油设施，铁路专用线(从横店车站到油库约1公里)，污水处理设施，供冷及供热设施，消防救援设施，公安警卫设施，有

关房屋（办公楼、 仓库、宿舍等）及有关道路（包括立交桥的进场公路约九公里、拆建公路）。

(4) 上述(3)所属的有关设施只能用于武汉天河民用机场。

3．有关实施细则2 （2）中方表示要将土质结构进行充份的说明，若以它为前提不再进行对土质调查的补充调查。

4．有关实施细则2 （2）中方表示提供调查所需要的地形原图或清晰的复印件，在此前提下决定不再进行现场地形测量的补充调查。

5．有关实施细则2 （2），中方要求日方提供有关视距气象条件调查所需设备，日方同意中方要求。

6．有关实施细则2 （5），中方要求日方进行飞机噪音影响预测，日方同意了中方的要求。

7．有关实施细则3，中方要求日方缩短调查时间，日方表明对中方要求做出充分的努力。

日方为了缩短调查时间，要求中方在开始正式调查之前，中方将日方所需要的资料及时提供给日方，并对由中方负责费用而进行的内容做出预算，中方同意日方要求。

8．有关实施细则4，中方向日方要求写成用中文或英文的书面报告，日方本着曾经与中国进行的开发调查的惯例表明用日文写成报告书的希望。中日双方就本项要求各自传达各自的有关部门。

本会谈纪要分别用中文和日文写成，两种文本具有同等的效力，由下列双方签名确认。

1988年8月3日

中华人民共和国
中国民用航空局
计划司副司长

王　道

日本国
国际协力事业团
调查团团长

亀甲邦敏

中 方 参 加 人 员

中国民用航空局计划司副司长	王　道
中国民用航空局航行司总工程师	庄　良
中国民用航空局计划司主任科员	朱丽春
中国民用航空局国际司翻译	谭作成
中国民航工程咨询公司总经理	蒋作舟
中国民航工程咨询公司副总工程师	魏绮华
中国民航广州管理局总工程师	钱仁杰
中国民航湖北省局局长	李华松
中国民航湖北省局工程师	唐绍光
武汉市计委副主任	张优瑞
武汉市计委交通处副处长	关有庆
武汉市规划局总工程师	刘美卿

日本側協議参加者名簿

調査団

団長		亀甲　邦敏
団員		矢島　道夫
団員		林　清實
団員		小竹　秀朗
団員		南谷　敏一
団員		根本　万里

在中華人民共和国日本国大使館

一等書記官	有野　一馬

国際協力事業団中華人民共和国事務所

所長		田口　定則
所員		鈴木　有津子

Appendix 1-2 List of persons concerned

Advisory Committee

CHAIRMAN:

Kunitoshi KIKOU,	Director Administration Division Ports and Harbours Bureau Ministry of Transport

MEMBERS:

Michio YAJIMA,	Director Second Construction Division Fourth District Port Construction Bureau Ministry of Transport (in charge of Airport Plan)
Kiyomi HAYASHI,	Section Chief Radio Engineering Division Air Traffic Services Department Ministry of Transport (in charge of Air Navigation Facilities Plan)
Hiroshi ISHITANI,	Director Civil and Architectural Works Division Aerodrome Department Tokyo Regional Civil Aviation Bureau Ministry of Transport (in charge of Demand Forecast)

JICA

COORDINATOR:

Kazuo NAKAGAWA	Deputy Director First Development & Research Division Social Development Cooperation Department

COORDINATOR:

Toshikazu MINATANI	First Development & Research Division Social Development Cooperation Department

COORDINATOR:

Rika Inada	First Development & Research Division Social Development Cooperation Department

Staff Assignment of Study Team

NAME	SPECIALITY	JOBS IN CHARGE
Hiraku MORIGUCHI	Leader	1)Responsible for the management of the entire study 2)Responsible for the overall airport planning 3)Coordination both with JICA and with CAAC
Hiroyoshi KAKIZAKI	Sub-Leader/ Economist	1)Assistant to the leader 2)Air transport demand forecast 3)Economic analysis 4)Financial Analysis
Hiroji KOZAKI	Air Traffic Management Specialist	1)Air traffic and airspace use plan 2)Supervision and analysis of Meteorological observation 3)Forecast of aircraft noise contour
Hitoshi KANNO	Civil Engineer	1)Planning, design, construction schedule and cost estimate of airfield facilities 2)Planning, design, construction schedule and cost estimate of airport related roads 3)Planning, design, construction schedule and cost estimate of roads and car park 4)Planning, design, construction schedule and cost estimate of drainage facilities
Kohei AOYAGI	Architect	1)Planning, design, construction schedule and cost estimate of terminal facilities 2)Planning, design, construction schedule and cost estimate of fire-fighting rescue and facilities, guard facilities and related buildings
Kunihiro KANAYA	Utility Engineer	1)Planning, design, construction schedule and cost estimate of water supply, electric power supply, fuel supply (including pipeline and oil terminal), and air-conditioning facilities

(Continued)

NAME	SPECIALITY	JOBS IN CHARGE
Shigenori MIURA	Aeronautical Engineer	1)Planning, design, construction schedule and cost estimate of radio nav-aids, visual nav-aids, aeronautical telecommunications, air traffic control and meteorological facilities
Naonori YAMADA	Railway Planner	1)Planning, design, construction schedule and cost estimate of the exclusive railway
Yuri YOSHITAKE	Interpreter	1)Interpretation at official meetings 2)Interpretation at field surveys 3)Translation of minutes and data collected

Chinese Counterparts

NAME	SPECIALITY	JOBS IN CHARGE
王　道	团长	中国民用航空局计划司副司长
朱丽春	调查计划	中国民用航空局计划司主任科员
谭作成	翻　　译	中国民用航空局国际司翻译
蒋作舟	机场计划	中国民航工程咨询公司总经理
魏绮华	机场计划	中国民航工程咨询公司副总工程师
钱仁杰	航空保安计划	中国民航广州管理局总工程师
唐绍光	需求预测	中国民航湖北省局工程师
关有庆	需求预测	武汉市计委交通处副处长

Chinese Couterparts in Wuhan

武漢市計画委員会交通処副処長	関有慶	接待組副組長
武漢市計画委員会商易処副処長	周一舟	接待組副組長
湖北省民航局修建科高級工程師	唐紹光	接待組副組長兼専門家組長 全体計画、土木施設計画
武漢市規画局総工程師	劉美卿	建築施設計画
鄭州鉄路局武漢勘測設計院高級工程師	虞徳成	鉄道施設計画
鄭州鉄路局武漢勘測設計院総工程師	李裕家	鉄道施設計画
湖北省民航局計画財務科経済師	劉宏康	需要予測
湖北省民航局計画財務科経済師	劉暁燕	需要予測
湖北省民航局航行科科長	蔡振文	運航空域計画
湖北省民航局航行情報室主任	宋徳寛	運航空域計画 航空保安施設計画
湖北省民航局気象科副科長	程徳新	気象観測
湖北省民航局通訊科工程師	周承流	航空保安施設計画
湖北省民航局供応科副科長	張海軍	給油施設、設備計画
湖北省民航局辨公室副主任	李暁照	接待組組長
武漢市城市規画設計研究院	龍亜軍	都市計画
武漢市電信局設計所所長	霍童英	電話施設計画

