5-3. Air Space Use Plan (Procedure work)

Instrument Approach and Departure Procedures plan for the airport development were studied in accordance with ICAO Criteria (PANS-OPS Doc 8168-OPS/611).

In target year 1995, renewal of existing navigation aids is planned, and situation for procedure construction will not be changed.

Therefore, operational procedures will be same as the present ones.

In target year 2000, installation of new ILS for RWY19, two sets of VOR/DME and one set of NDB are planned.

Locations of two new VOR/DME (#1 and #2) are selected to ensure safety and efficiency of aircraft operation.

Approach procedures are assumed to be ILS approach for RWY24 and RWY19, and VOR/DME approach for RWY06 and RWY01 runways.

Concepts of the instrument approach and departure procedures are shown respectively in Figs. 5-6 ~ 5-9 by runway directions.

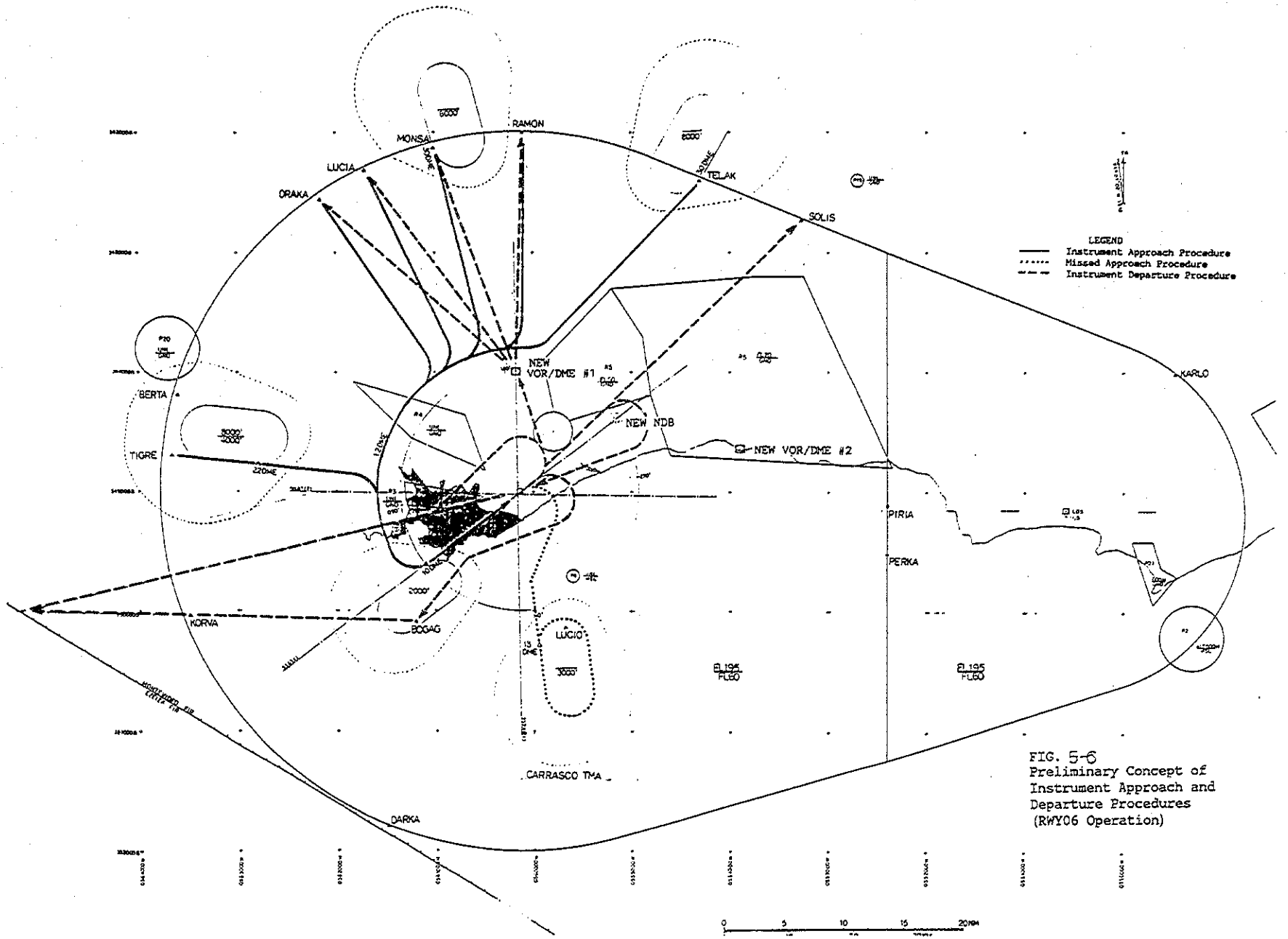


FIG. 5-6
Preliminary Concept of Instrument Approach and Departure Procedures (RWY06 Operation)

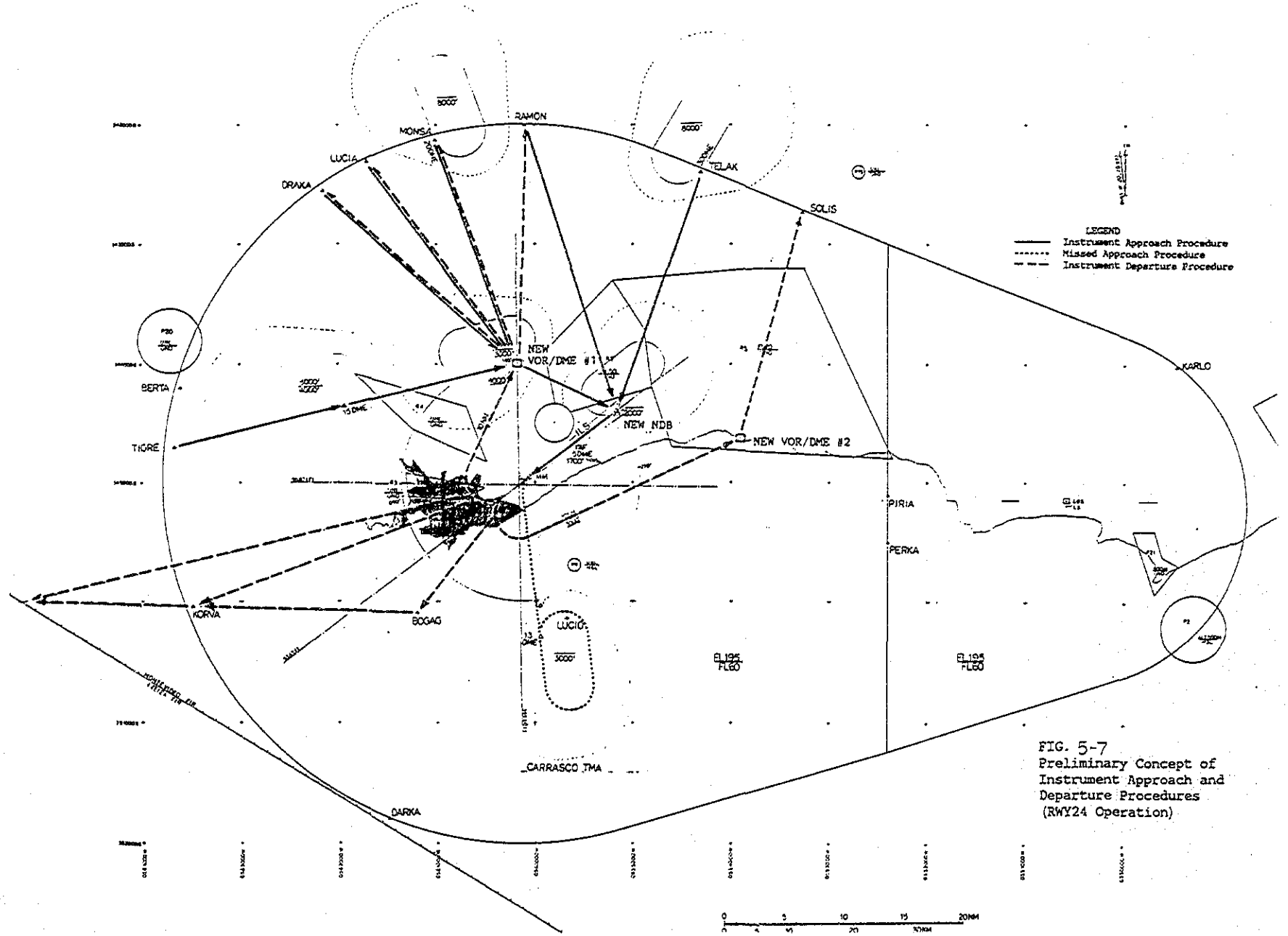


FIG. 5-7
Preliminary Concept of Instrument Approach and Departure Procedures (RWY24 Operation)

