6) Standardization of production and quality of commodities.

With a view to realizing the Common Market completely by 1992, some concrete measures have so far been implemented such as phased reduction of tariff in the region and concentrated settlement of accounts of intra-regional trades at the Zimbabwe Reserve Bank.

1-2-5 National Development Plan and Future Prospects

(1) National Development Plan

The country's Third National Development Plan (TNDP) for the period 1979 - 1983 actually started from January 1980 ending December 1984 with the following basic objectives:

1) To use planning as an instrument for attaining socialism;
2) To consider generation of more and fuller employment as a major objective of development;
3) To diversify the economic structure in order to reduce the economy's dependence on copper;
4) To undertake a crash economic programme of promoting agriculture and industry; and
5) To give the highest priority to rural development in order to create a strong rural economy.

It is clear from the Table 1-8 that Zambia's economy remained stagnant during the TNDP period with the annual growth rate of 0.1% as against the TNDP target of 4.8%.

Table 1-8 Year to Year Changes in the GDP at Constant 1977 Prices in the Third National Development Plan Period

	1980 over 1977	1981 over 1980 (TNDF Base)	1982 over 1981	1983 over 1982	1984 over 1983	1980-84 Average	TNDP Target Rate of Growth
Aggregate GDP	0.5	6.2	-2.8	-2.0	-1.3	0.1	4.8
Agriculture, Forestry & Fisheries	-6.7	+8.0	-10.0	+8.6	+9.5	1.9	5.5
Mining and Quarrying	-12.0	+5.0	-	+3.3	-8.1	-2.6	1.0
Manufacturing	+8.8	+12.0	3.5	-7.2	-1.8	+1.7	8.0
Electricity Gas & Water	+37.0	+7.6	-7.0	-5.3	-	+9.3	6.0
Construction	-9.7	-23.3	+6.3	-6.0	-1.1	-4.4	5.5
Wholesale & Retail Trade	+3.7	-0.5	-8.5	-4.0	-10.0	-3.8	5.5
Hotels & Restaurants	18.0	+32.5	-	6.6	-1.8	+11.1	4.3
Transport & Communications Storage	-10.0	-	+0.8	-	-5.0	-2.8	5.0

Source: Economic Report 1984, January 1985

Though the Fourth National Development Plan has not been published as of this writing, the short-run economic policy of the Zambian Government is stated in the report entitled "Restructuring in the Midst of Crisis" presented to the Consultative Group for Zambia in 1984. According to this policy the Government plans to tackle the following four main issues of:

1) the critical shortage of foreign exchange,
2) the massive underutilization of capacity,
3) the excessive level of capital intensity, and
4) the excessive dependence on copper exports,

by means of the following measures:

1) the restructuring of incentives, which covers pricing policies, tariff reforms, budget subsidies, exchange rate policies, and foreign exchange allocation and budgeting system;
2) the revision of public investment priorities to emphasize the rehabilitation of existing assets and to enhance capacity utilization in the short run and export-oriented agricultural growth in the long run;
3) improvement in budget and debt management; and
4) the strengthening of institutions, particularly public enterprises, and the improvement of economic management capacity of the Government.

Table 1-9 shows the prospect for GDP that would be realized by the implementation of economic planning as stated above.

Table 1-9 Gross Domestic Product, 1983-86, with the Economic Planning

(Kwacha, millions at constant 1983 prices)

	1983	1984	1985	1986
Real GDP	4,222	3,937	4,270	4,419
Percentage change over previous year	+2	-7	+8	+3
Government Consumption	1,085	1,001	976	1,031
Private Consumption	2,525	2,256	2,391	2,525
Investment (Inc. Stocks)	644	575	967	1,093
Resources Balance	-32	+105	-64	-230

Source: "Restructuring in the Midst of Crisis", 1984, the Government of Zambia

(2) Future Prospects of Zambian Economy

It is very difficult to forecast the future prospects of Zambian economy at this time with the economic situation as stated above. However, the following

picture may be derived from the Government's restructuring policy:

1) The diversification of the economic structure will be pursued through economic programmes;
2) The mining sector will reach the capacity limit of the production in 20 years, but still be the leading sector of the economic development;
3) The agricultural sector which has the greatest growth potential will expand its production;
4) Manufacturing sector will grow by the encouragement of import-substitution and promotion of exports.
5) Tourism sector which has almost unlimited potential will contribute to the economy in terms of net foreign exchange earnings and employment opportunities; and
6) Regional trade will increase as a result of the implementation of the Preferential Trade Area Treaty and the activities of the Southern African Development Co-ordination Conference.

Depending on the extent of realization of the above-prospects, it can be said that the Zambian economy could grow with an annual growth rate of between 1% and 3% in real terms over the next decade.

1-3 Transport System

1-3-1 General

As a result of considerable investments made since her independence, the land-locked, sparsely settled Republic of Zambia has a well developed transport infrastructure consisting of about 2,000 km of railways, about 37,000 km of roads, 18 commercial airports, oil pipelines, and limited water transport facilities as shown in Fig. 1-6. Particularly characteristic of the country's transport system development is that its demand is mainly derived from the needs of the copper production.

There are four main external trade routes to link Zambia to the sea coast:

1) the road and railway route from Lusaka to Dar es Salaam port through Tanzania (1,870 km by road and 2,040 km by rail);
2) the railway route from Ndola to Lobito port through Zaire and Angola (2,370 km);
3) the railway route via Zimbabwe to East London and Port Elizabeth ports in South Africa; and
4) the railway route from Lusaka to Beira port in Mozambique via Zimbabwe (1,885 km).

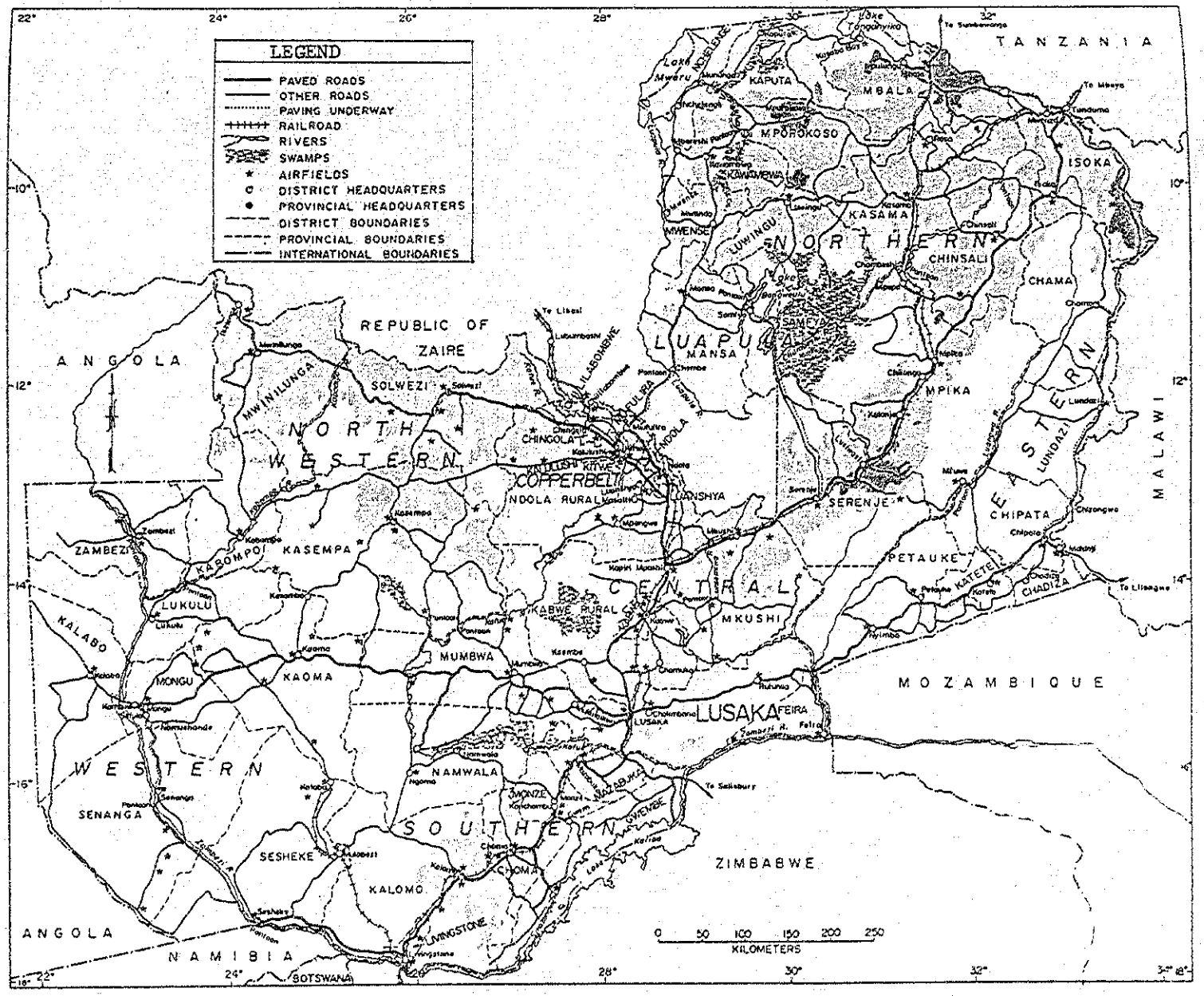


Fig. 1-6 Transport System in Zambia

In recent years there has been increased use of railway transport and less reliance on road transport in external trade. Air transport has played a significant role in both international and domestic transport.

1-3-2 Railway

The railway system in Zambia is run by two organizations, namely Zambia Railways Limited (ZR) operating domestic routes, and Tanzania-Zambia Railway Authority (TAZARA) operating international routes.

ZR, managed by ZIMCO, has a total line length of 1,260 km stretching between the borders with Zaire and Zimbabwe with some branch lines. In 1982, ZR carried 3,472 thousand tonnes of domestic freight and 1,615 thousand tonnes of international freight, but has shown a declining trend since 1979.

TAZARA was established by a joint capital contribution of Zambia and Tanzania under the technical and financial assistance of the People's Republic of China in 1970, and started operation in June 1976. TAZARA connects with ZR at Kapiri Mposhi and stretches to Dar es Salaam in Tanzania with the total length of 1,860 km, and carried 900 thousand tonnes of freight and 975 thousand passengers in 1982.

1-3-3 Road

The total length of roads was 37,000 km in 1982, of which about 15% was paved, and about 40% was gravel roads. About 55% of the roads is administered by the Government, and 45% by the local provinces. The road network covers almost all of the urban areas, but access to the road network is generally unsatisfactory in rural areas. In 1982 only 40% of the population was within 7.5 km of all-weather roads.