APPENDIX 3

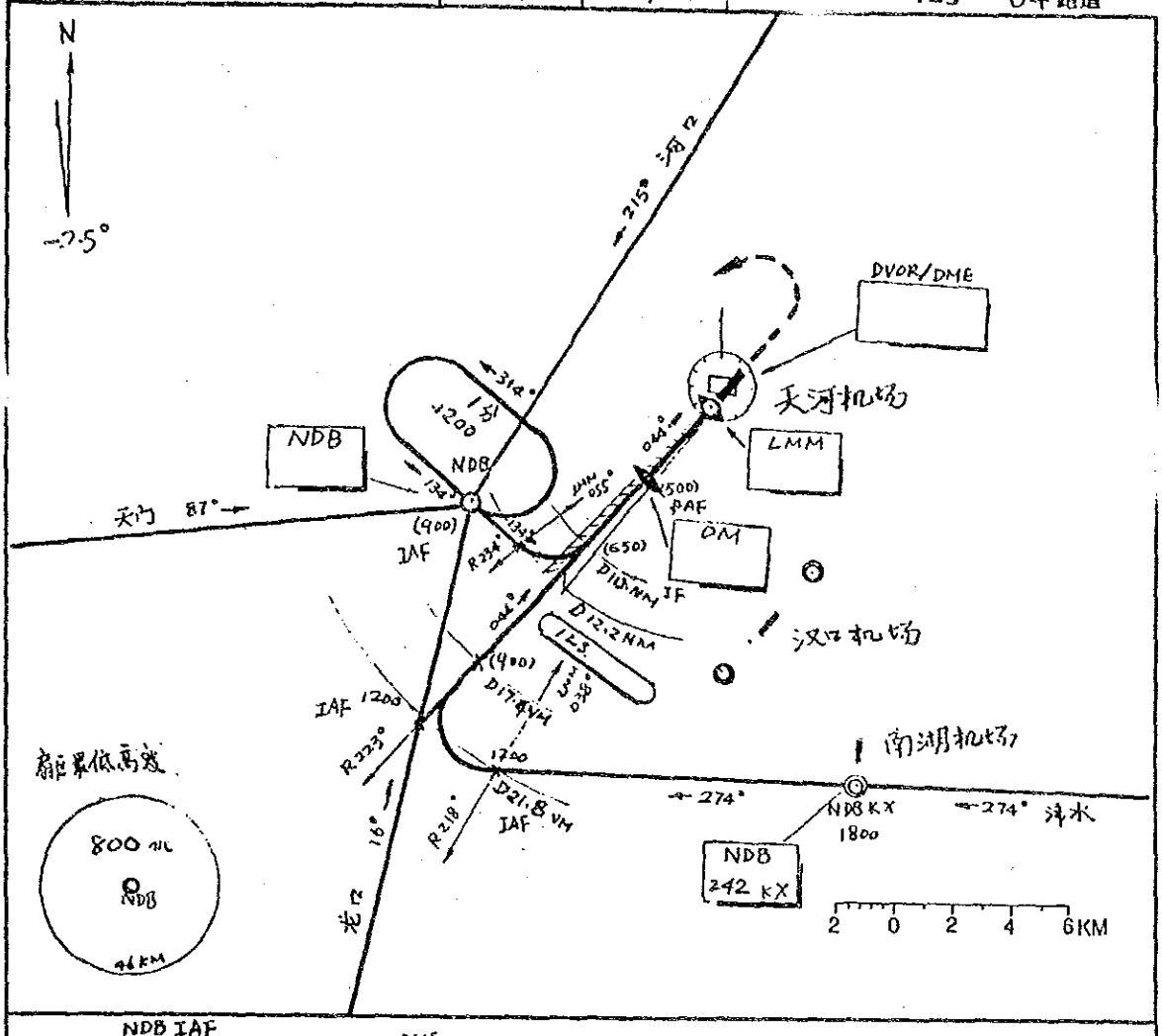
仪表进近图

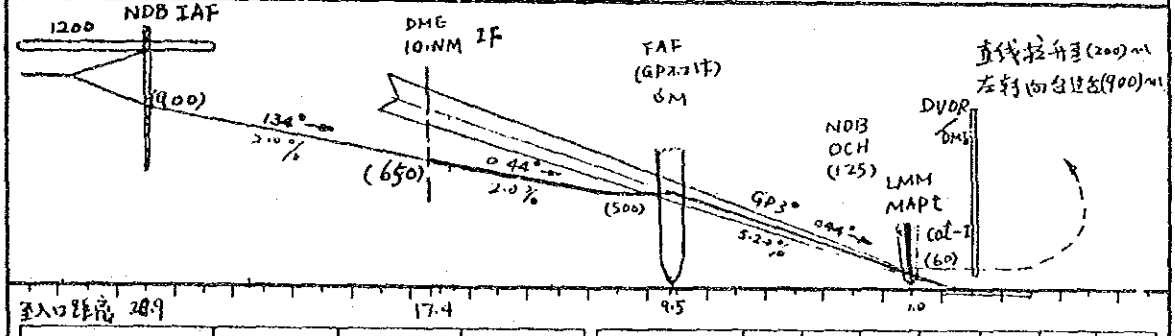
磁差 -2.5°

机场标高	塔台
入口标高	29 m

武汉/天河

ILS 04 跑道





着陆最低标准		大型		中型		小型	
		①	②	①	②	①	②
ILS—I类	云高/能见度						
	决断高度	(60)		(60)		(60)	
下滑道不工作	云高/能见度						
	最低下降高度	(100)		(100)		(100)	
目视盘旋	云高/能见度						
	最低下降高度	(190)		(190)		(160)	

测距(NM)							
至入口(NM)							
高度(米)							

地速 公里/时 (浬/时)	150 (81)	200 (108)	250 (135)	300 (162)	350 (189)	400 (216)
OM—入口						
下降率 (米/秒)						

1989.4.2.