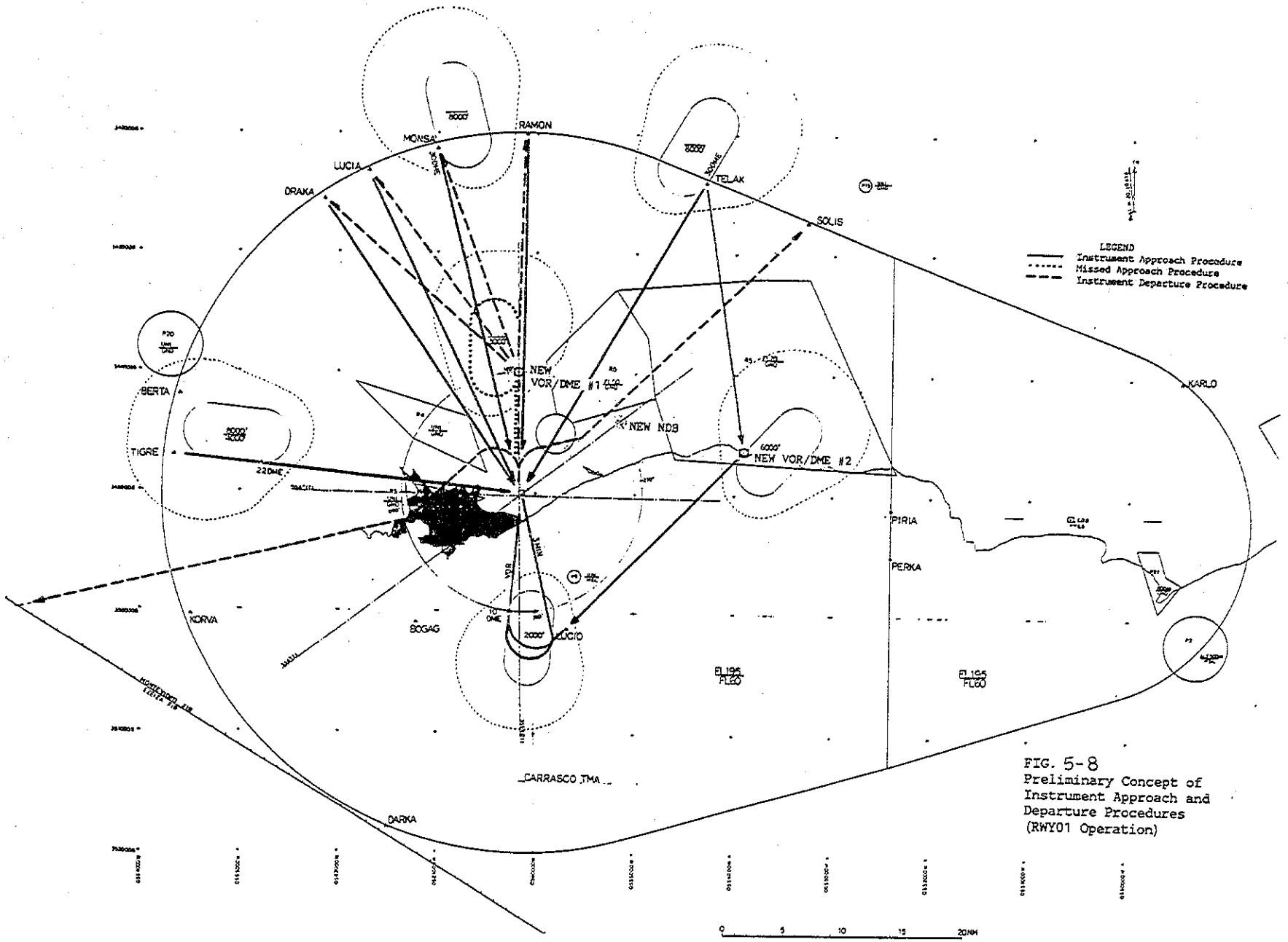


FIG. 5-8
Preliminary Concept of Instrument Approach and Departure Procedures (RWY01 Operation)

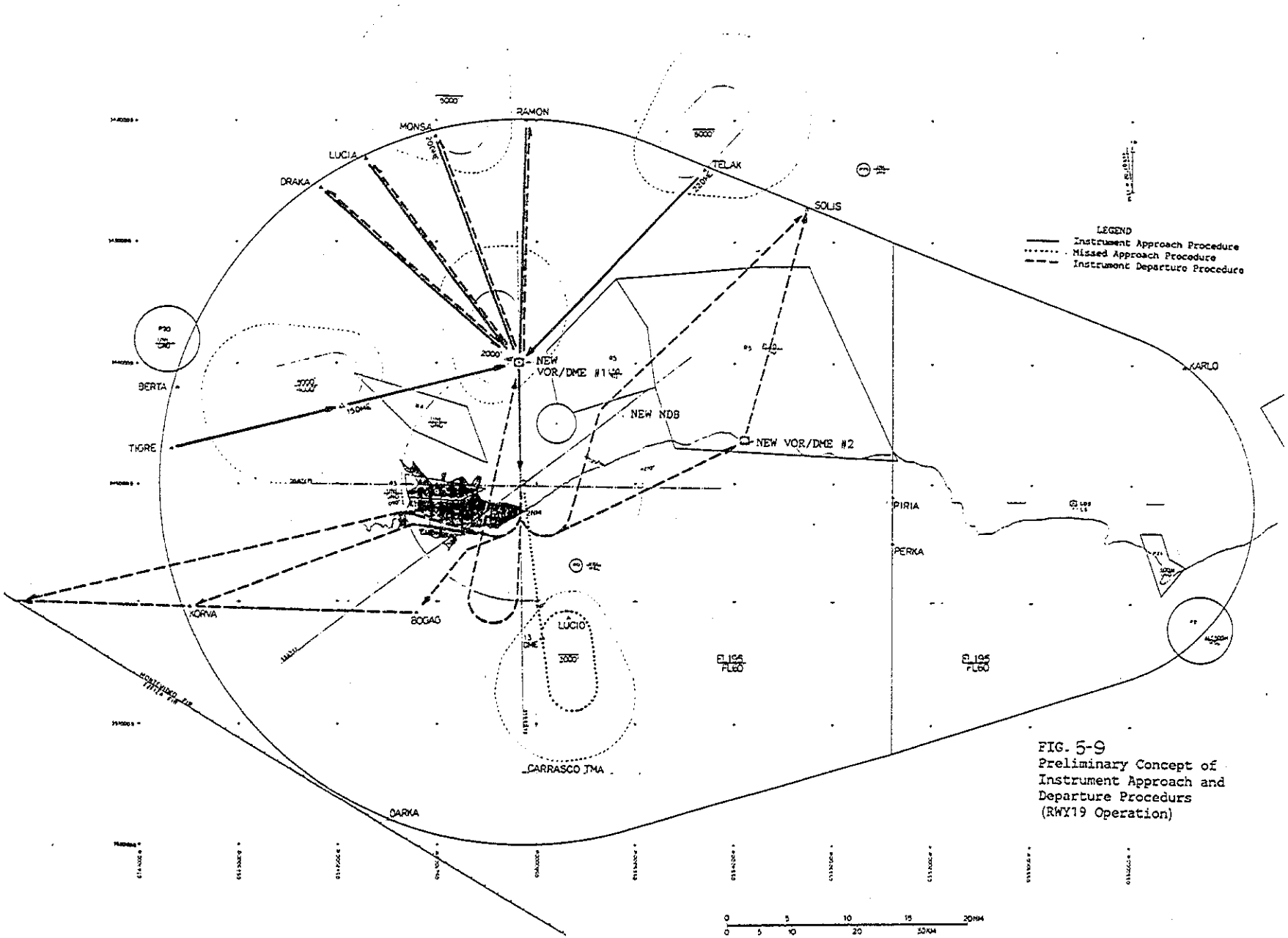


FIG. 5-9
Preliminary Concept of Instrument Approach and Departure Procedurs (RWY19 Operation)

CHAPTER 6

PRELIMINARY DESIGN

6-1. General

On the basis of the finalized facility requirement and airport development plan, preliminary design has been developed.

For the purpose of present feasibility study, preliminary design is conducted for short-term development plan.

Design years are set at 1995 and 2000 as development stages of Phase I and Phase II respectively.

Preliminary design is made based on Annexes, Aerodrome Design Manuals and other documents published by ICAO.

Japanese standards are also referred to, in case that ICAO's specification is not clear and Japanese standards are considered recommendable.

Preliminary design drawings are shown in Attachment-14

6-2. Airfield Facilities

6-2-1 Primary Runway and Related Taxiways

Reinforcement of existing facilities to accommodate B747 operations is planned in Phase I.

RWY06/24 should continue to serve operations of aircraft during construction period, and reinforcement of the runway will be made at night time. Therefore, asphalt overlay is selected as improvement measure of RWY06/24.

As for taxiways, asphalt overlay is also selected, even though short time closure of a taxiway is acceptable. However, partial reconstruction by cement concrete is planned, in order to reduce total thickness of pavement and make smooth longitudinal slope.

Shoulders and over-run should be constructed with half thickness of the runway and taxiways pavement.

Design conditions of pavement are shown below.

Design aircraft : B747-400
However, design curve of B747-200B is alternatively used because design curve of B747-400 has not been published, and both curves will not have much difference.