The total number of vehicles has decreased since 1975 mainly because of the strict governmental control of foreign exchange allocations for the importation of cars and spare parts, as well as of the high cost of locally assembled cars. In 1982 road transport carried about 350 - 400 thousand tonnes, or 25 - 30% of the total international freights. Statistics is not available for domestic road transport.

1-3-4 Air Transport

Zambia Airways, a subsidiary of ZIMCO, operates the entire domestic air services and about 65% of long-haul and 55% of short-haul international passenger flights with a fleet of one DC-10-passenger, one B707-passenger, two B707-freighter, two B737, and two HS748 aircraft as shown in Fig. 1-7. Zambia Airways has reduced its domestic routes due to the decrease of demand, but increased its international routes.

In 1983, a total traffic of 549 thousand embarked and disembarked passengers was recorded, showing a declining trend back from 1978. The total air freight also fell to 33% level of 1975, amounting to 8,900 tonnes.

There are 127 airports and airfields in Zambia, of which 18 airports, including one international airport of Lusaka and two regional airports of Ndola and Livingstone, are served by scheduled flights as shown in Fig. 1-8 and Table 1-10.

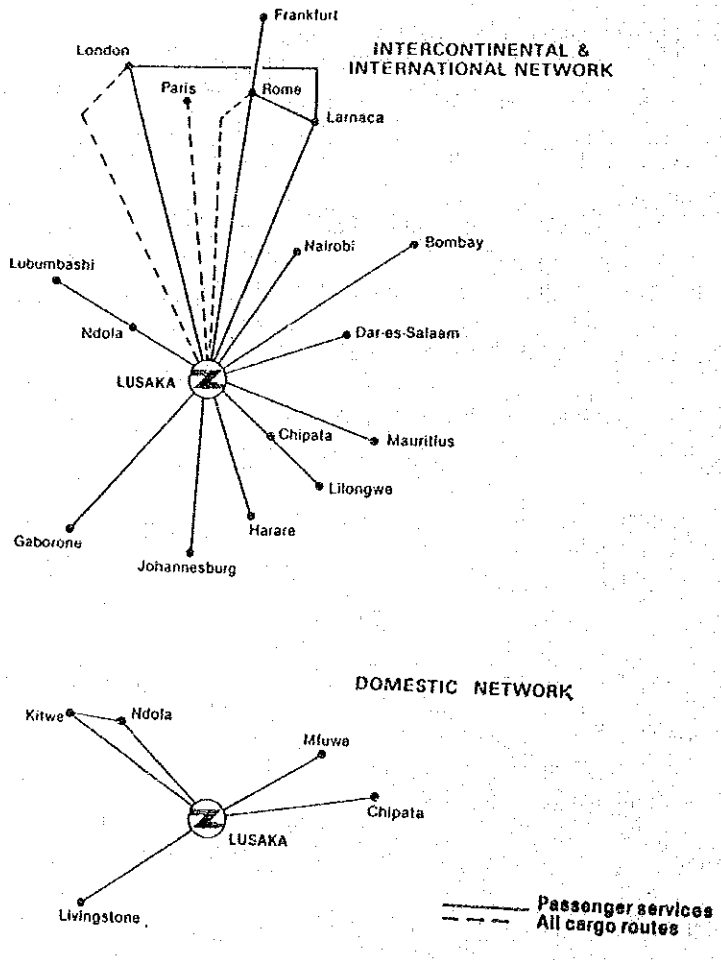
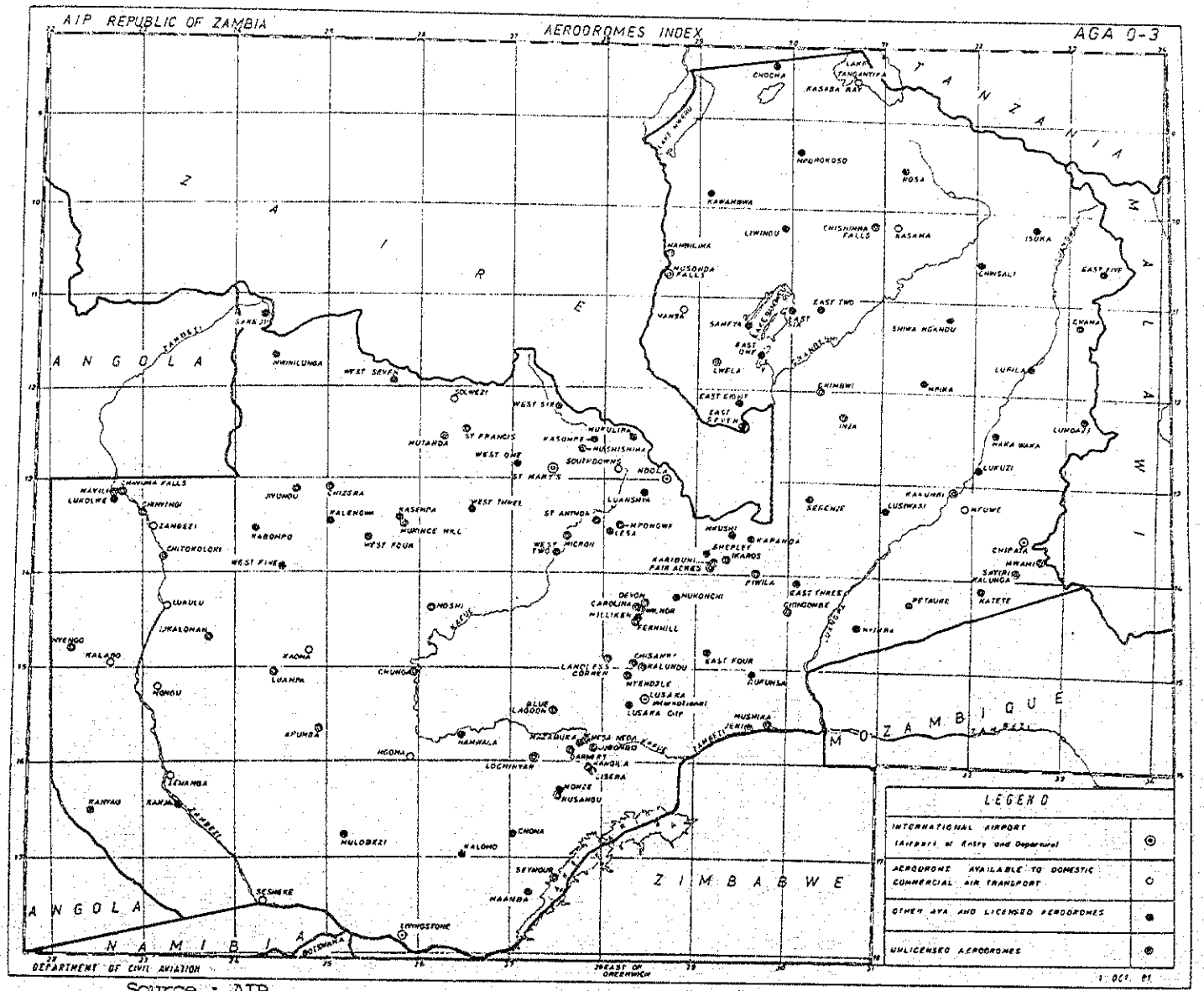


Fig. 1-7 Zambia Airways Route Network as of March 1985

Table 1-10 Outline of Major Airports in Zambia

Airport (Elevation)	Runway (strucrure·strength)	Radio NAV-AIDS	Visual Aids	Operational Hour
Lusaka (3,779ft)	3,962mX46m (Flex. and Rig. LCN 100) 823mX30m (Grass)	VOR/DME,NDB ILS,ATIS	App. Lights RWY,TWY,Apron	0400-2200
Ndola (4,167ft)	2,515mX46m (Rig. LCN 70) 1,219mX23m (Flex.LCN 25)	VOR,NDB	App. Lights RWY,TWY,Apron	0400-1800
Livingstone (3,250ft)	2,292mX61m (Flex. LCN 32) 1,372mX30m (CS. SIWL 9500kg)	VOR,NDB	App. Lights RWY,TWY,Apron	0500-1600
Mfuwe (1,880ft)	2,200mX30m (Flex. LCN 45)	NDB	-	Sunrise to Sunset
Chipata (3,359ft)	1,470mX21m (CS.SIWL 9500kg) 809mX21m (Grass)	VOR,NDB	-	Sunrise to Sunset
Kasama (4,542ft)	2,008mX24m (CS.SIWL 9500kg) 840mX24m (CS.SIWL 9500kg)	NDB	-	Sunrise to Sunset
Mansa (4,100ft)	1,710mX18m (CS.SIWL 9500kg)	NDB	-	Sunrise to Sunset
Mongu (3,465ft)	1,463mX21m (Flex. LCN 20)	NDB	-	Sunrise to Sunset
Solwezi (4,547ft)	1,341mX18m (Flex. LCN 23)	NDB	-	0600-1100 1200-1500
Zambezi (3,538ft)	1,100mX30m (CS.SIWL 9500kg)	NDB	-	Sunrise to Sunset
Kalabo (4,100ft)	1,190mX30m (CS.SIWL 9500kg)	-	-	Sunrise to Sunset
Kasaba Bay (2,780ft)	1,100mX30m (CS.SIWL 9500kg)	-	-	Sunrise to Sunset
Southdowna (4,147ft)	2,000mX30m (Flex. LCN 50)	NDB	-	Sunrise to Sunset

Note: Flex. : Flexible pavement
Rig. : Rigid pavement
CS : Crushed stone pavement



Source : AIP

Fig. 1-8 Location of Airports in Zambia

1-4 Lusaka International Airport

1-4-1 Outline of Airport

Lusaka International Airport is located 20 km northeast of the centre of Lusaka city, the capital of Zambia. The airport was opened in July 1967 only after three and a half years from the date the planning started. It then was certainly a first-class international airport with a 3,962 m runway, 14,000 sq.m of passenger terminal, ILS, etc. as shown in Table 1-11 and Fig. 1-9. The airport facilities, however, are physically getting old and outdated today, especially such facilities as navigational aids and telecommunications because no renewal has been made of these facilities since inauguration. Furthermore, due to the recent increase and qualitative evolution of air traffic caused by the introduction of wide-body jet aircraft such as DC-10, A-300 and B747, the passenger terminal building in particular is beginning to show apparent inadequacy.