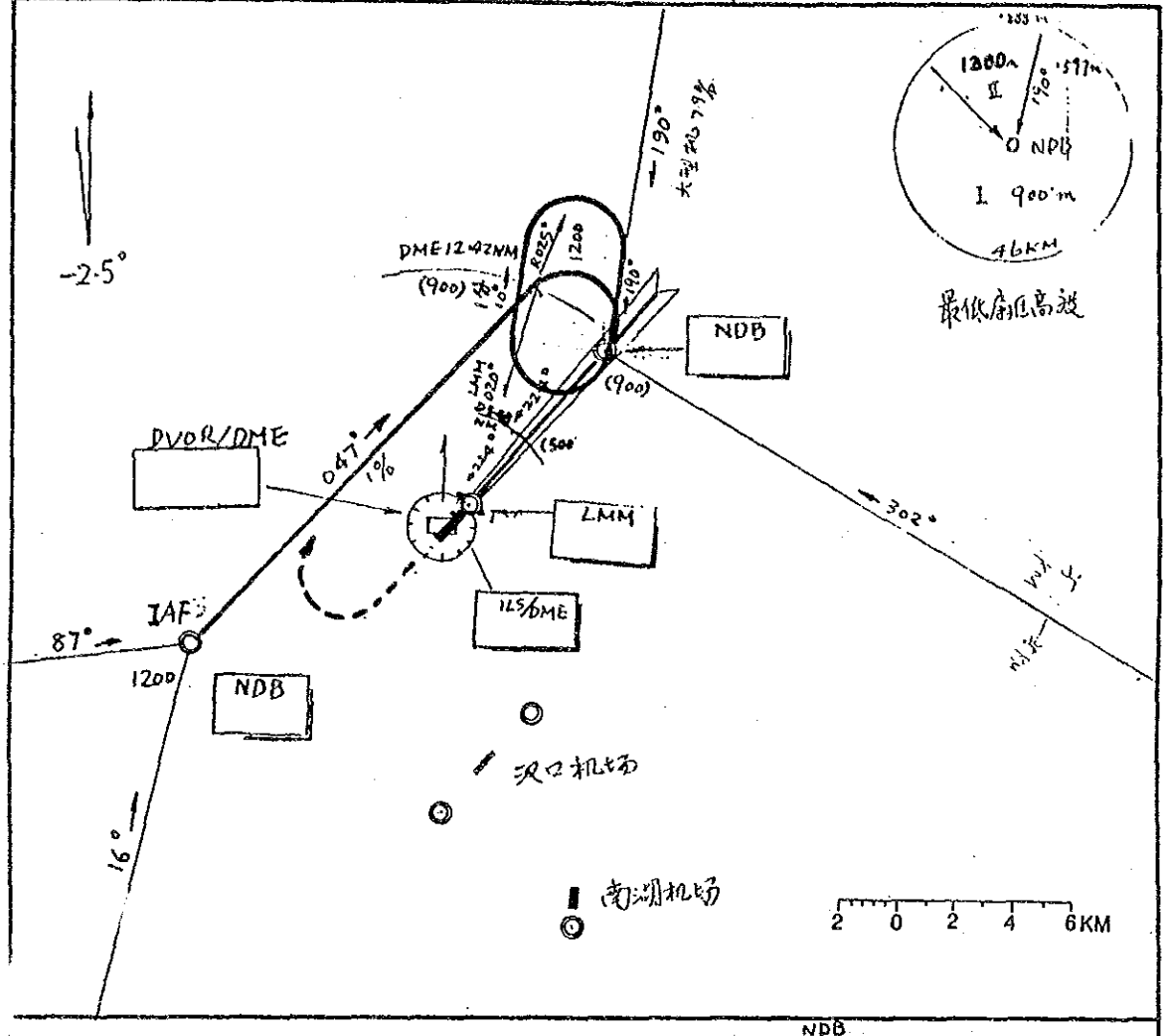
仪表进近图

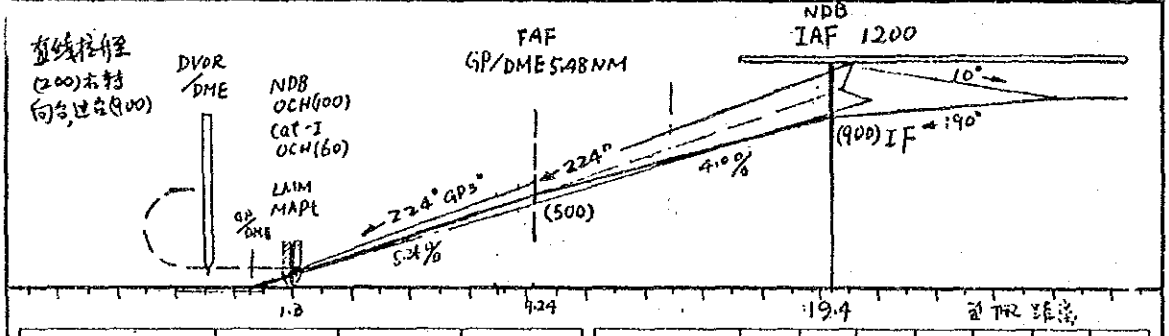
磁差 -2.5°

机场标高	塔台
入口标高	34.5

武汉/天河

ILS 22跑道





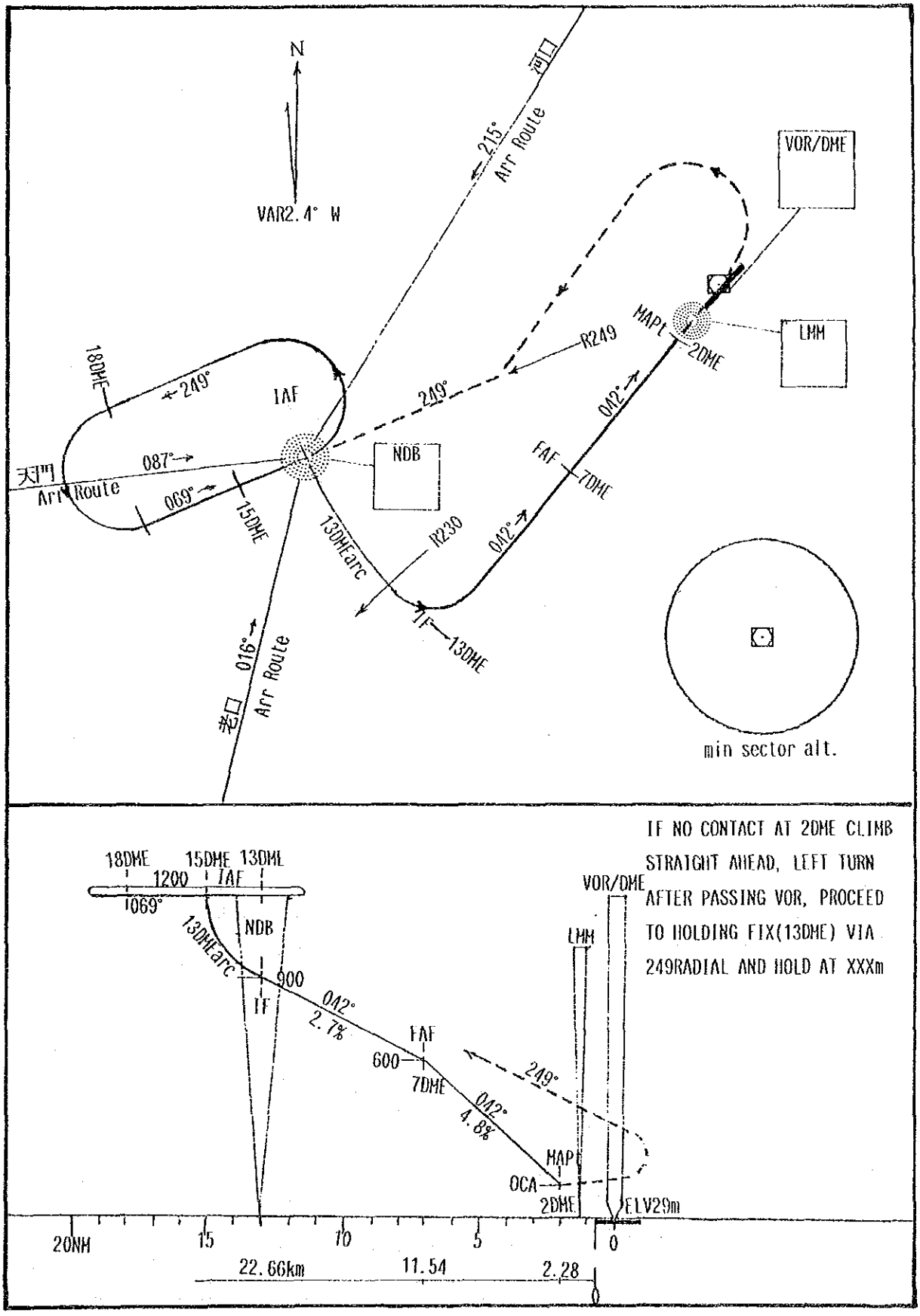
着陆最低标准		大型		中型		小型	
		①	②	①	②	①	②
ILS—I类	云高/能见度						