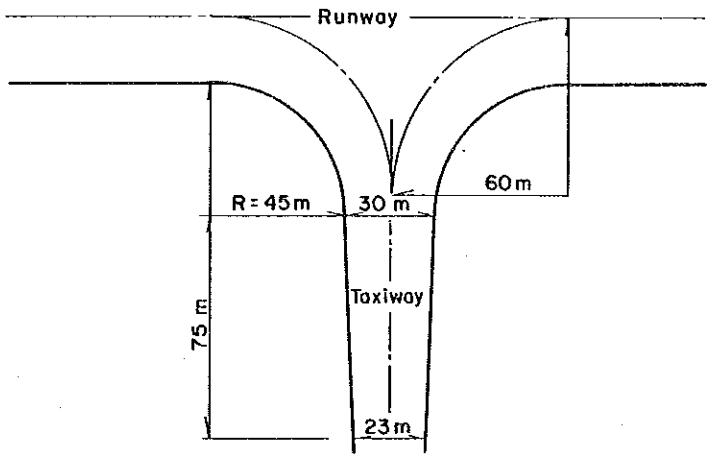
Design weight : 625,000 lb. (283,500 kg)
(Take-off weight to RIO DE JANAIRO)

Annual departures: 2,000
(Half of forecast annual departures in target year 2000)

Subgrade CBR : 3.5% (K = 63 pci)

Required overlay thickness is shown in Table 6-1.

Curvature of taxiways is corrected as shown below.



In Phase II, no improvement is planned for primary runway and related taxiways.

Table 6-1 Required Overlay Thickness
(RWY06/24 and related taxiways)

a. RWY06/24

Location	0K00-1K722	1K722-2K148	2K148-2K298	2K298-2K448	2K448-2K698
Type of overlay	Bituminous overlay				
Required overlay thickness (cm)	25	20	20	20	10
Remarks	At 2K448 2K698 existing pavement is enough to support design weight. However minimum overlay thickness of 10 cm on rigit pavement is required as a transition layer.				

b. TWY - A

Improvement measure	Overlay		New construction	
Type of pavement	Bituminous overlay		Rigid pavement	
Required thickness of overlay or new pavement	T1	T2	Cement concrete	35 cm
	41	33	Existing concrete	20 cm
			Existing sandy gravel	38 cm
			Total	93 cm

c. TWY - B

Location	T5	T6	T7	T8
Type of overlay	Bituminous overlay			
Required thickness of overlay (cm)	31	18	10	20

d. TWY - C [T4-2]

Improvement measure	Overlay	New construction	
Type of pavement	Bituminous overlay	Rigid pavement	
Required thickness of overlay or new pavement	33 cm	Cement concrete	35 cm
		Stabilized sub-base	20 cm
		Existing sandy gravel	30 cm
		Total	85 cm

e. TWY - D

Improvement measure	Bituminous overlay	Cement concrete overlay	
Required thickness of overlay or new pavement	41 cm	Cement concrete	35 cm
		Existing concrete	20 cm
		Existing sand	30 cm
		Total	85 cm

6-2-2 Secondary Runway

RWY01/19 will be reinforced to accommodate B737 operations in Phase I.

Design conditions of pavement are shown below.

Design aircraft	:	B737 (Dual wheel gear)
Design weight	:	109,000 lb. (49,500 kg)
Annual departures:		1,200
(Minimum number shown in Design Manual)		
Subgrade CBR	:	3.5% (K = 63 pci)

Required overlay thickness for typical section of RWY01/19 is approximately 23 cm for both asphalt concrete and cement concrete, and asphalt concrete is considered cheaper.

Asphalt overlay is better from view point of easy construction work at intersection of runways and taxiway.

Therefore, asphalt overlay is selected as improvement measure.

Required overlay thickness is shown in Table 6-2.

In Phase II, RWY01/19 will be lengthened to 2,050 m, and be upgraded to precision approach runway CAT-1.

Turning area for B747 will be provided at northern end of RWY01/19.

Glide slope area and localizer area will be appropriately graded.

Table 6-2 Required Overlay Thickness
(RWY01/19)

Location	0K00-0K170	0K400-1K598	0k170-0K400	1K598-1K748
Type of overlay	Bituminous overlay			
Required overlay thickness (cm)	25	25	23	8

6-2-3 Apron

Apron is divided into 7 areas including new apron S-7, and all area should have strength to accommodate B747 operations.

In phase I, new construction of S-7 and reinforcement of S-4, S-5 and S-6 are planned.

The new apron S-7 has two B747-400 parking positions and two B707(or B767) parking positions. Aircraft parking concept should be taxi-in & push-out, in order to keep transitional surface of RWY10/28 free from tail wing of parking B747. Dimension of the apron is shown in Fig.6-1.

Design conditions of pavement are shown below.

Design aircraft	:	B747-400
Design weight	:	744,000 lbs. (337,500 kg)
Annual departures:		4,000
(Forecast annual departures in target year in 2000)		
Subgrade K value	:	63 pci (CBR = 3.5%)
Concrete flexural strength	:	New pavement 710 psi(50 kg/m^2)
		Existing pavement 670 psi(47.3kg/cm^2)

Cement concrete pavement is selected for apron, and total thickness calculated on above conditions is as follows:

Cement concrete slab	35 cm
Stabilized sub-base	20 cm
Gravel sub-base	30 cm
Total	85 cm

For S-7, above-mentioned pavement thickness is required.

For S-4, S-5 and S-6, existing upper layers with thickness of 20 to 55 cm should be replaced, and new concrete slab, and stabilized sub-base if required, are constructed.

In phase II, reconstruction of S-3 is planned.

In order to strengthen pavement of S-3, existing upper cement concrete slab (15.5 cm thick) should be replaced, and new 35 cm thick concrete slab will be constructed.

Transition structure is required between S-3 and S-2.

Typical section of pavement is shown in Table 6-3.

6-2-4 Drainage

Reconstruction of subgrade drainage is planned.

6-2-5 Perimeter road

Paving with gravel is planned.