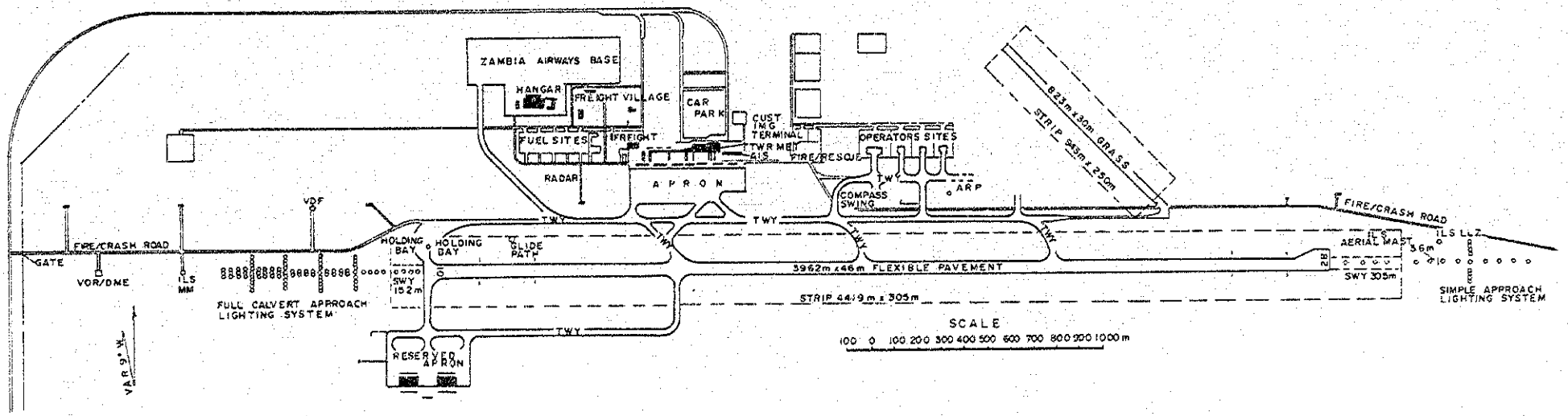
The airport handled 248 thousand international passengers, and 149 thousand domestic passengers, totaling 397 thousand passengers in 1984, and is now served by, besides the national flag carrier of Zambia Airways, 13 foreign carriers of British Caledonian Airways, TAAG-Angola Airlines, Air Zimbabwe, UTA French, Air Tanzania, LAM-Linhas Aereas de Mocambique, Air Botswana, South African Airways, Kenya Airways, Air India, Royal Swazi National Airways, Air Malawi and Aeroflot.

Table 1-11 Description of Lusaka International Airport

(1) Location	Lat. 15° 19' 36" South, Long. 28° 27' 21" East
(2) Elevation	3,779ft. (1,152m)
(3) Administrator	Ministry of Power, Transportation and Communications
(4) Operational Hours	18 Hours (0400-2200)
(5) Temperature	(Unit; °C)

	Ja.	Fe.	Ma.	Ap.	Ma.	Ju.	Ju.	Au.	Se.	Oc.	No.	De.
Max.	28.3	26.9	27.1	27.8	26.1	24.0	24.1	26.7	29.5	31.9	29.0	27.9
Min.	18.5	17.2	15.5	10.3	10.3	8.2	7.0	9.5	12.7	16.0	17.6	17.6

(6) Runway Strips, Runways and Taxiways	1 Runway Strips	(10/28)	4419m(length) X 305m(width)
		(15/33)	943m(length) X 250m(width)
	2 Runways	(10/28)	3962m(length) X 46m(width)
		(15/33)	823m(length) X 30m(width)
	(Structure)	(10/28)	Flexible Pavement (Partially Rigid)
		(15/33)	Grass
	(Strength)	(10.28)	LCN 100
	3 Taxiways	23m width, Flexible Pavement, LCN 100	
(7) Apron	63,000m^2, Rigid Pavement, LCN 100 (Int'l); 75 (Dom.)		
	6 Aircraft Stands for B707 and 6 for HS748		
(8) Navigational Aids	ILS(GP,LLZ,OM,MM), NDB, VOR/DME, ATC Facilities, ASR		
(9) Visual Aids	Approach Lights, Runway Edge Lights, Runway Centerline Lights, Runway Threshold/End Lights, PAPI, Touch Down Zone Lights, Taxiway Centerline Lights, Apron Edge Lights, Apron Flood Lights		
(10) Fire Station	ICAO Category 8		
(11) Passenger Terminal Building	RC 3F, Floor Area 14,700m^2		
(12) Cargo Terminal Area	Freight Shed S 1F, Floor Area 3,200m^2		
	Customs Office and Warehouse B 1F, 490m^2		
(13) Control Building	RC 3F (Partially 7F), Floor Area 4,000m^2		
(14) Aircraft Hangar	S 1F, For HS 748		
(15) Fuel Supply and Storage Facility	Fueled by fuel trucks		
(16) Catering Facility	RC 1F, Floor Area 680m^2		
(17) Car Parking	41,000m^2		



SOURCE: DEPARTMENT OF CIVIL AVIATION

Fig. 1-9 Existing Layout of Lusaka International Airport

1-4-2 Necessity of Development

The development of Lusaka International Airport is urgently needed due to the following reasons:

1) It would be difficult to secure air safety if the Airport was operated with the present airfield and air navigation facilities;
2) It would be hard to maintain a service level of international standard if the terminal facilities were to remain as is; and
3) The Airport is indispensable as the gateway to land-locked Zambia as well as that to southern African countries.

CHAPTER 2

AIR TRANSPORT DEMAND FORECAST

CHAPTER 2 AIR TRANSPORT DEMAND FORECAST

2-1 General

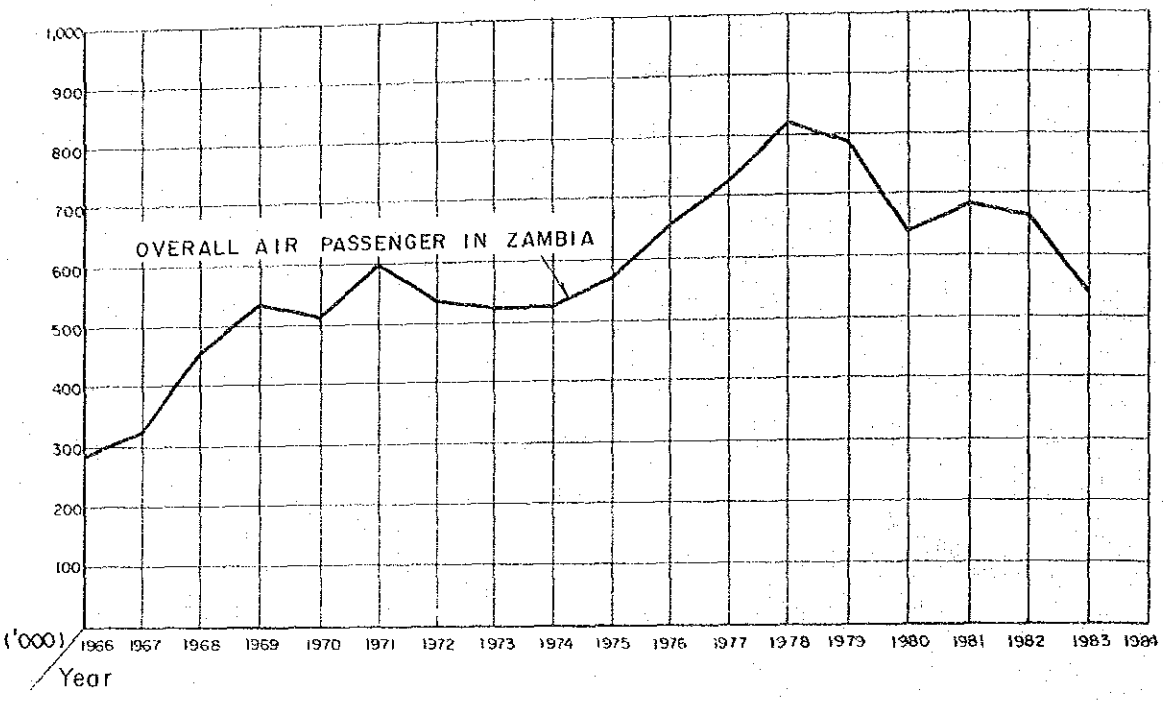
Forecast is made for the air transport demand at Lusaka International Airport as well as that of Zambia for a period of 20 years between 1990 and 2010 based on the data and information collected in the field survey. The supplemental materials on this chapter are complied in Appendix B.

2-2 Demand Analysis of Air Transport

2-2-1 Air Passenger Transport

The overall air passenger transport demand of Zambia increased steadily with an annual growth rate of 10% from 1966 to 1978, though there was temporary stagnation. However, from 1978 on, the air passenger traffic showed a declining trend, and eventually in 1983, it fell to the level of 1975 as shown in Fig. 2-1. This can be explained by the following intertwining causes:

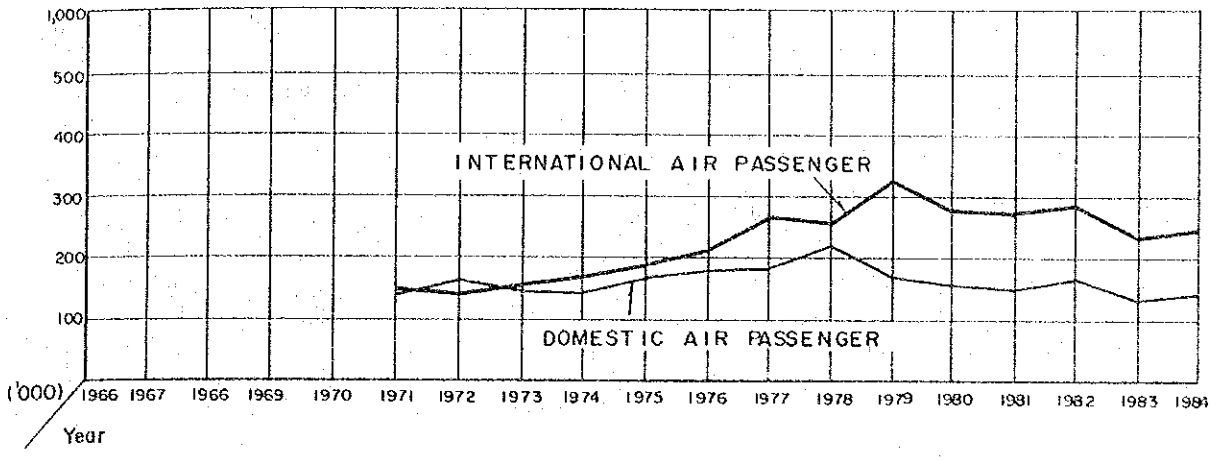
1) the stagnation of the Zambian economy;
2) the recession of the world economy, especially of the EEC economy after the oil crisis;
3) the deterioration of Zambia's trade balance caused by the drop of copper prices; and
4) strong tightening of foreign exchange.