	决断高度	(60)		(60)		(60)	
下滑道不工作	云高/能见度						
	最低下降高度	(100)		(100)		(100)	
目视盘旋	云高/能见度						
	最低下降高度	(190)		(190)		(160)	

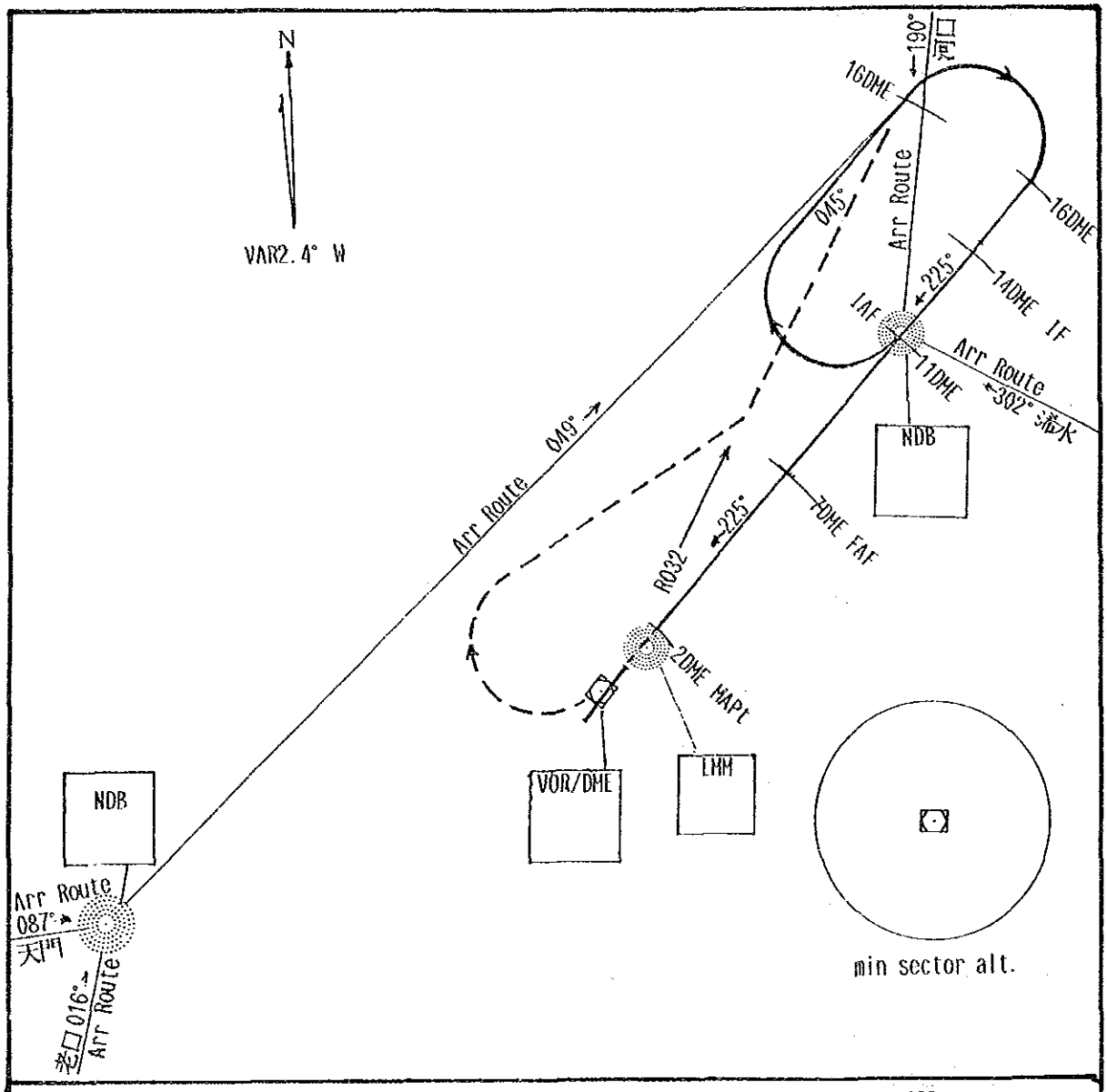
测距(NM)	1	2	3	4	5	6	7
至入口(NM)		0.92	1.92	2.92	3.92	4.92	5.92
高度(米)		89	186	283	580	477	