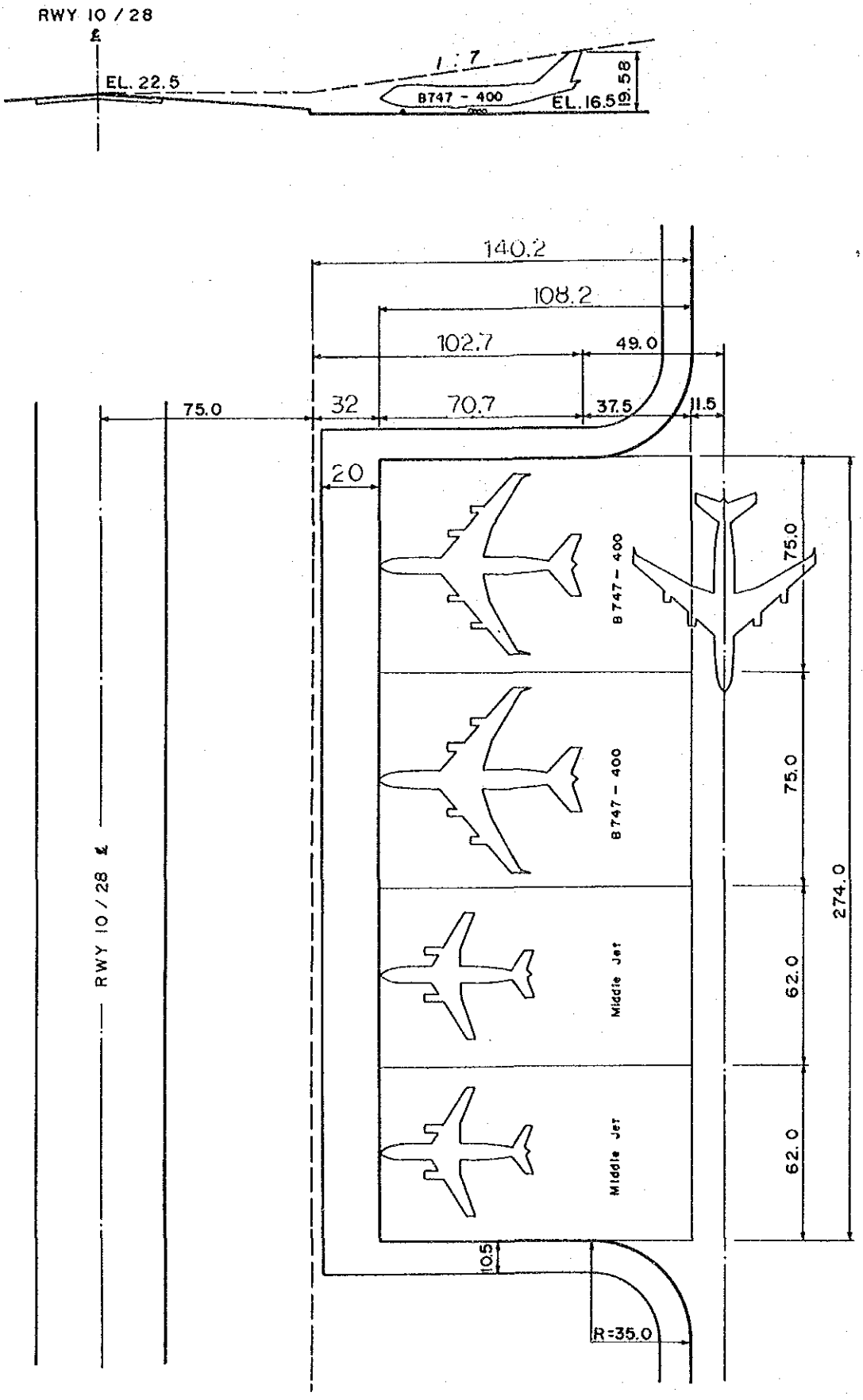
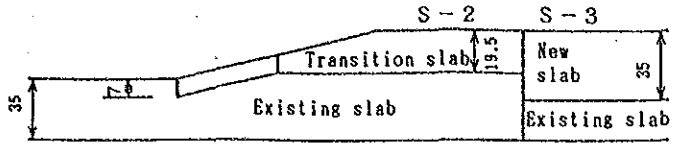
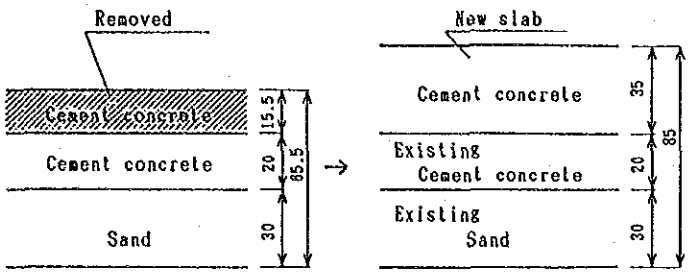
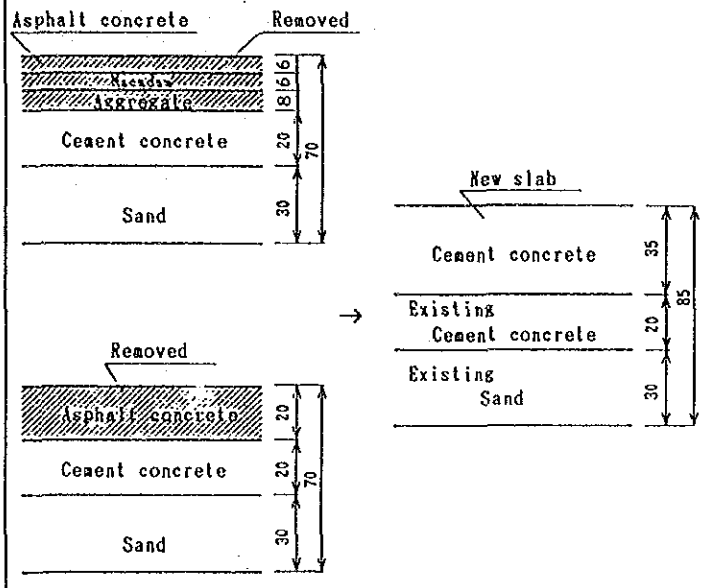
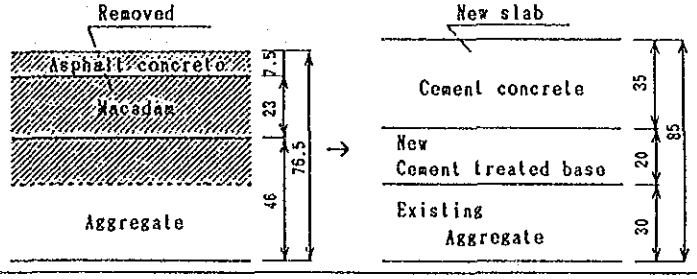


Fig. 6 - 1 Dimension of New Apron (S - 7)

Table. 6-3 Typical Cross Section of Apron Pavement

Location	Slab thickness		Improvement measure
	Existing	Required	
S-2 and S-3	35cm	35cm	
S-3	15.5cm	35cm	
S-4 S-6	Asphalt concrete	35cm	
S-5	Asphalt concrete	35cm	

6-3. Terminal Area Facilities

Preliminary design for following terminal area facilities has been prepared in accordance with design conditions and criteria shown in Table 6-4.

- Passenger terminal (central building) including X-ray, metal detection, and baggage claim installation.
- Cargo handling facilities
- Public utilities such as swage, water supply, rescue and fire-fighting, and garbage handling facilities, however full facility is not included into this project, because this facility will be owned by oil company.
- G.S.E. (ground service equipment) building including fire-fighting building.

Table 6-4 Preliminary Design Conditions and Criteria for Terminal Area Facilities (Target year 1995)

Facility	Size and Volume to be Improved	Design Conditions and Criteria
1. Apron	1. Repairs of areas S-1, S-2 and S-3 should be made to prevent further deterioration.	
	2. New aircraft parking positions at north-east side of existing apron.	2. All possitions can be used simultaneously. - two B747-400 - two B707 or B767
	3. Reinforcement of areas S-4, S-5, and S-6 should be made.	3. Traffic: Long-term traffic Design life: 20 years
2. Passenger Terminal Central Terminal	1. An area of 300 m^2 will be allocated as security check area, with three(3) X-ray detectors, two for international and one for domestic.	1-1. X-ray detector should satisfy ICAO Annex 17 and 18. 1-2. X-ray screening systems should be ASTM (committee F12.61) standard. 1-3. Metal detector: throughout rate and power should be at least 50 people per minute and less than 100 VA at 115/230 + 20%, 45/65 Hz.
3. Cargo Terminal	1. Warehouse: As is, with "open shed" to be provided.	1. Structure of open shed will be by light channel steel and clearance between GL and ceiling should be not less than 4.5 m.

Facility	Size and Volume to be Improved	Design Conditions and Criteria
	2. Cargo and G.S.E. handling area will be provided.	2-1. Design load for pavement: - single wheel load 8.8 ton - tire pressure 6.8 kg/cm^2 - tire area 1290 cm^2 2-2. Type of pavement: - asphalt concrete
4. Car Parks	1. Add space for 100 cars including cargo trucks at the cargo terminal area.	
5. Fuel	1. Major facilities: As is. 2. Oil-water separaters will be required for ESSO and SHELL.	
6. Water Supply	Add one 600-m^3 tank	
7. Sewage		
8. Rescue and Fire Fighting	1. Demolish the existing building and construct new building. 2. Construct one 30 m^3 elevated tank.	2. Based on the ICAO AIRPORT SERVICES MANUAL PART 1 "Rescue and fire flighting".
9. Garbage Disposal	Provide one 2 - 4 tons/day incinerator	
10. GSE Maintenance Shop and airline offices (located near the hangar)	1. Existing building will be demolished, and new building (floor area: 3,000 m^2) will be constructed along the east boundary of terminal area.	1. Type of structure: RC 2. Story: 2 stories 3. Structural standard: Uruguayan standard

Table 6-4 Preliminary Design Conditions and Criteria for Terminal Area Facilities (Target year 2000)

Facility	Size and Volume to be Improved	Design Conditions and Criteria
1. Apron	1. Reconstruction of area S-2 should be made.	1-1. Taxi-in and taxi-out concept will be maintained. 1-2. Traffic: Long-term. Design life: 20 years.
2. Passenger Terminal Central Terminal	1. Area of 105 m^2 for domestic baggage claim area with one baggage claim device. 2. Area of 300 m^2 for departure concourse and departure lounge will be modified.	1-1. Installation of claim device with electric supply works.
3. Cargo Terminal	1. Four(4) work stations will be installed at "open shed" whose area will be 360 m^2. 2. Rack system will be provided inside warehouse, covering area of 1080 m^2. 3. Modify existing warehouse for bulk cargo handling. 4. Provide cold storage (125 m^2 in area) inside the existing warehouse.	1. Fixed type work station available for main deck pallete and coutainer of B747. 2. Double deck rack system will be provided.
4. Fuel	Add three 600 kl tanks with related facilities.	
5. Water Supply	Add one 600-m^3 tank	
6. Sewage	Add 15 m^3/h plant.	
7. Garbage Disposal	---	

6-4. Air Navigation Facilities

Preliminary design for air navigation facilities has prepared in accordance with the result of on the existing situation and design standard shown in Table 6-5.