Source: Central Statistical Office

Fig. 2-1 Historical Trend of Air Passenger Transport in Zambia (Embarked and Disembarked)

The passenger transport at Lusaka International Airport has shown the same tendency as that of the overall demand of Zambia for the same period, accounting for about 60% of the national demand constantly. However, the demand in 1984 showed some recovery with an 8.6% increase over the previous year. At Lusaka International Airport, international and domestic passengers accounted for 64% and 36% respectively on an average in recent years as shown in Fig. 2-2.



Source: Department of Civil Aviation

Fig. 2-2 Historical Trend of Air Passenger Transport at Lusaka International Airport

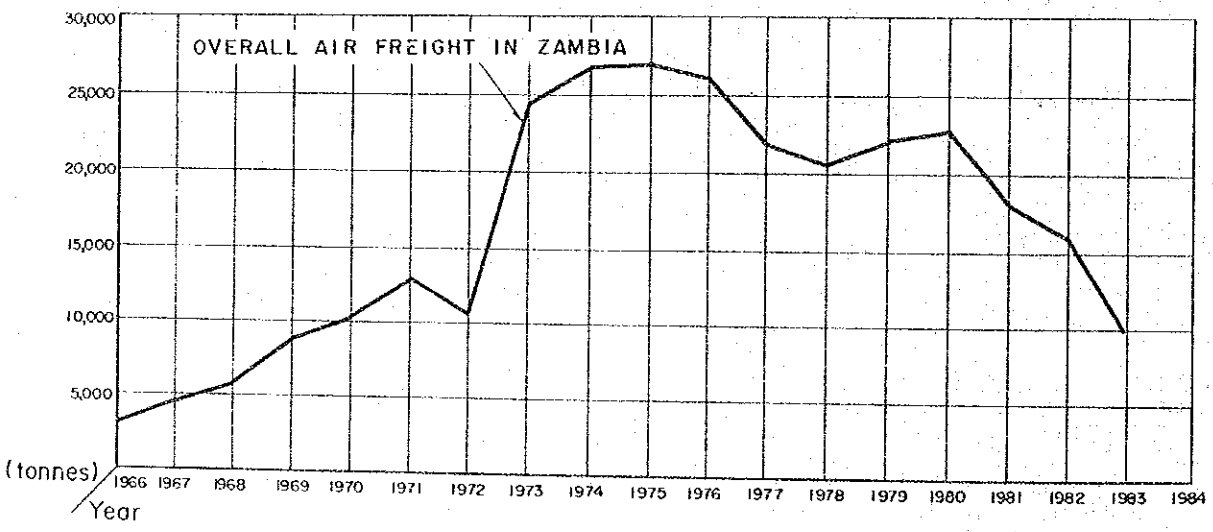
(Embarked and Disembarked)

2-2-2 Air Freight Transport

The trend of the overall air freight transport in Zambia was very unstable as shown in Fig. 2-3. In 1973 the demand increased abruptly more than two folds over the previous year. This is because Zambia Airways introduced B707-freighter causing the increase in transport capacity, and also because some part of rail freight was diverted to air due to the closure of the border gates with Rhodesia.

From 1976 on, however, the demand showed a declining trend, and eventually in 1983, it fell to the level of 1972 due to the following intertwined causes:

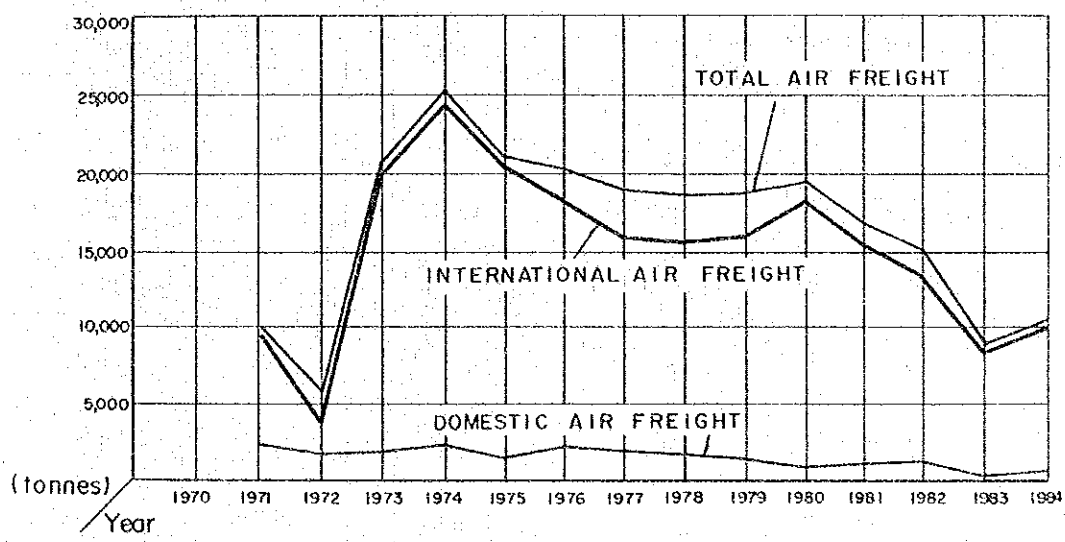
1) the opening of TAZARA in 1976;
2) the stagnation of the Zambian economy;
3) the recession of the world economy and the EEC economy after the oil crisis;
4) the strict import restriction; and
5) the diversification of external trade routes.



Source: Central Statistical Office

Fig. 2-3 Historical Trend of Air Freight Transport in Zambia (Loaded and Unloaded)

The air freight transport demand at Lusaka International Airport, which accounts for about 90% of the overall demand of the country, showed a similar tendency to that of the national demand up to 1983 as mentioned above. The air freight at the capital city airport, about 95% of which is international, showed an upward trend in 1984 with a 36% increase over the previous year as shown in Fig. 2-4.



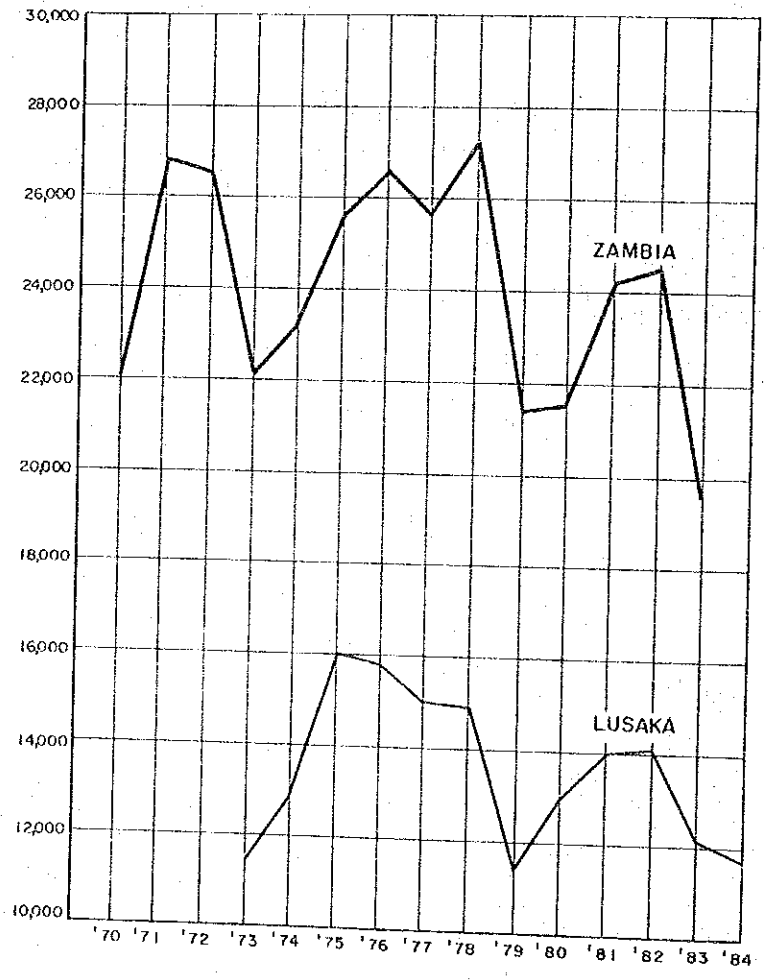
Source: Department of Civil Aviation

Fig. 2-4 Historical Trend of Air Freight Transport at Lusaka International Airport

(Loaded and Unloaded)

2-2-3 Aircraft Movement

The overall aircraft movements of Zambia, of which non-scheduled aircraft movements accounted for about 50% in 1983, showed a similar declining trend as indicated in Fig. 2-5, though with some fluctuations, to that of the air passenger transport as discussed in the foregoing section. At Lusaka International Airport jet aircraft movements have increased gradually in recent years.



Source: Zambia -- Central Statistical Office
Lusaka -- Department of Civil Aviation

Fig. 2-5 Aircraft Movements in Zambia and at Lusaka Internaonal Airport

2-3 Methodology

As has been seen in the preceding sub-chapter, the air transport demand in Zambia has been affected by various factors whose relationship is shown in Fig. 2-6. Forecast is made of the demand for air passenger transport and air freight transport in Zambia, based on the regression analysis using as explanatory variables the economic indicators affecting air transport demand. The demand at Lusaka International Airport is forecast based on the correlation with the overall demand of Zambia.

Forecast is made for a period of 20 years between 1990 and 2010 at intervals of every 5 years. Fig. 2-7 shows the flow of the air transport demand forecast.