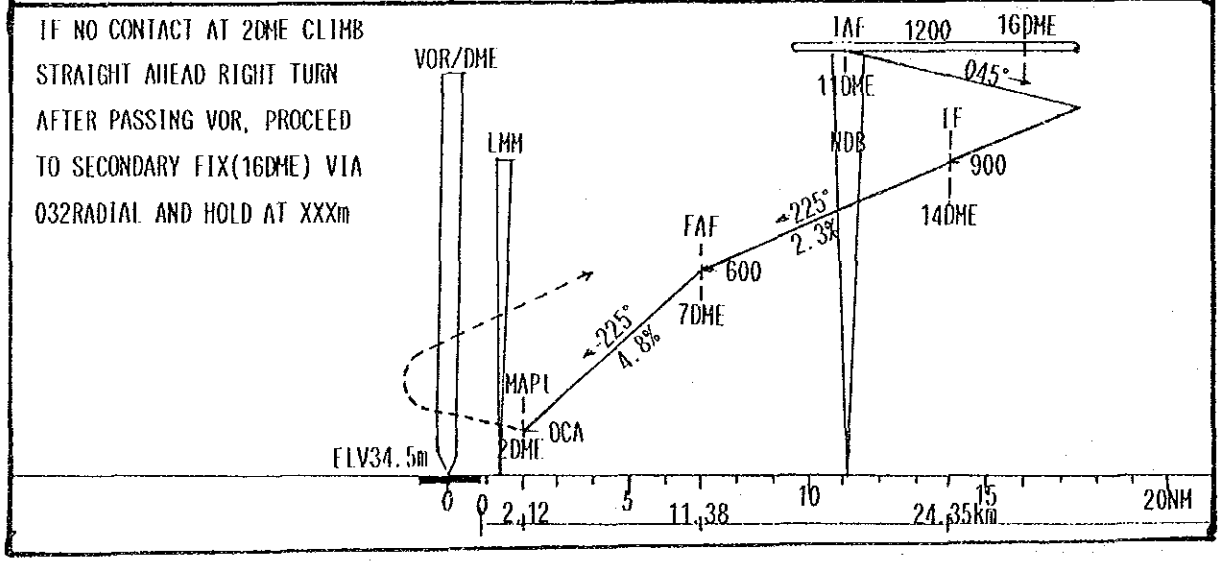
地速 公里/时 (浬/时)	150 (81)	200 (108)	250 (135)	300 (162)	350 (189)	400 (216)
DME 5.48NM 入口						
下降率 (米/秒)						