Table 6-5 Preliminary Design Conditions and Criteria for Air Navigation Facilities (Target year 1995)

Facility	Name of Equipment	Design Conditions and Criteria
1. Radio Navigational Area	1. ILS (CAT-1) equipment for RWY24 should be renewed.	1. Glide slope/DME, Localizer. Middle marker Communication and Power Cable, will be installed for RWY06 ILS (CAT-1) Approach.
	2. Terminal VOR/DME should be renewed.	2. VOR will be conventional Type, VOR output power 100 w. DME output power 1 kw.
2. Air Traffic Control Facilities	1. VFR equipment should be renewed.	1. ATC Consoles. (Aerodrome Control, Ground Control) and Back up VHF Transceiver.
	2. VHF Air-to-Ground communication equipment for VFR should be renewed	2. Transmitters, receivers. Antennas and antenna supporting structure.
	3. Tape recorder should be renewed.	3. Multi-channel magnetic tape recorder for VFR.
3. Communications Facilities	1. Following equipment or facilities should be renewed: - ATS direct speech equipment - HF receiving station - HF transmitting station	 - one transmitter control panel & receiver control panel - HF receivers, antennas communication and power cable, and equipment building - HF transitters, antennas communication and power cable, and equipment building
4. Meteorological Equipment	1. Equipment should be renewed. 2. RVR system should be installed.	Ceilograph, aneroid barometer wind direction and speed meter.
5. Electrical Power Supply	1. New station and euipment should be provided.	The service voltage of Electric Supply to the airport will be changed from the current 6,000 V to 22,000 V. New station should be installed two sets of 500 kVA Back up Engine.

Facility	Name of Equipment	Design Conditions and Criteria
6. Visual Aids	1. RWY06/24	- Design standard: Precision approach runway CAT-1, as specified in ANNEX 14, ICAO.
	1) Existing approach lights and sequenced flahsing lights of RWY24 should be changed to meet ALS requirement.	
	2) Following lights should be installed:	Same as above
	- SALS for RWY06	
	- Two sets of PAPI	
	- Stopway lights	
	3) Following lights should be renewed:	Same as above
	- RWY edge lights and end lights.	
	- Wingbar lights for RWY24	
	- RWY threshold lights	
	- Touchdown zone lights	
	- RWY centerline lights	
	2. TWY-A, TWY-B and TWY-D	Same as above
	1) Taxiway edge lights should be renewed.	
	2) Taxiing guidance lights should be installed.	

Facility	Name of Equipment	Design Conditions and Criteria
	3. RWY01/19 and TWY-C	Same as above
	1) Following lights should be installed: - SALS for RWY19 - Two sets of PAPI - TWY edge lights - Taxiing guidance light	
	2) Following lights should be renewed: - RWY edge lights - RWY threshold lights and end lights - REIL for RWY01	ICAO
	4. Aerodrome beacon should be renewed.	- Design standard: ANNEX 14.5.3.3
	5. Apron flood-lights should be renewed.	- Design standard: ANNEX 14.5.3.22

Table 6-5 Preliminary Design Conditions and Criteria for Air Navigation Facilities (Target year 2000)

Facility	Name of Equipment	Design Conditions and Criteria
1. Radio Navigational Aids	1. Two sets of VOR/DME and one set of NDB should be installed.	1. Glide slope/DME, localizer and middle marker will be installed for RWY19 ILS (CAT-1) approach. Communication and Power Cable. VOR will be doppler Type. VOR output power 200 w. DME output power 3 kw.
2. Visual Aids	1. RWY01/19	1. RWY19 SALS will be changed to ALS. 2. SALS for RWY01 will be installed. 3. Wingbar lights for RWY19 will be installed. 4. Following lights for RWY19 will be moved to appropriate locations; - PAPI - RWY threshold lights and end lights. 5. RWY edge lights will be added for extended part of runway. 6. REIL of RWY01 will be taken away.

CHAPTER 7

AIRPORT MANAGEMENT AND OPERATION

7-1. Existing airport administration organization

Existing Carrasco International Airport is well operated by D.G.I.A. under the D.I.N.A.C.I.A. Organization chart of D.I.N.A.C.I.A. and D.G.I.A. is shown in Fig. 7-1 and 7-2.

However, in order to cope with future demand and to maintain airport facilities after the completion of Short-term Development, increase of technical and administration staff will be absolutely required and recommended.

The planning and construction of Development work of the airport should fall under the project implementing task force which are to be selected from five Departments of D.G.I.A.