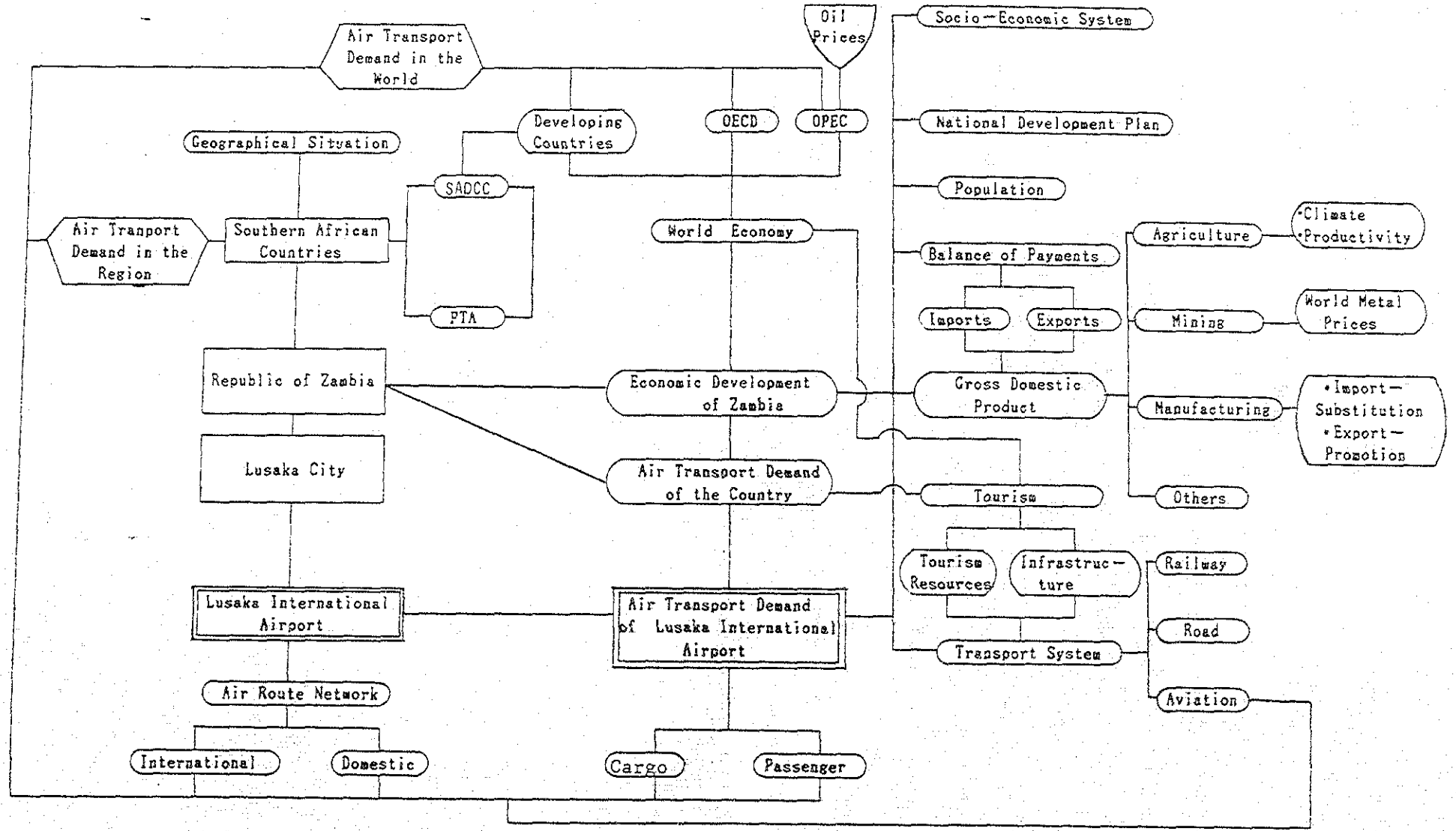


Fig. 2-6 Interrelation between Air Transport Demand Factors

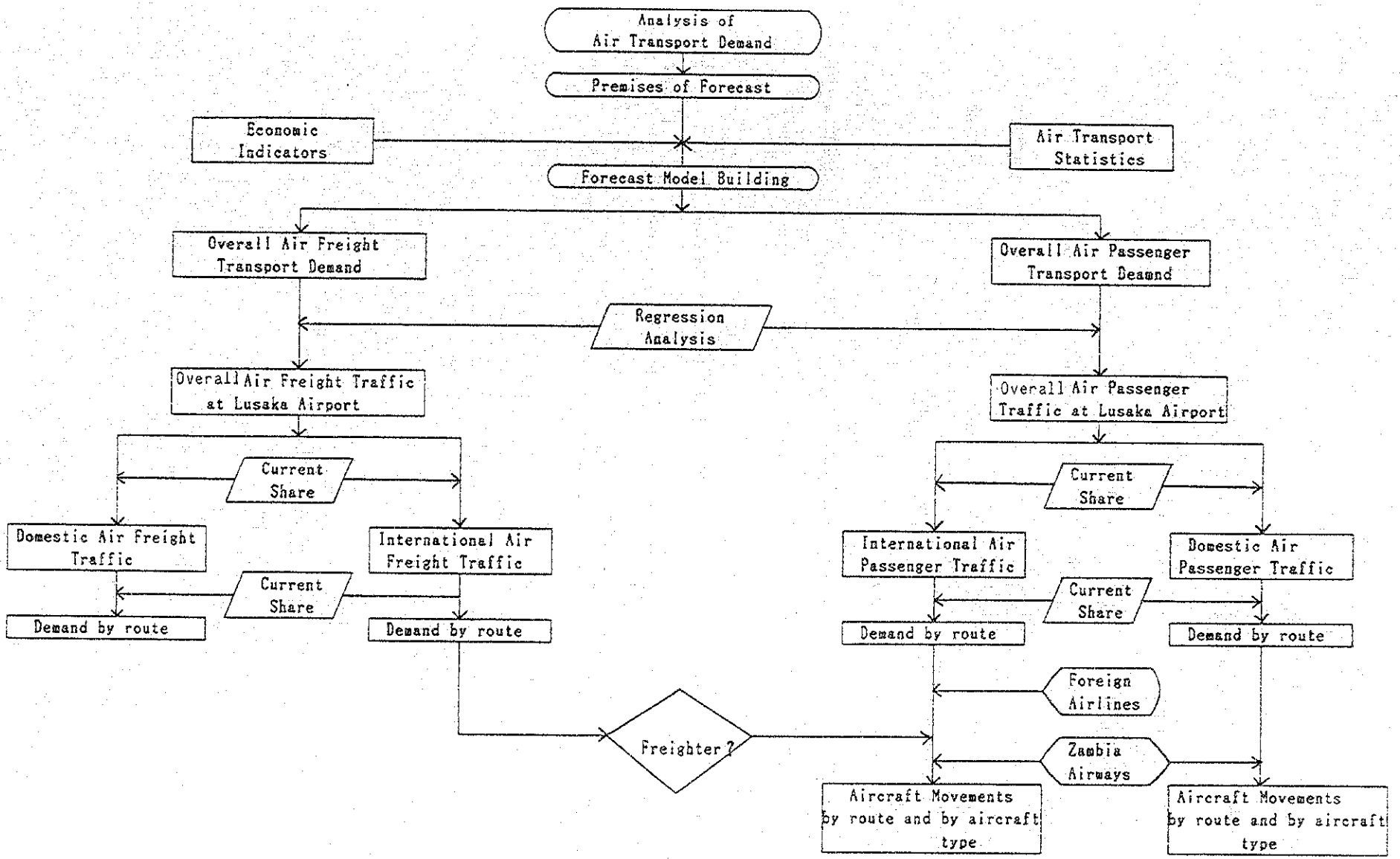


Fig. 2-7 Flow of Air Transport Demand Forecast

2-4 Forecast

2-4-1 Air Passenger Transport

(1) Overall Air Passengers in Zambia

The overall air passenger transport of Zambia is closely related to the economic activities of Zambia as well as of EEC countries. Regression analysis was made using the Gross Domestic Products of Zambia and of EEC countries as explanatory variables, and a positive result was obtained. Forecast was made based on the regression model, and the result is shown in Table 2-1 and Fig. 2-8.

Table 2-1 Forecast of Overall Air Passengers in Zambia

('000)

Year	(1984)	1990	1995	2000	2005	2010
Passenger	(597)	880	1,215	1,679	2,113	2,660

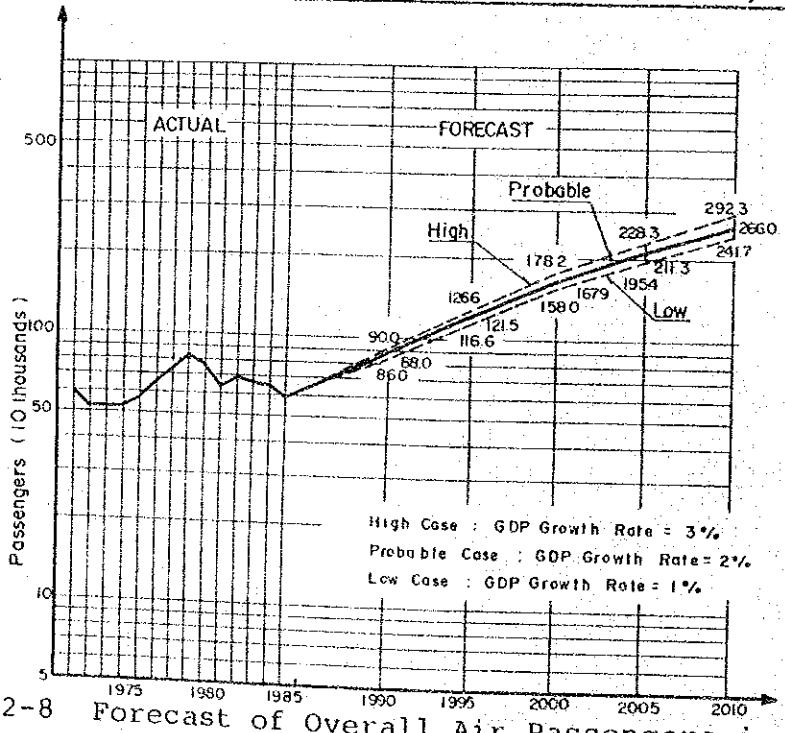


Fig. 2-8 Forecast of Overall Air Passengers in Zambia

(2) Overall Air Passengers at Lusaka International Airport

Assuming that the overall air passenger transport demand at Lusaka International Airport grows in close relation to that of Zambia, forecast is made based on the regression model, and the result is shown in Table 2-2 and Fig. 2-9.