1989.4.7

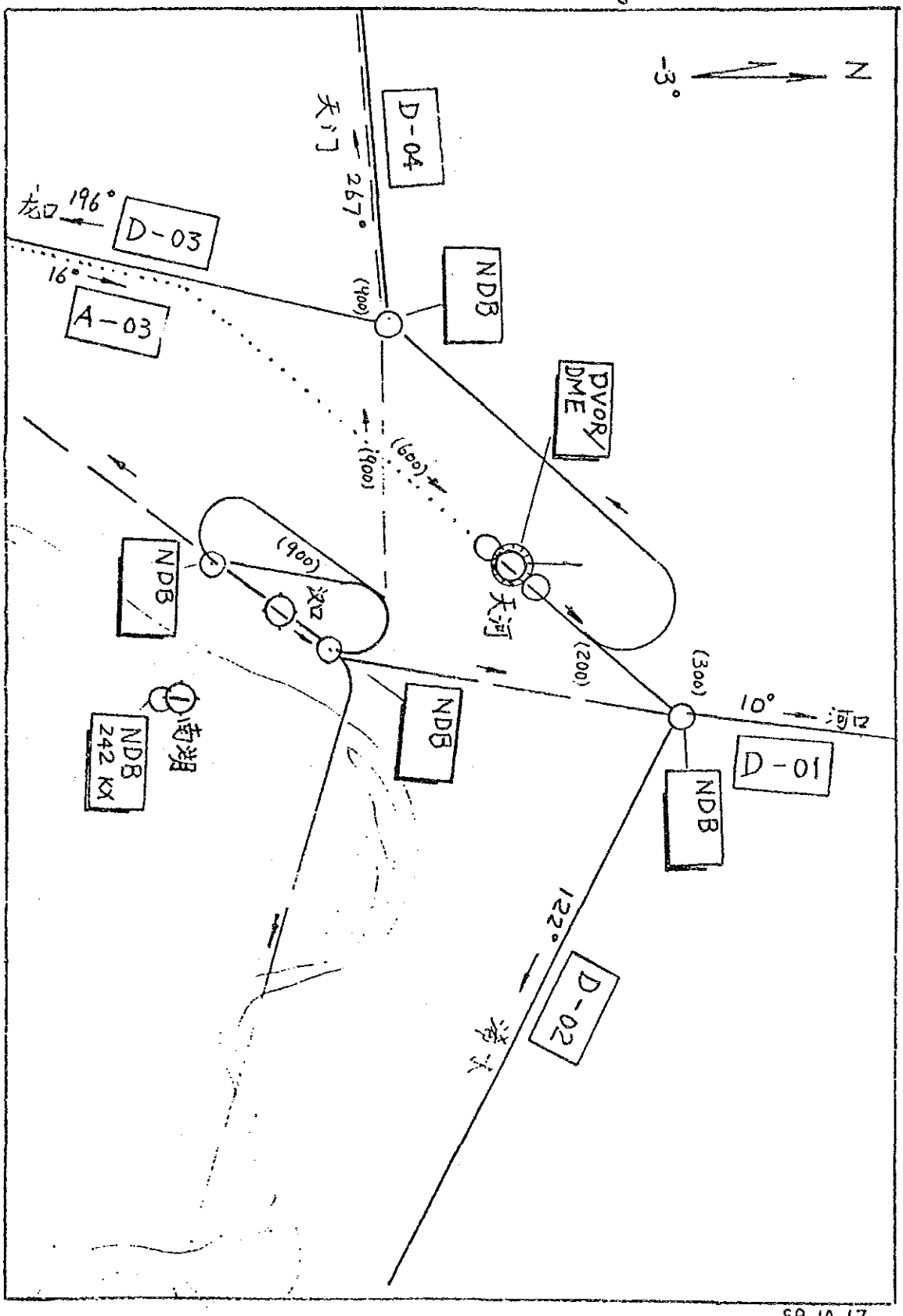
VOR/DME RWY04



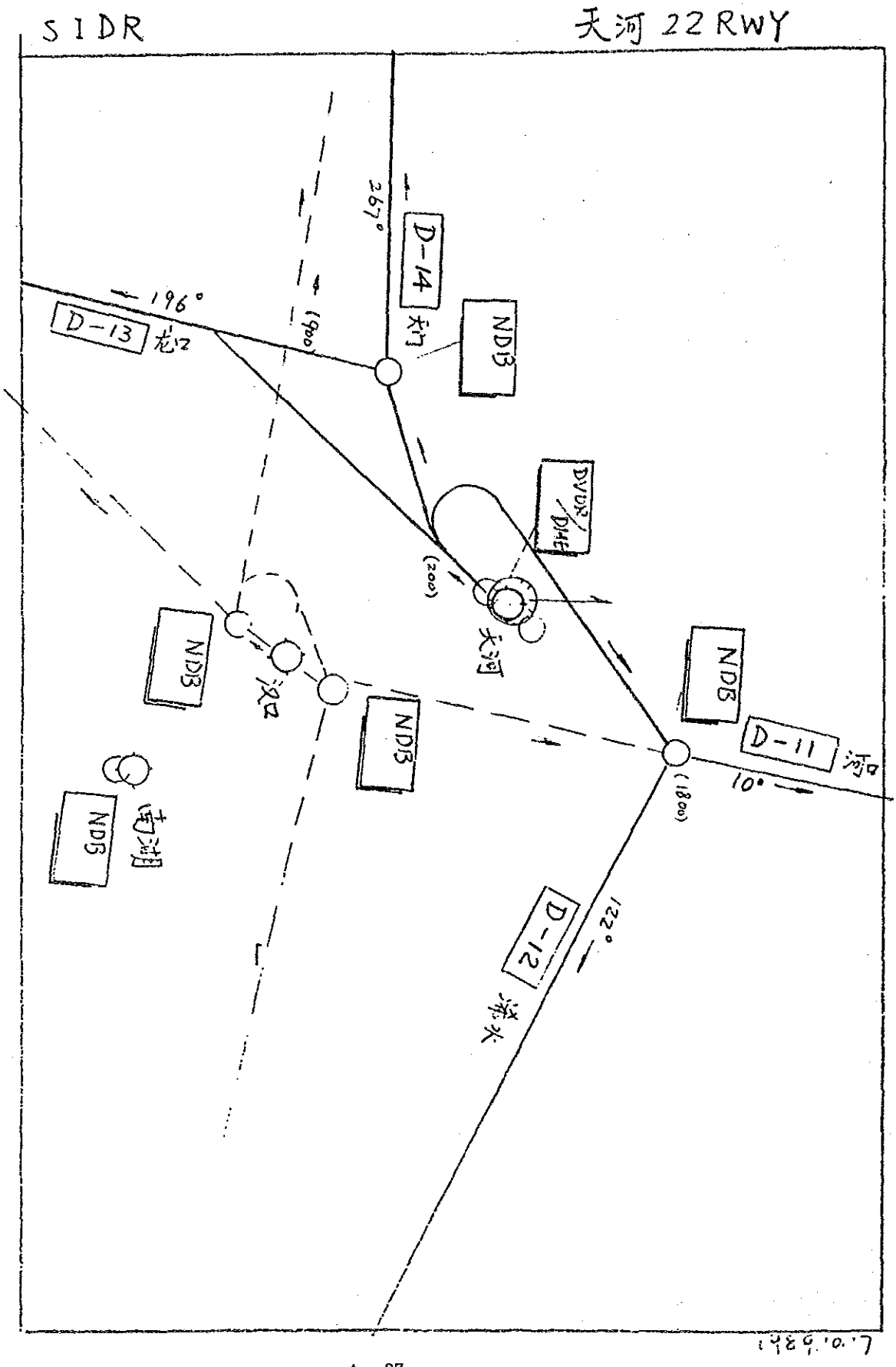

N
VAR2.4° W
190°
老口
16DME
Arr Route
045°
16DME
225°
14DME IF
IAF
11DME
Arr Route
302° 添水
NDB
Arr Route 049°
225°
7DME FAF
R032
2DME MAPt
VOR/DME
LMM
NDB
Arr Route
087°
天門
老口 016°
Arr Route
min sector alt.


IF NO CONTACT AT 2DME CLIMB
STRAIGHT AHEAD RIGHT TURN
AFTER PASSING VOR, PROCEED
TO SECONDARY FIX(16DME) VIA
032RADIAL AND HOLD AT XXXm
VOR/DME
LMM
IAF 1200 16DME
045°
11DME
NDB
IF
900
14DME
FAF
600
7DME
225°
2.3%
225°
4.8%
MAPt
OCA
2DME
ELV34.5m
0 0 2.12 5 11.38 10 15 20NM
24.35km