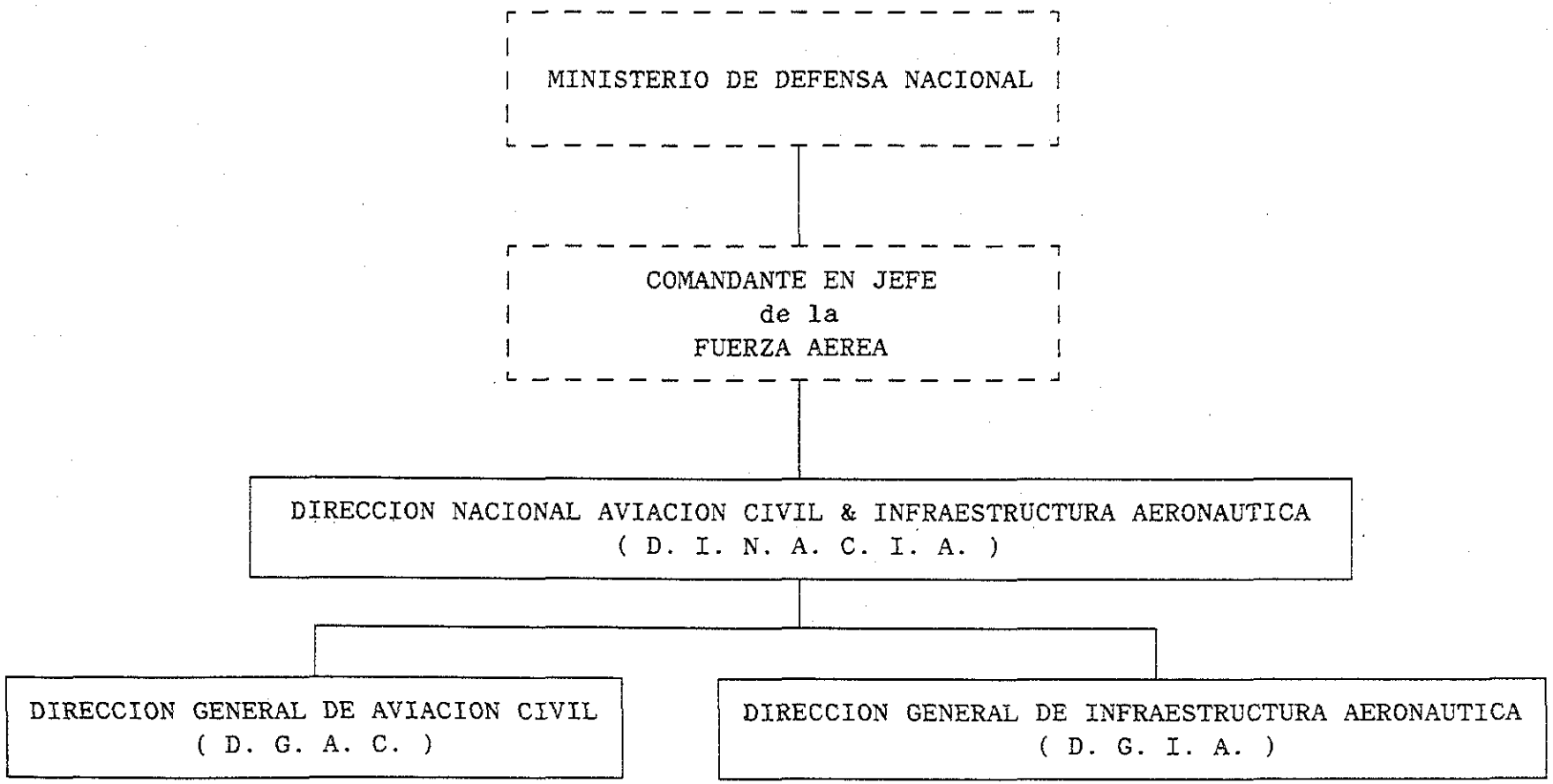


Fig. 7-1 ORGANIZATION CHART OF DINACIA

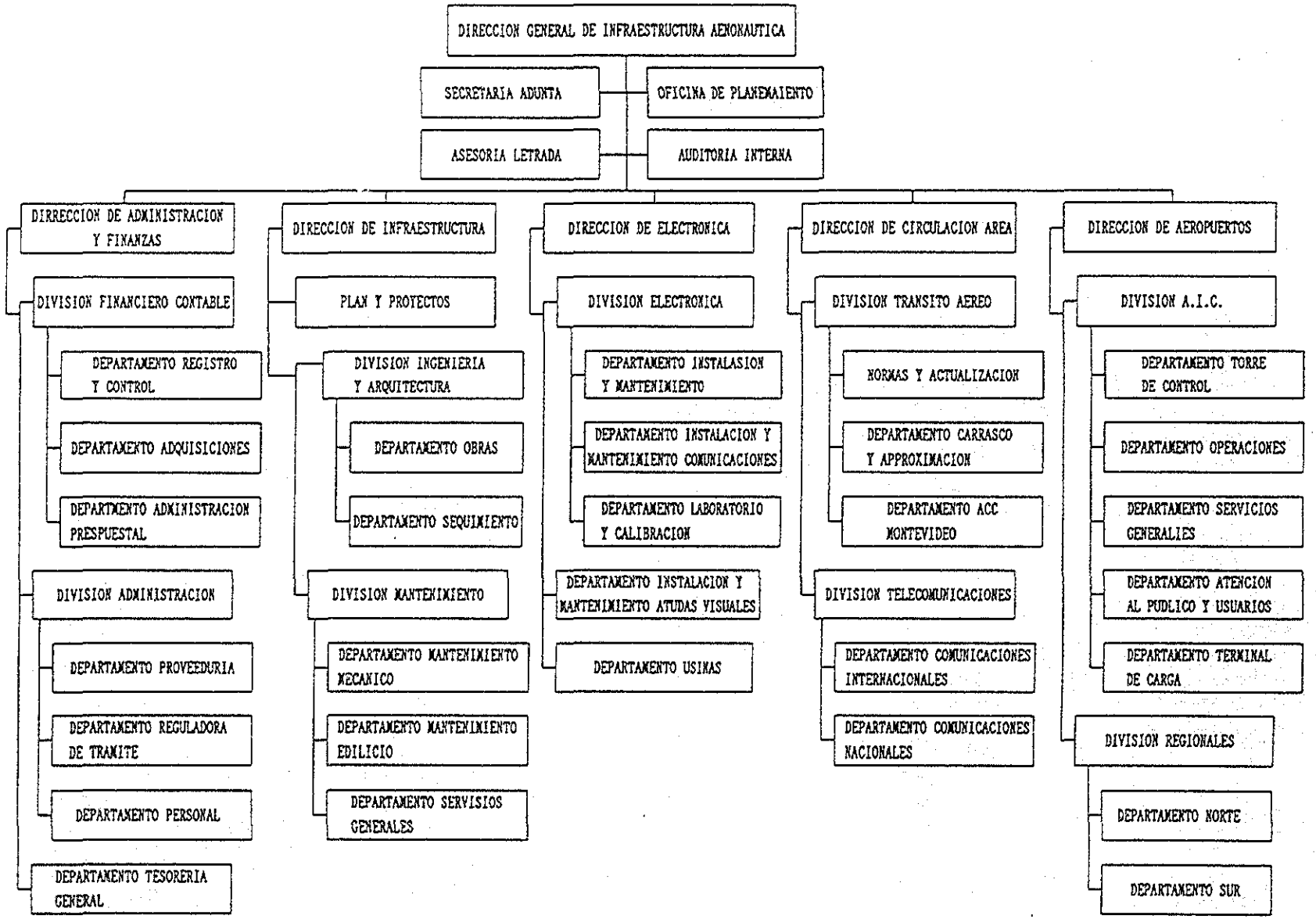


Fig. 7-2 ORGANIZATION CHART OF DGIA

1) The "Direccion de Infraestructura" will be in charge of daily maintenance, including upkeep of the runway, taxiway, apron and drainage, as well as of the turfing in the landing area, etc. It is recommended that senior civil engineer and his staff be increased in this Direccion is envisaged throughout the period of the project life. And Department de Mantenimiento Edificio in this Direccion will be in charge of maintenance of the passenger and cargo terminal buildings, including their normal upkeep. It is not necessary to increase the number of staff.

2) The "Direccion de Electronica" will be in charge of maintaining visual-aids, power supply, radio navaids and telecommunications equipment, many of which are planned to be renewed under the Project, except for ASR/SSR. This Direccion will require an increase in the number of staff in order to cope with the planned addition of new facilities and equipment concerned.

3) The "Direccion de Circulacion Area" will be in charge of the air traffic control, as well as responsible for approving flight plans and providing aeronautical information and telecommunications services. This Direccion will require an increase in the number of staff for ATC service is anticipated throughout the project life.

4) The Division Aeropuerto International Carrasco in "Direccion de Aeropuertos" will be in charge of air passenger operation. It is necessary to increase the number of staff in order to cope with the forcasted passenger traffic. The division staff for security check of the passengers using X-ray and Metal detector, and for collection of passenger service charges will need to be increased in order to cope with the expected increase of passengers and new installation of X-ray and metal detector.

5) The "Direccion de Administracion y Finanzas" will be composed of the general duties, registry, stores and accounts sections, all of which are expected to require an average annual increase in the number of staff of about 2% throughout the project life.

Table 7-1 summarizes the manning programme of the Airport's administration, operation and maintenance for the years of completion of the proposed improvement works.

Table 7-1 Recommended Manning Programme of D.G.I.A.

Classification / Year	Present (1989)	1995
Director General	1	1
Director	5	5
Advisor/Secretary Staff	12	14
1. Direccion de Administracion y Finanzas	89	98
- Direccion	2	3
- Divicion Financiero Contable	41	45
- Divicion Administracion	27	30
- Departomento Tesoreria	19	20
2. Direccion de Infraestructura	158	175
- Direccion	24	26
- Divicion Ingenieria y Arquitectura	75	83
- Divicion Mantenimiento	59	66
3. Direccion de Electronica	80	88
- Direccion	3	4
- Divicion Electronica	53	58
- Departomento Inst. y Mantenimiento Ayudas Visuales	12	13
- Departomento Usinas	12	13
4. Direccion de Circulacion Aerea	57	64
- Direccion	10	11
- Div. Transito Aereo	22	25
- Div. Telecomunicaciones	25	25
5. Direccion de Aeropuertos	257	284
- Direccion	2	3
- Div. Aeropuerto Int. Carrasco	179	205
- Div. Regionales	76	76
TOTAL	659	729

CHAPTER 8

CONSTRUCTION SCHEDULE

AND COST ESTIMATE

Construction schedule and cost estimate are made, based on the results of preliminary design as well as the data and information collected in the First and Second Field Surveys.

8-1. CONSTRUCTION CONDITIONS

8-1-1 Site Condition

Carrasco International Airport is located about 25 km southeast of Montevideo and has a well developed access road in line with La Plata river.

The airport has ample room for storing and stockpiling the construction materials and equipment, as well as installing asphalt plants, etc. on the site as required for the improvement work.

According to AIP, operation hours of the airport is around-clock. However, actual operation hours of the airport is between 7:00 and 22:15. In view of this situation, construction works of the airfield facilities and a part of navigational facilities that might interfere with the operation of the airport will have to be executed during the night time hours between 22:30 and 6:30.

Regarding the meteorological conditions of the airport, the work will not require special care in each season.

8-1-2 Construction Materials and Equipment

(1) Aggregate (Crushed Stone and Sand)

There are quarries with adequate supply capacity of crushed stone both in Montevideo and Carrasco area. Sand can be obtained in adequate supply both in quantity and quality from La Plata river.

(2) Cement

Cement is 100% locally procured as it is produced in Uruguay based on the ASTM and AASHO standard.

(3) Bitumen

Bitumen of the required quality and quantity is to be imported, mainly from Brazil.

(4) Steel Products

A kind of steel products such as steel bars, steel plate, light weight steel etc. are to be imported, mainly from Algentina.

(5) Building Materials

Most of building materials used to be imported with exception of a few locally produced items such as bricks, concrete blocks, wooden products, paint, etc.

(6) Terminal Equipment

All terminal equipment such as X-Ray, metal detector, baggage claim devices, work station, etc. are to be imported.

(7) Utility Equipment

Water supply, garbage handling plant and a part of sewage equipment are to be imported.

(8) Air Navigation Equipment and Instruments

All equipment and instruments for air navigation facilities are to be imported from countries available.

8-1-3 Labour

Unskilled labour is locally procurable in view of type and scale of the project.

Regarding such skilled labour as operators of construction machine, it is also locally procurable. However, for installation of air navigation facilities, terminal equipment and utility plants, skilled labours are not locally procurable and has therefore, to be sought from outside of Uruguay.

8-2. CONSTRUCTION SCHEDULE

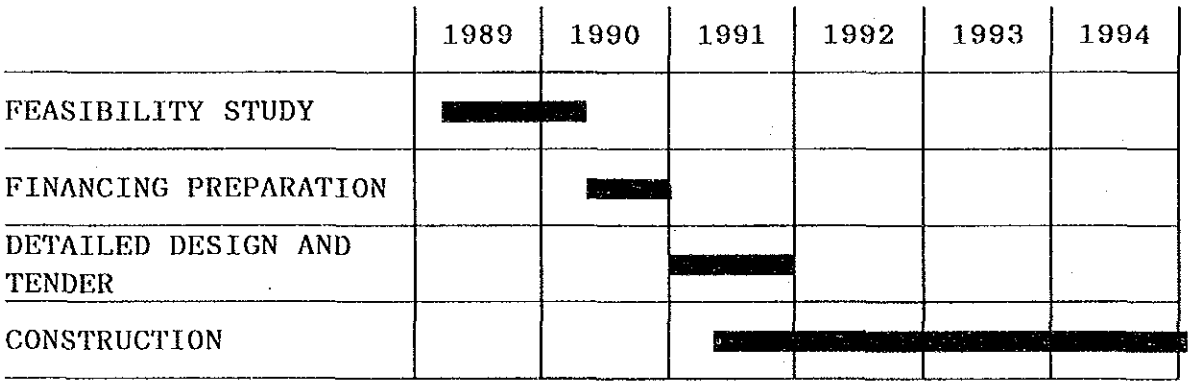
Based on the construction work volume and construction conditions, construction schedule has been prepared, with due regard to the following matters, and on the basis of construction taking place while the airport is kept in normal operation.