Table 2-2 Forecast of Overall Air Passengers at Lusaka International Airport

('000)

Year	(1984)	1990	1995	2000	2005	2010
Passenger	(390)	560	757	1,025	1,292	1,628

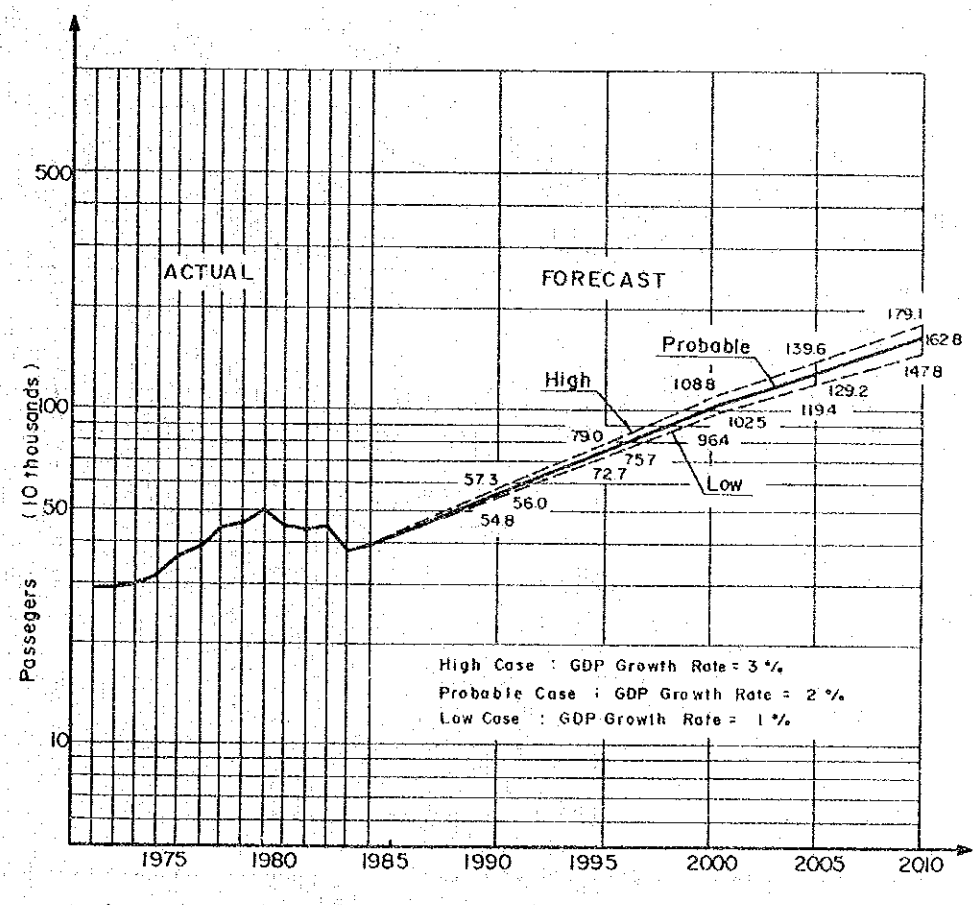


Fig. 2-9 Forecast of Overall Air Passengers at Lusaka International Airport

(3) International and Domestic Air Passengers at Lusaka International Airport

Forecast is made for international and domestic passengers by distributing the overall air passenger demand at the Airport over the two categories according to the current share of 64% for international and 36% for domestic passengers as shown in Table 2-3. The result is shown in Table 2-4 and Fig. 2-10.

Table 2-3 Passenger Distribution International and Domestic Air Passengers at Lusaka Int'l Airport

Year	International	Domestic
1981	64.5	35.5
1982	63.5	36.5
1983	62.9	37.1
1984	63.3	36.7
Average	63.6	36.4

Table 2-4 Forecast of International and Domestic Air Passengers at Lusaka Int'l Airport

('000)

Year	International	Domestic	Total
(1984)	(247)	(143)	(390)
1990	356	204	560
1995	483	274	757
2000	656	369	1,025
2005	827	465	1,292
2010	1,042	586	1,628

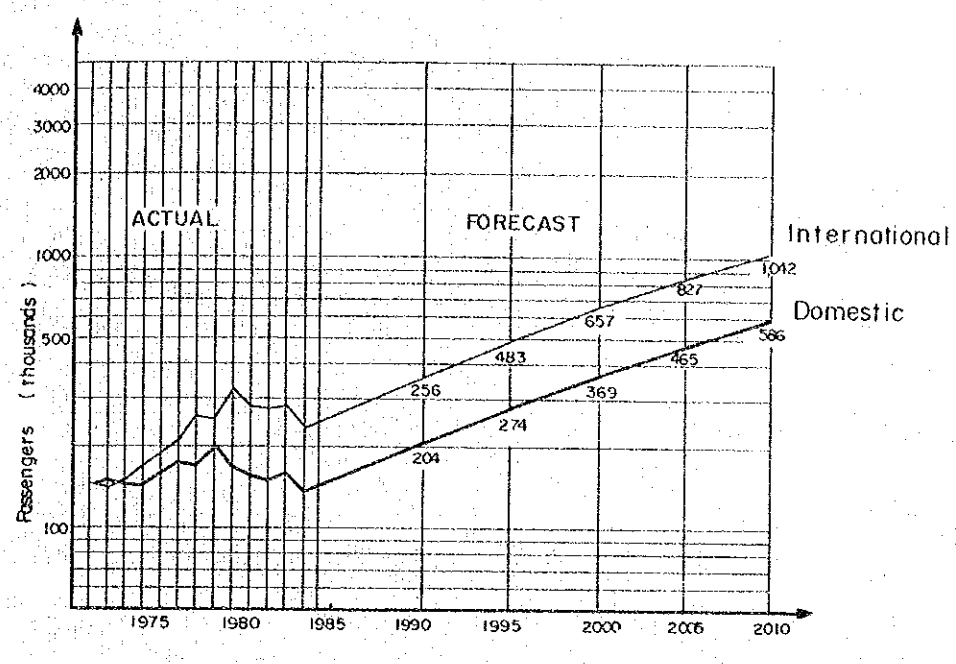


Fig. 2-10 Forecast of International and Domestic Air Passengers at Lusaka International Airport

(4) International Air Passengers by Region

International routes to and from Lusaka are divided, for the purpose of this study, into 5 regions, i.e. 1) countries bordering with Zambia, 2) all African countries not bordering with Zambia, 3) Europe, 4) North America and 5) Asia including Oceania.

The share of each region is established in this forecast as shown in Table 2-5. Assuming that this share does not change throughout the forecasting period, forecast is made for the international passengers by region as shown in Table 2-6.

Table 2-5 International Air Passengers Share by Region

Region	Share (%)
Africa (S) - bordering with Zambia	22
Africa (L) - not bordering with Zambia	18
Europe	41
North America	8
Asia (including Oceania)	11
Total	100

Table 2-6 International Air Passengers by Region

('000)

Region	1990	1995	2000	2005	2010
Africa (S)	78	106	144	182	229
Africa (L)	64	87	118	149	188
Europe	146	198	269	339	428
North America	29	39	52	66	83
Asia	39	53	72	91	115
Total	356	483	656	827	1,042

(5) Domestic Air Passengers by Region

Domestic routes to and from Lusaka International Airport are divided into 4 regions, namely the Copperbelt including Ndola and Kitwe, Southern region including Livingstone, Eastern region including Mfuwe and Chipata, and the rest of Zambia expressed as "Others". The statistics show that the demand of Copperbelt accounts for 80% in average but is in a declining trend, while the other 3 regions of Southern, Eastern and Others show an increasing trend accounting for 12%, 3% and 5% in average respectively.

Routes serving the Copperbelt are characterized as business routes, while those of the Southern and Eastern regions primarily cater for tourism.

As rural development envisaged in the Third National Development Plan and the trend of urbanization are both considered to continue, it can be said that the share of Copperbelt will decrease gradually despite the recent increasing tendency as seen above, while those of the other 3 regions will show a relative increase gradually in a long term. Taking these factors into consideration, the forecast is made on domestic passengers by region as shown in Table 2-7.

Table 2-7 Domestic Air Passengers by Region

('000)

Region	1990	1995	2000	2005	2010
Copperbelt	163	213	277	337	410
Southern	24	34	48	63	82
Eastern	6	10	16	24	35
Others	11	17	28	41	59
Total	204	274	369	465	586

2-4-2 Air Freight Transport

(1) Overall Air Freight Transport of Zambia

Air freight transport has a close relation with economic activities of the points of origin and destination. Regression analysis is made by using Gross Domestic Product of Zambia, population of Zambia, and Gross Domestic Product of EEC countries as explanatory variables. Forecast is made based on the regression model, and the result is shown in Table 2-8 and Fig. 2-11.

Table 2-8 Forecast of Overall Air Freight in Zambia

('000 tonnes)

Year	(1984)	1990	1995	2000	2005	2010
Freight	(13.1)*	19.8	27.7	38.7	52.0	69.7

* Estimated

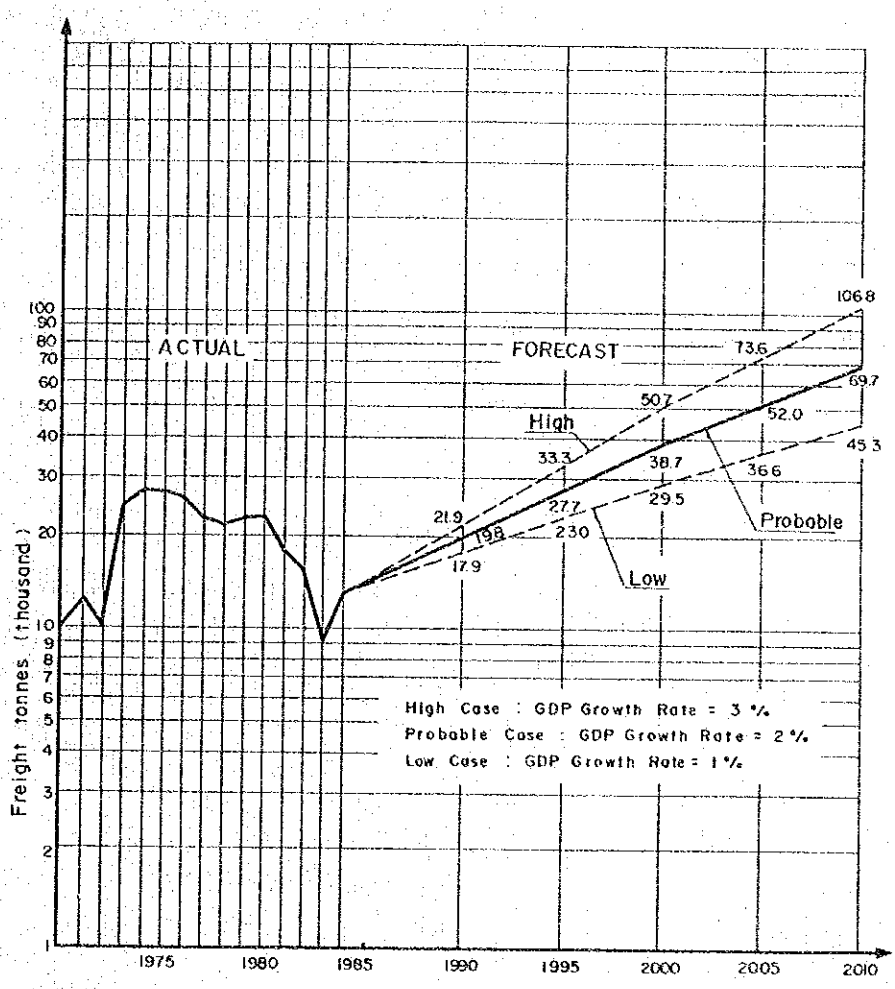


Fig. 2-11 Forecast of Overall Air Freight in Zambia

(2) Overall Air Freight Transport at Lusaka International Airport

Assuming that the overall air freight transport demand at Lusaka International Airport grows in close relation to that of Zambia, forecast is made based on the regression model and the result is shown in Table 2-9 and Fig. 2-12.