SIDR 天河 04RWY

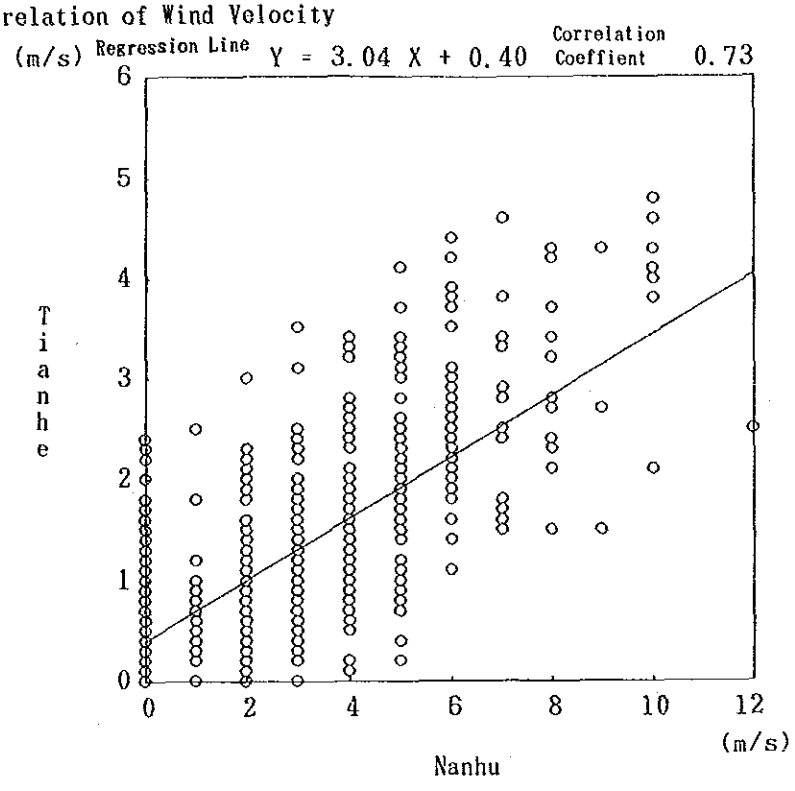


89.10.17

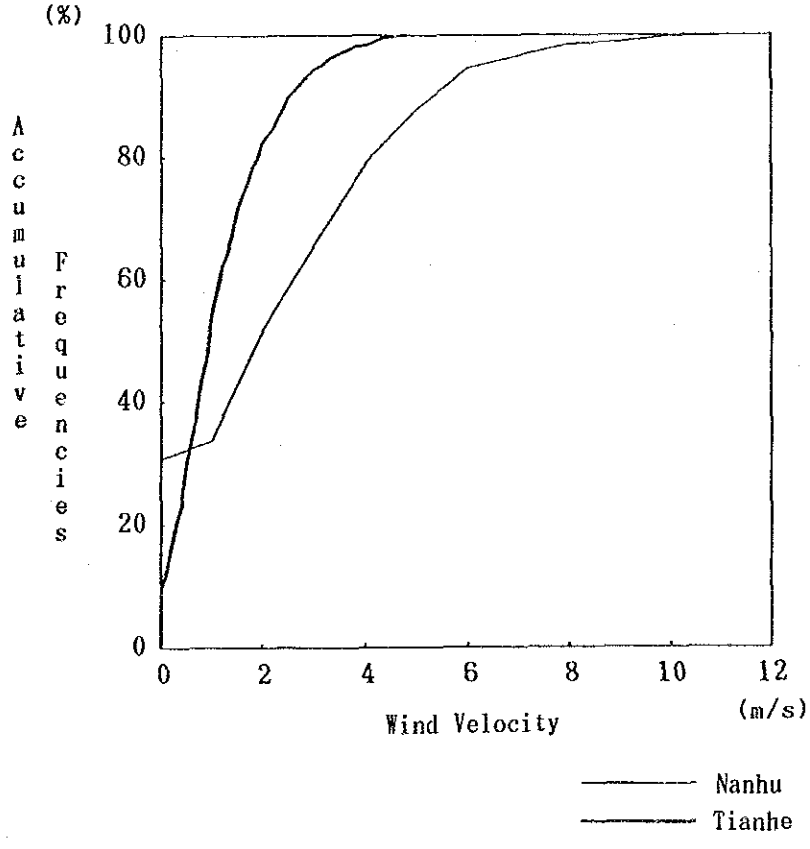

SIDR
天河 22 RWY
267°
D-14
NDB
196°
D-13
1900
(200)
DVOR/DME
NDB
NDB
NDB
NDB
D-11
河口
10°
(1800)
D-12
122°

Appendix 3 -2 Correlation of Weather Data at Nanhu and Tianhe Site
(Jan 1, 1989～Jan 31, 1989)

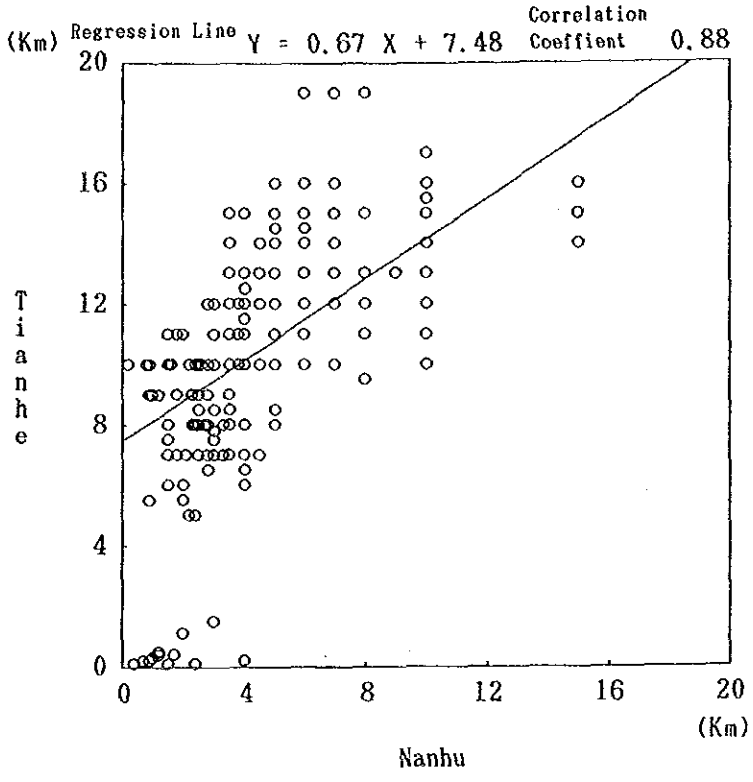
(1) Correlation of Wind Velocity



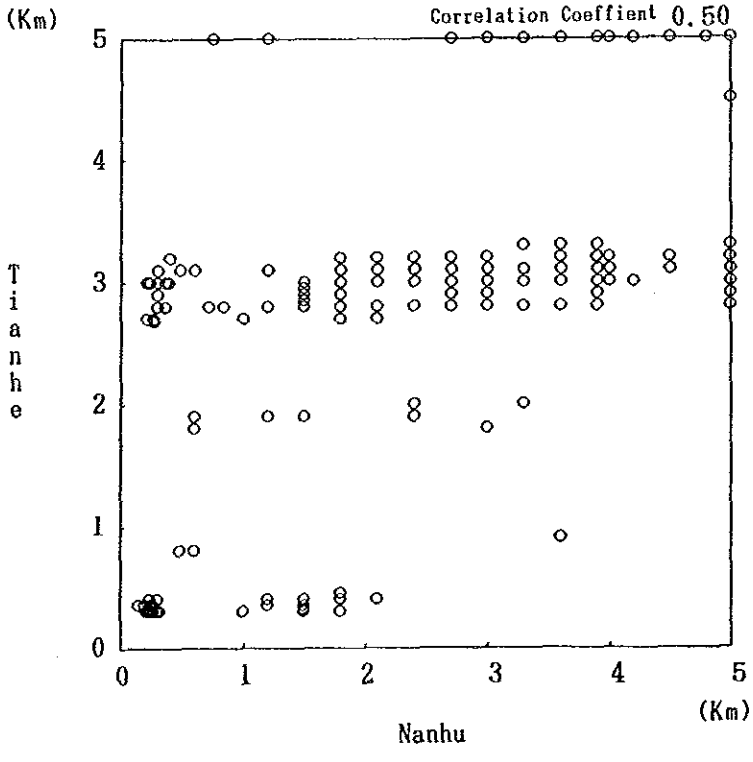
(2) Accumulative Frequencies of Wind Velocity



(3) Correlation of Visibility



(4) Correlation of Ceiling



APPENDIX 4

Appendix 4-1 Air Transport Statistics

Year	Air Passenger		Air Cargo	
	China (thousand)	Wuhan (thousand)	China (thousand tons)	Wuhan (thousand tons)
1970	220	13	37	2.2
1971	336	21	33	2.7
1972	465	28	30	2.2
1973	600	33	28	1.6
1974	942	33	35	1.5
1975	1,390	80	47	2.1
1976	1,460	74	53	2.3
1977	1,930	79	53	2.7
1978	2,310	84	64	3.1
1979	2,980	119	80	4.0
1980	3,430	125	89	3.7
1981	4,010	128	94	3.0
1982	4,450	140	102	3.3
1983	3,910	90	116	2.7
1984	5,540	189	150	3.4
1985	7,470	241	195	4.8
1986	9,960	358	224	5.7
1987	13,100	492	299	9.0