Table 2-9 Forecast of Overall Air Freight at Lusaka International Airport

('000 tonnes)

Year	(1984)	1990	1995	2000	2005	2010
Freight	(11.8)*	17.5	24.2	33.5	45.5	61.5

* Estimated

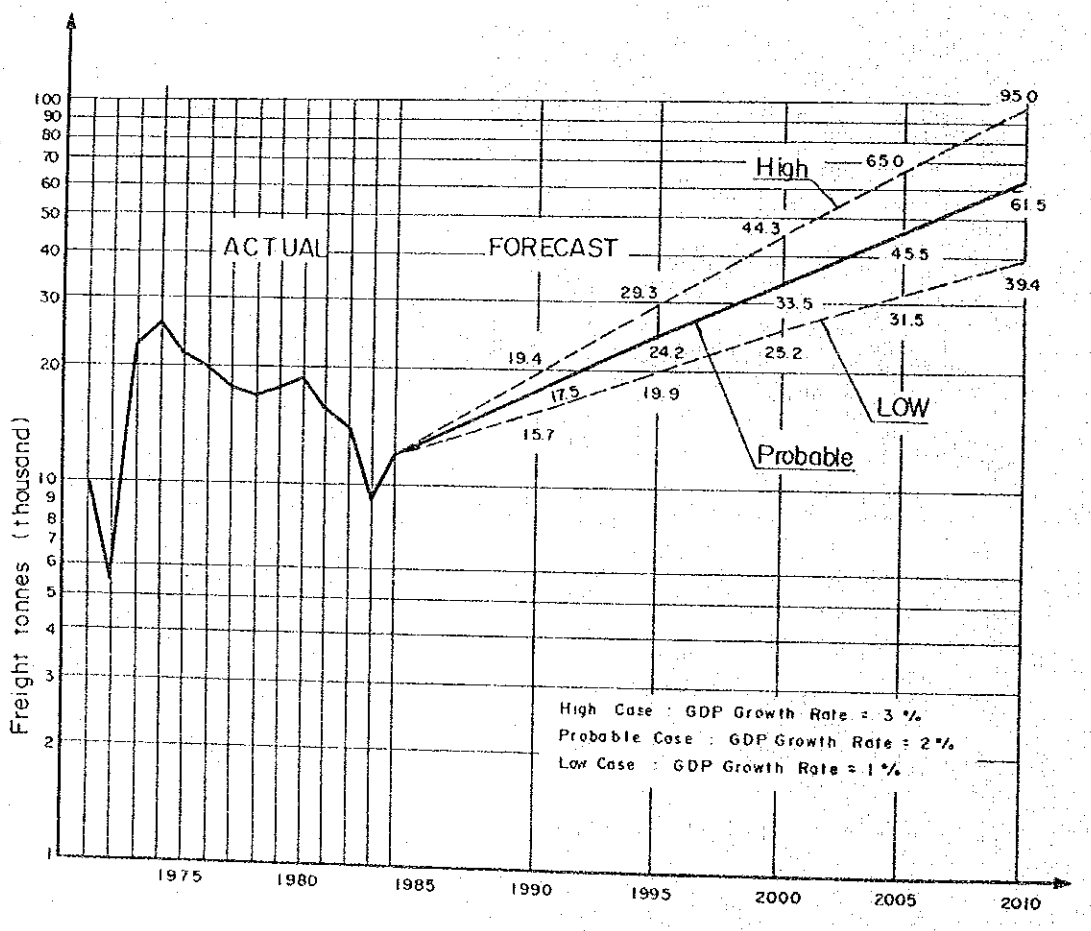


Fig. 2-12 Forecast of Overall Air Freight at Lusaka International Airport

(3) International and Domestic Air Freight

Forecast is made on international and domestic air freight by distributing the overall air freight at Lusaka International Airport based on the current share of 95% for international and 5% for domestic services. The result is shown in Table 2-10 and Fig. 2-13.

Table 2-10 Forecast of International and Domestic Air Freight at Lusaka International Airport

('000 tonnes)

Year	International	Domestic	Total
(1984)	(11.2)	(0.6)	(11.8)
1990	16.6	0.9	17.5
1995	23.0	1.2	24.2
2000	31.8	1.7	33.5
2005	43.2	2.3	45.5
2010	58.4	3.1	61.5

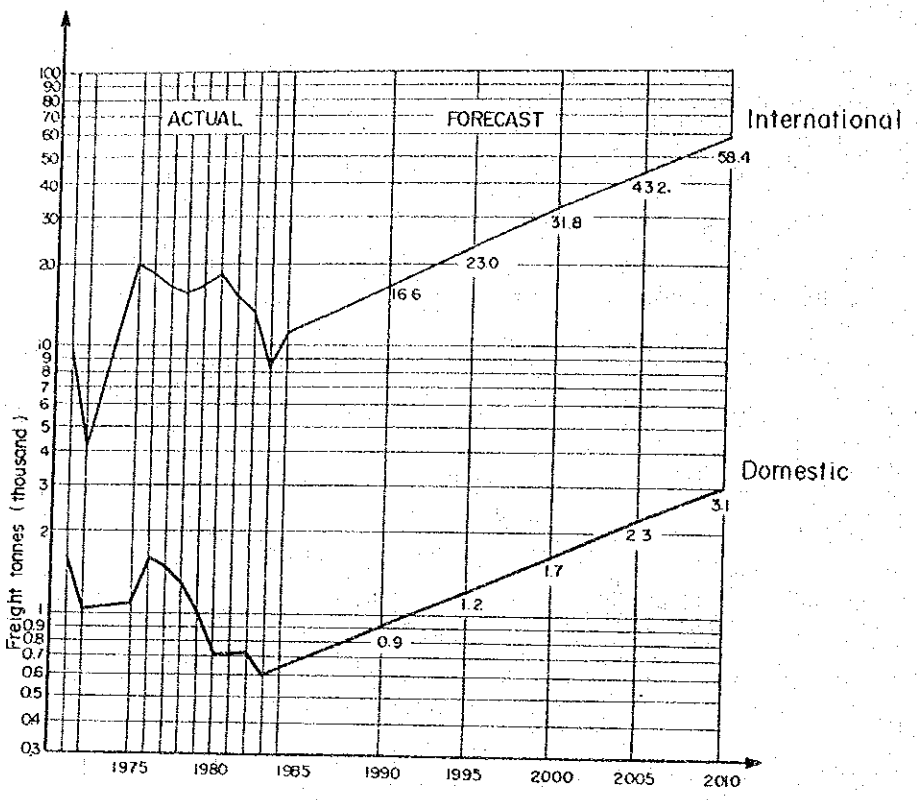


Fig. 2-13 Forecast of International and Domestic Air Freight at Lusaka International Airport

(4) International Air Freight by Region

Forecast is made on international air freight by region, assuming that the current share by region does not change throughout the forecasting period. The result is shown in Table 2-11.

Table 2-11 International Air Freight by Region

(tonnes/year)

Year	Africa(S)	Africa(L)	Europe	Asia	Total
1990	249	199	10,871	5,253	16,572
1995	344	276	15,061	7,278	22,960
2000	477	382	20,867	10,084	31,810
2005	647	518	28,315	13,683	43,163
2010	876	701	38,304	18,510	58,390

(5) Domestic Air Freight by Region

Forecast is made on domestic air freight by region as in the case of international air freight, with the results as shown in Table 2-12.

Table 2-12 Domestic Air Freight by Region

(tonnes/year)

Year	Copperbelt	Southern	Others	Total
1990	723	48	121	912
1995	979	92	165	1,236
2000	1,326	125	223	1,674
2005	1,799	169	304	2,272
2010	2,433	229	411	3,073

2-4-3 Aircraft Movements

(1) Aircraft Mix

In order to calculate the number of aircraft movements by region, aircraft mix for Lusaka International Airport is forecast in terms of seating capacity based on Zambia Airways' aircraft purchasing plan for the next 5 years and also by referring to the current mix at Nairobi and Johannesburg international airports whose current traffic happen to be similar to Lusaka's forecast demand for 2000 and 2010 respectively. The result is shown in Fig. 2-14.

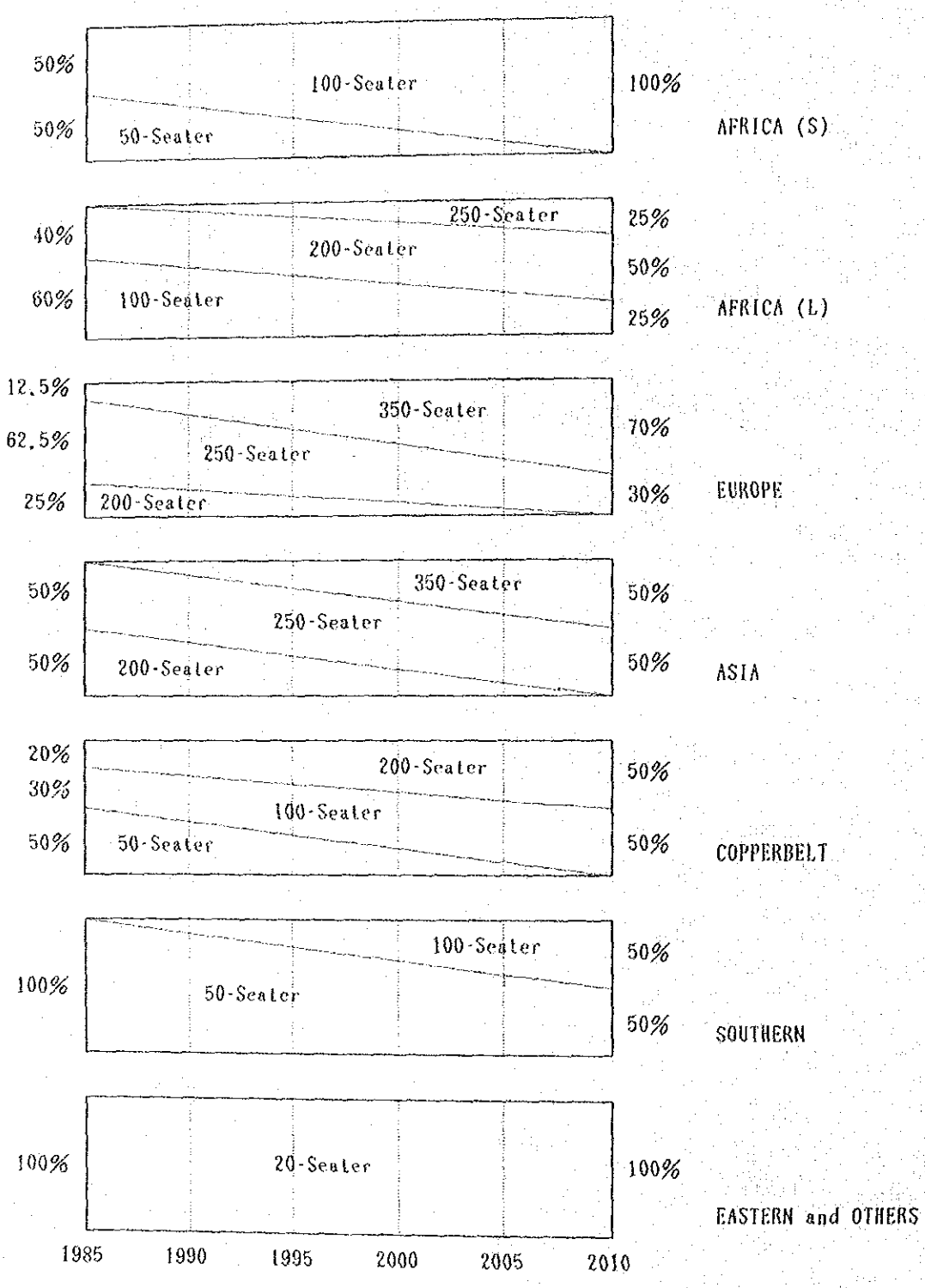


Fig. 2-14 Forecast Aircraft Mix by Region

(2) Annual Aircraft Movements

The annual aircraft movements by region are calculated by the following formula based on the forecast aircraft mix.

$$\text{Aircraft Movements} = \frac{\text{Number of Passengers}}{\text{Average Seating Capacity} \times \text{Load Factor}}$$

where: Load factors for international and domestic services are both assumed to be 60%.

The results are shown in Table 2-13 and Table 2-14 for international and domestic services respectively.

Table 2-13 Forecast of International Aircraft Movements by Region and by Aircraft Type

Route	Seater	1990	1995	2000	2005	2010
Africa (S)	50	696	656	552	326	-
	100	1,046	1,532	2,212	2,934	3,822
	200	-	-	-	-	-
	250	-	-	-	-	-
	350	-	-	-	-	-
	Total	1,742	2,188	2,764	3,260	3,822
Africa (L)	50	-	-	-	-	-
	100	378	418	452	440	416
	200	300	400	532	662	832
	250	36	90	174	276	416
	350	-	-	-	-	-
	Total	714	908	1,158	1,378	1,604
Europe	50	-	-	-	-	-
	100	-	-	-	-	-
	200	232	220	188	112	-
	250	652	730	806	810	798
	350	280	524	880	1,300	1,862
	Total	1,164	1,474	1,874	2,222	2,660
Asia	50	-	-	-	-	-
	100	-	-	-	-	-
	200	116	110	92	54	-
	250	146	182	228	268	318
	350	30	72	138	216	320
	Total	292	364	458	538	638
Total	50	696	656	552	326	-
	100	1,424	1,950	2,664	3,374	4,238
	200	648	730	812	828	832
	250	834	1,002	1,208	1,354	1,532
	350	310	596	1,018	1,516	2,182
	Total	3,912	4,934	6,254	7,398	8,784

Table 2-14 Forecast of Domestic Aircraft Movements by Region and by Aircraft Type

Route	Seater	1990	1995	2000	2005	2010
Copperbelt	20	-	-	-	-	-
	50	1,146	976	750	410	-
	100	974	1,236	1,576	1,888	2,280
	200	744	1,040	1,424	1,804	2,280
	Total	2,864	3,252	3,750	4,102	4,560
Southern	20	-	-	-	-	-
	50	736	817	904	924	912
	100	82	205	386	616	912
	200	-	-	-	-	-
	Total	818	1,022	1,290	1,540	1,824
Eastern	20	361	647	1,086	1,574	2,243
	50	44	46	49	61	69
	100	5	12	21	40	69
	200	-	-	-	-	-
	Total	410	705	1,156	1,675	2,381
Others	20	663	1,187	1,990	2,886	4,113
	50	80	85	91	111	127
	100	9	21	39	74	127
	200	-	-	-	-	-
	Total	752	1,293	2,120	2,471	4,367
Total	20	1,024	1,834	3,076	4,460	6,356
	50	2,006	1,924	1,794	1,506	1,108
	100	1,070	1,474	2,022	2,618	3,388
	200	744	1,040	1,424	1,804	2,280
	Total	4,844	6,272	8,316	10,388	13,132

2-4-4 Peak Hour Traffic

Hourly distribution of aircraft movements is determined by such factors as trip time by route, time difference, curfew at originating or destination airport, carrier's operating policy, nature of airport, etc.

The ratio of peak hour aircraft movements to daily movements is calculated based on current airport traffic at Lusaka and other neighbouring international airports. Assuming that the basic pattern of distribution of aircraft movements will not change for the forecasting period, the peak hour traffic is calculated by simulating the future aircraft movement distribution as shown in Fig. 2-15 based on the current distribution pattern, with the results as shown in Table 2-15.

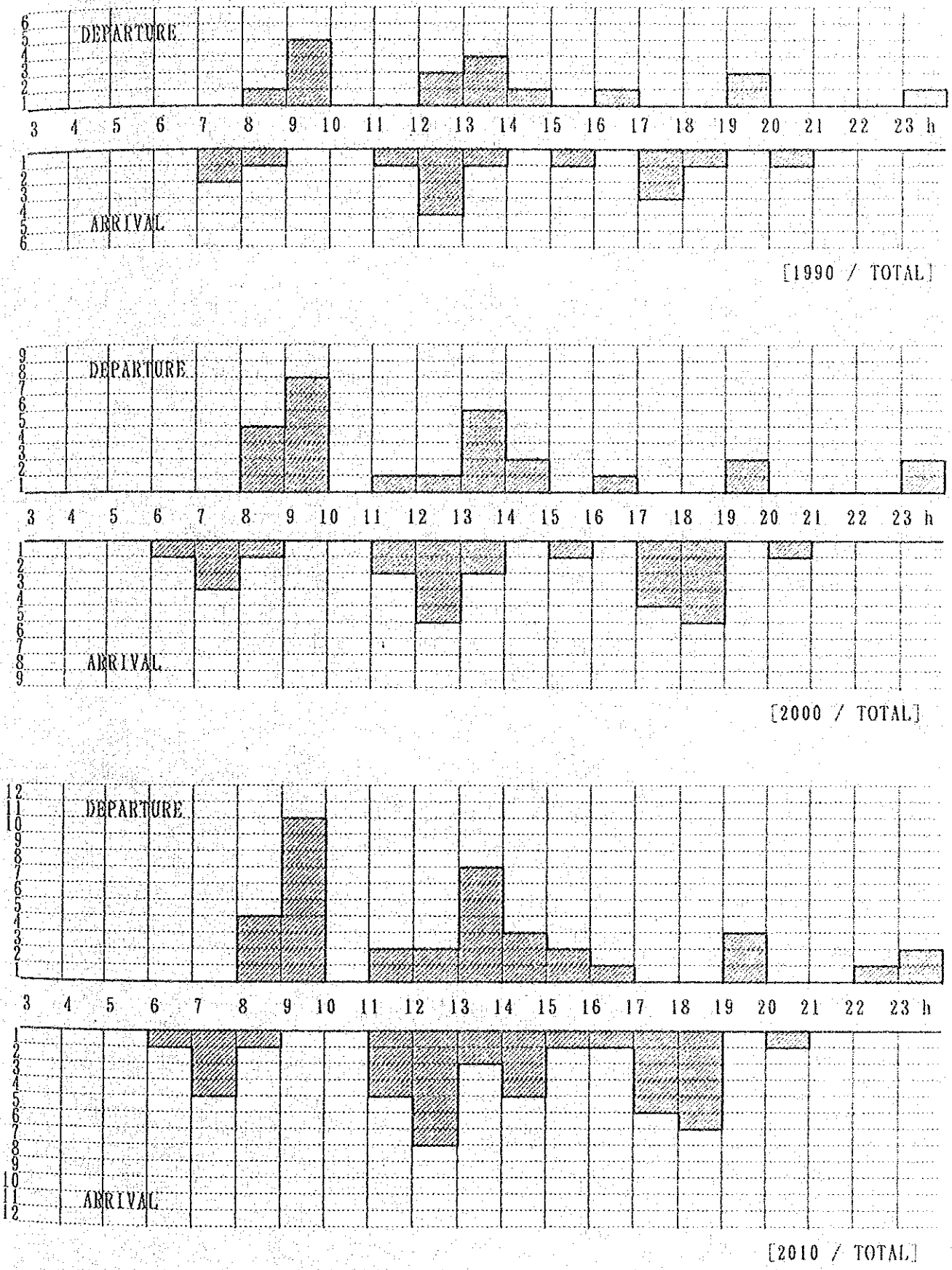


Fig. 2-15 Estimated Aircraft Movement Distribution by Time Period

Table 2-15 Estimated Peak Hour Aircraft Movements and Passengers

Year	Item	Daily A/C Movements	Peak Hour A/C Movements	Peak Hour Passengers	Remarks
1990	Domestic Dep.	8	3	210	
	Domestic Arr.	8	2	120	
	Domestic Total	16	3	210	
	Int'l Dep.	7	3	270	
	Int'l Arr.	7	3	300	
	Int'l Total	14	4	300	
	Overall Dep.	15	4	270	
	Overall Arr.	15	4	300	
	Overall Total	30	6	300	
2000	Domestic Dep.	14	5	234	
	Domestic Arr.	14	3	132	
	Domestic Total	28	5	234	
	Int'l Dep.	11	3	360	
	Int'l Arr.	11	3	360	
	Int'l Total	22	4	360	
	Overall Dep.	25	7	360	
	Overall Arr.	25	5	390	
	Overall Total	50	7	390	
2010	Domestic Dep.	22	7	258	
	Domestic Arr.	22	4	132	
	Domestic Total	44	7	264	
	Int'l Dep.	15	4	420	
	Int'l Arr.	15	4	570	
	Int'l Total	30	5	570	
	Overall Dep.	37	10	528	
	Overall Arr.	37	7	690	
	Overall Total	74	10	714	