Appendix 4-2 Socio-economic Statistics

Year	Population		Gross Social Product	
	China (million)	Wuhan (thousand)	China (billion Yuan in 1980 price)	Wuhan (million Yuan in 1980 prece)
1970	829.92	4,809	407.8	5,613
1971	852.29	4,909	450.5	6,407
1972	871.77	5,005	470.1	6,594
1973	892.11	5,008	511.1	7,195
1974	908.59	5,106	520.5	5,824
1975	924.20	5,193	580.2	7,771
1976	937.17	5,297	588.7	6,649
1977	949.74	5,382	649.3	8,327
1978	962.59	5,483	733.8	9,892
1979	975.42	5,584	796.9	11,660
1980	987.05	5,672	853.2	12,976
1981	1,000.72	5,779	903.5	13,905
1982	1,015.90	5,870	989.7	14,812
1983	1,027.64	5,949	1,091.2	16,216
1984	1,038.76	6,006	1,250.8	18,471
1985	1,050.44	6,084	1,464.9	21,255
1986	1,065.29	6,200	1,615.1	22,701
1987	1,080.73	6,293	1,842.9	24,959

Appendix 4-3 Air Transport Related Statistics

Year	Number of Air Passenger per one thousand population		Share of Wuhan Airport in Total Air Transport	
	China (person)	Wuhan (person)	Passenger (%)	Cargo (%)
1970	0.265	2.703	5.9	5.9
1971	0.394	4.278	6.3	8.2
1972	0.533	5.594	6.0	7.3
1973	0.673	6.486	5.5	5.7
1974	1.037	6.463	3.5	4.3
1975	1.504	15.405	5.8	4.5
1976	1.558	13.970	5.1	4.3
1977	2.032	14.679	4.1	5.1
1978	2.400	15.320	3.6	4.8
1979	3.055	21.311	4.0	5.0
1980	3.475	22.038	3.6	4.2
1981	4.007	22.149	3.2	3.2
1982	4.380	23.850	3.1	3.2
1983	3.805	15.129	2.3	2.3
1984	5.333	31.469	3.4	2.3
1985	7.111	39.612	3.2	2.5
1986	9.350	57.742	3.6	2.5
1987	12.121	78.182	3.8	3.0

Appendix 4-4 Relation between Load Factor and Potential Demand

Load Factor (%)	Potential Demand/ Actual Passenger
50.0	1.004
51.0	1.005
52.0	1.007
53.0	1.008
54.0	1.009
55.0	1.012
56.0	1.015
57.0	1.016
58.0	1.020
59.0	1.023
60.0	1.025
61.0	1.029
62.0	1.033
63.0	1.039
64.0	1.044
65.0	1.050
66.0	1.056
67.0	1.064
68.0	1.071
69.0	1.078
70.0	1.088
71.0	1.098
72.0	1.109
73.0	1.121
74.0	1.135
75.0	1.148
76.0	1.164
77.0	1.182
78.0	1.202
79.0	1.224
80.0	1.248
81.0	1.273
82.0	1.305
83.0	1.341
84.0	1.381
85.0	1.429
86.0	1.481
87.0	1.549
88.0	1.634
89.0	1.729
90.0	1.858
91.0	2.026
92.0	2.276
93.0	2.668
94.0	3.723

Source: "Economics on Air Transport"
Prof. Masaki Ohta, Waseda University

Appendix 4-5 Air Passenger Questinnaire

乘机旅客实况调查

1988年12月
中国民用航空局

各位乘机旅客

中国民用航空局作为筹备建设武汉机场的基础资料，以各位乘机旅客为对象，正在进行实际情况调查。请在回答下列调查项目之后，将调查表在乘机口处交给工作人员。

请您协助我们的调查工作。

调 查 项 目

（请在符合您情况的项目上划○）

问题 1 您的姓别？

1. 男 (81.0) 2. 女 (18.8)

问题 2 您的年龄？

1. 19岁以下(2.7) 2. 20岁～29岁(23.8) 3. 30岁～39岁(33.2) 4. 40岁～49岁(21.1)
5. 50岁～59岁(14.8) 6. 60岁以上(4.4)

问题 3 您的职业？

1. 农、林、渔业(2.6) 2. 制造业(18.5) 3. 商业、服务行业(31.0) 4. 公务员(26.8)
5. 无工作(2.4) 6. 其他(18.4)

问题 4 您的地址？

1. 武汉市(32.3) 2. 湖北省(10.3) 3. 湖南省(1.3) 4. 江西省(1.5)
5. 浙江省(4.1) 6. 安徽省(1.6) 7. 河南省(0.5) 8. 陕西省(1.5)
9. 四川省(2.3) 10. 北京市(6.2) 11. 上海市(6.1) 12. 天津市(1.0)
13. 广东省(14.8) 14. 云南省(0.5) 15. 其他(15.7)

问题 5 今天前往的机场？

1. 北京(16.6) 2. 成都(3.9) 3. 重庆(1.6) 4. 大连(2.5)
5. 福州(5.7) 6. 广州(35.2) 7. 杭州(3.3) 8. 合肥(1.8)
9. 济南(0.6) 10. 南昌(0.7) 11. 南京(3.1) 12. 上海(14.0)
13. 沙市(0.2) 14. 沈阳(1.9) 15. 厦门(1.8) 16. 西安(4.9)
17. 宜昌(1.2) 18. 郑州(0.3) 19. 天津(0.0) 20. 其他(0.6)

问题 6 今天的旅行目的？

1. 工作(82.8) 2. 旅游(7.4) 3. 探亲、私事(6.1)
4. 其他(3.3)

问题 7 到南湖机场所利用的交通工具？

1. 出租车(24.1) 2. 公共汽车(23.9) 3. 轿车(35.1) 4. 自行车(0.6)
5. 其他(15.6)

问题 8 乘出租车和轿车时的同乘人数？

1. 1人(13.4) 2. 2人(22.9) 3. 3人(15.8) 4. 4人(10.7)
5. 5人(5.1) 6. 6人(2.9) 7. 7人以上(12.0) 8. 0人(17.2)

问题 9 旅行的同行人数？

1. 1人(21.2) 2. 2人(34.2) 3. 3人(17.1) 4. 4人(7.7)
5. 5人(3.7) 6. 6人(2.0) 7. 7人以上(5.7) 8. 0人(8.4)

问题10 到机场的送行人数？

1. 1人(23.2) 2. 2人(15.4) 3. 3人(7.2) 4. 4人(2.7)
5. 5人(1.5) 6. 6人(1.0) 7. 7人以上(3.0) 8. 0人(46.0)

（谢谢您的大力协助）

Note: 1) Figures in parentheses indicate the percentage of each answer in each question.
2) As regards Questions 8 to 10, Items 8 are added to complete the questionnaire.