8-2-1 General

In order to cope with urgent requirements of runway improvement and sake of optimizing investment effects, construction of Short-term development will be commenced early in 1991 and finished in 1994.

Project development schedule is shown in Fig. 8-1, and detailes of each construction work such as airfield facilities, terminal area facilities and air navigation facilities are as follows.

Fig. 8-1 PROJECT DEVELOPMENT SCHEDULE



(1) Airfield Facilities

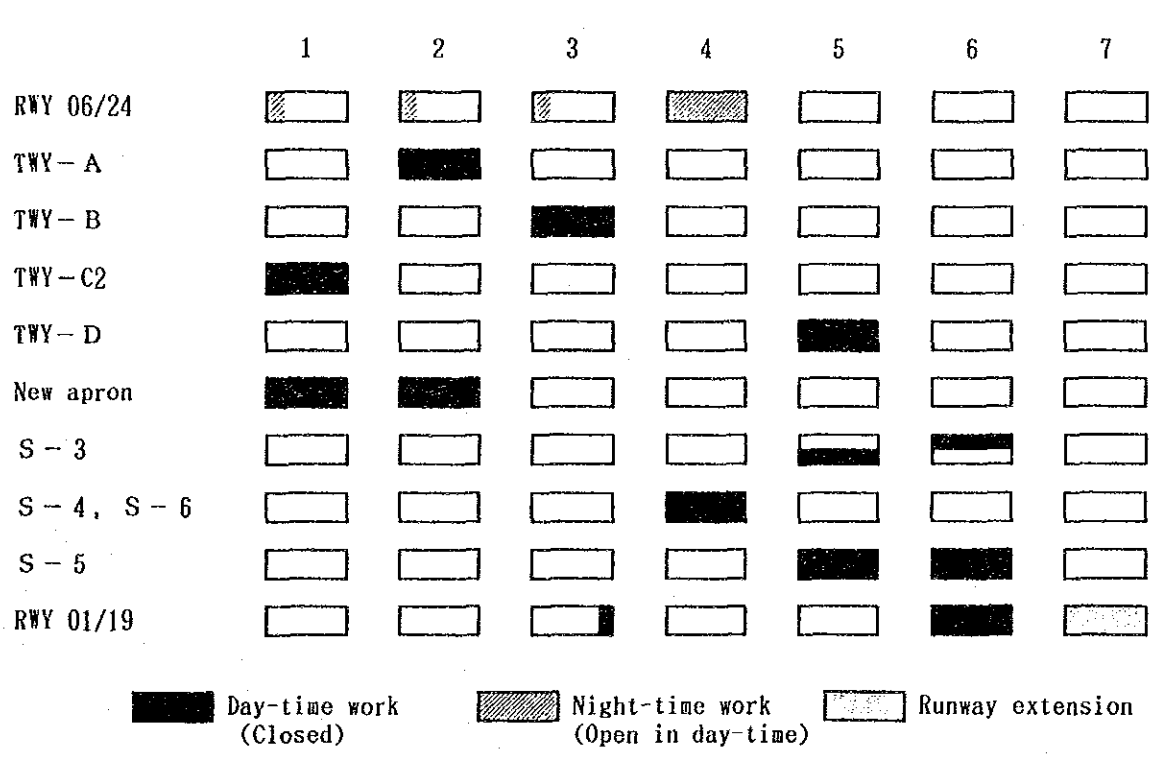
1) Priority of Improvement

As pavement of TWY-A and asphalt paved apron are in serious conditions, they need urgent improvement.
As for RWY06/24, shoulder has serious problem, and D.G.I.A. will reconstruct 3.5 m wide shoulder next year.
Therefore, improvement of RWY06/24 has the second priority.
TWY-B also has the second priority.
TWYs C2 (from RWY06/24 to apron) and D have lower priorities, and sequence of improvement for these taxiways should be set, considering alternative use with TWY-A or TWY-B.
RWY01/19 should be improved after completion of RWY06/24 and related taxiways.

2) Construction Stages

Construction work is divided into seven stages as shown below, considering following points:

- Priority of improvement
- Maintain existing number of aircraft parking positions as practicable.
- At least two taxiways should be available to connect RWY06/24 and apron.
- Night-time work should be minimum to reduce construction cost.



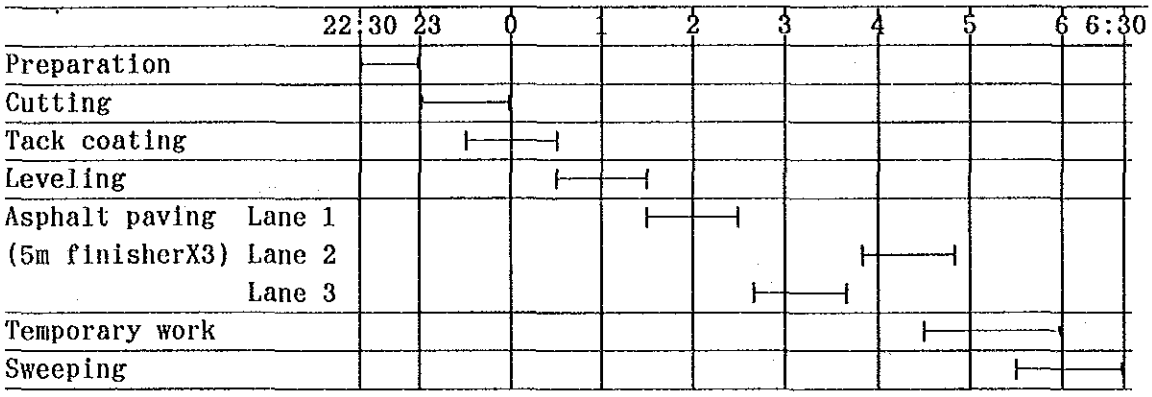
3) Construction Hours

a. Day-time Work

Preparation	8:00 ~ 9:00	1 hour
Paving	9:00 ~ 12:00 13:00 ~ 15:00	5 hours
Compaction or Curing	15:00 ~ 16.30	1.5 hours
Clearing	16:30 ~ 17:00	0.5 hour
Total		8 hours

b. Night-time Work

Asphalt overlay 105m/day (4,700m^2/day)



4) Construction Capacity

Quarry in Motevideo can supply enough aggregate for this project.

Cement, sand and other materials are also available.

Therefore, construciton capacity is not derived from availability of materials, but from availability and capacity of construction equipment.

a. Asphalt overlay

Three asphalt finishers (5 m class) will be used as one party.
Hourly construction capacity is calculated below.

5 m x 3.5 m/min. x 60 min. x 0.5 x 3 = 1,575 m^2/h.
(Width) (Velocity)

1,575 m^2/h. x 0.06 m x 2.35 t/m^3 ≒ 220 t/h.

Uruguayan contractors have enough asphalt plants to provide asphalt pre-mix of 220t/h.

Three hours at night-time work and five hours at day-time work are available for asphalt paving respectively, and daily capacity are set as shown below.

Night-time work: 660 t/day
(Length: 105 m, Area: 4,700 m^2)
Day-time work: 1,100 t/day)
(Length: 175 m, Area: 7,900 m^2)

b. Cement concrete paving

Capacity of concrete finisher is assumed as shown below.

5 m x 20 m/h x 0.7 = 70 m^2/h.
(Width) (Velocity)

70 m^2/h x 0.35 m ≒ 24 m^3/h

Daily capacity are as follows:

Night-time work 70 m^3/day
Day-time work 120 m^3/day

c. Other works

Earthwork: Bulldozer 21t class 300 m^3/h
300 m^3/h x 6 = 1,800 m^3/day

Base and subbase: 2,000 m^2/day

5) Workable days

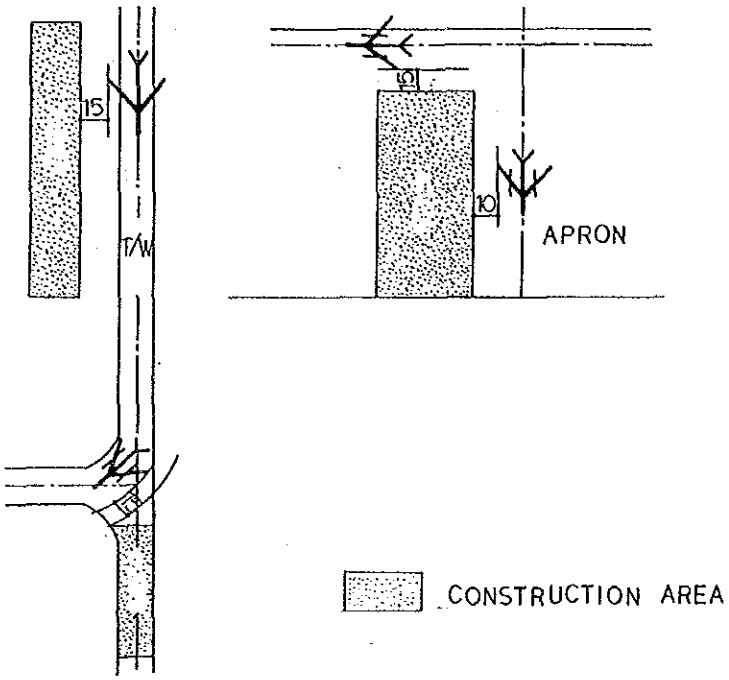
Following percentages show unworkable days during a year due to rain and holidays:

Asphalt concrete pavement	50%
Cement concrete pavement	40%
Other works	30%

6) Obstacle restrictions during construction period

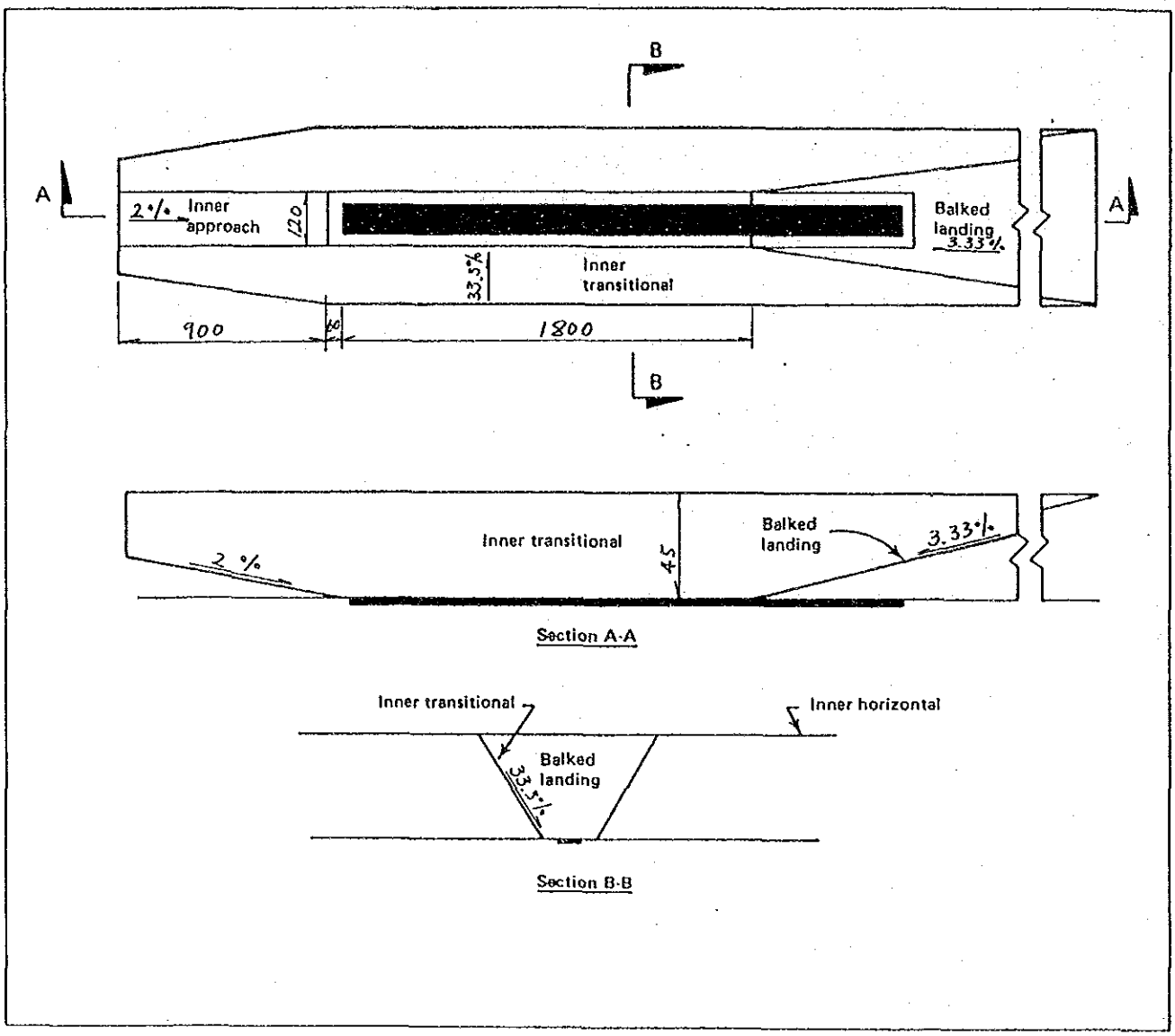
According to "Aerodrome Design Manual", Part 6 -- "Control of Obstacles", no work should be permitted within "Obstacle Free Zone" when precision approach runway CAT I is in use.

According to the Japanese regulation, clearance between construction area and aircraft should be secured as following figure.



7) Construction schedule

Construction schedule of airfield facilities is shown in Fig. 8-2, and Figs 8-3 ~ 8-9 show construction areas by each stage.



Inner approach, inner transitional and balked landing obstacle limitation surfaces.

OBSTACLE FREE ZONE

Fig. 8-2 CONSTRUCTION SCHEDULE OF AIRFIELD FACILITIES

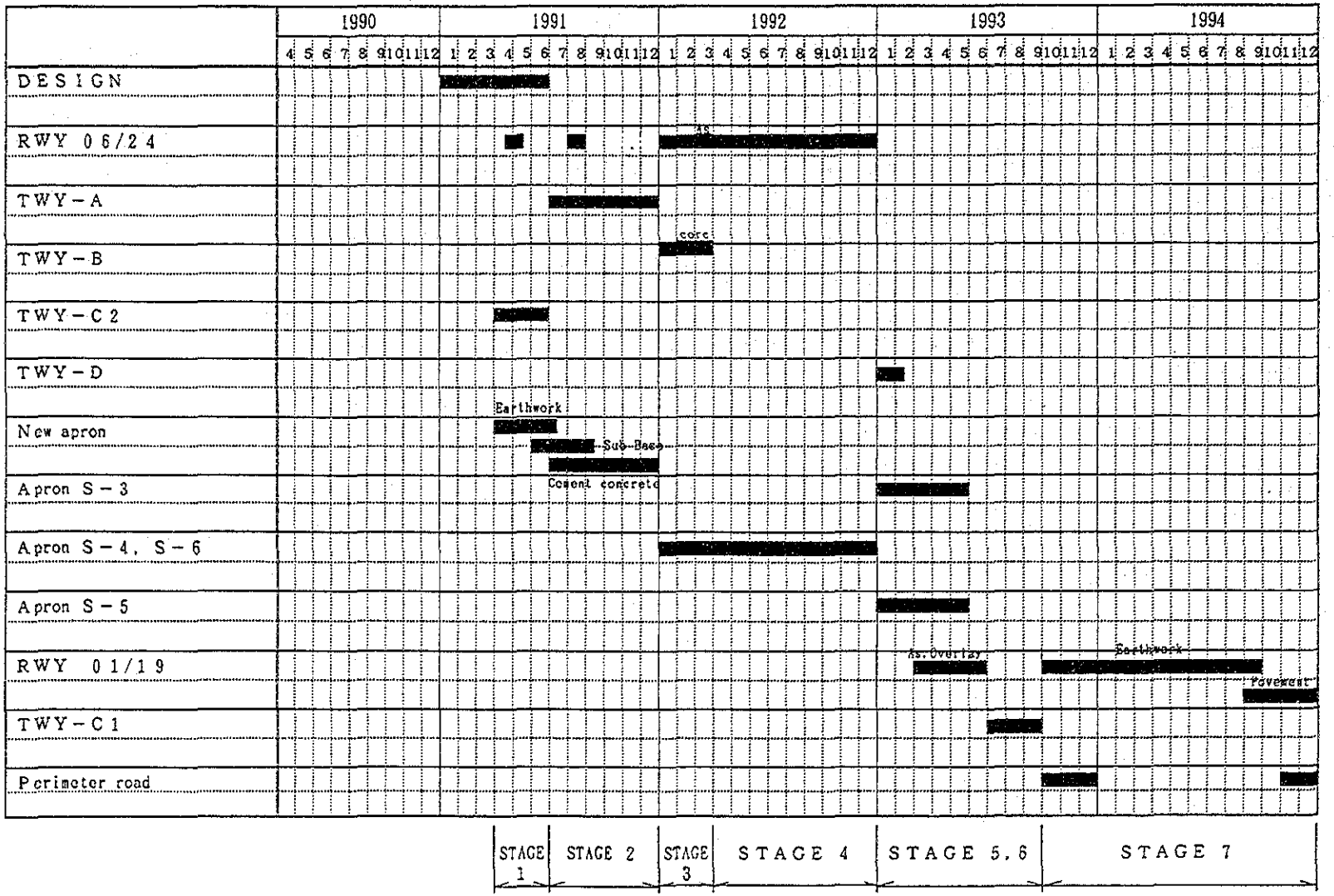
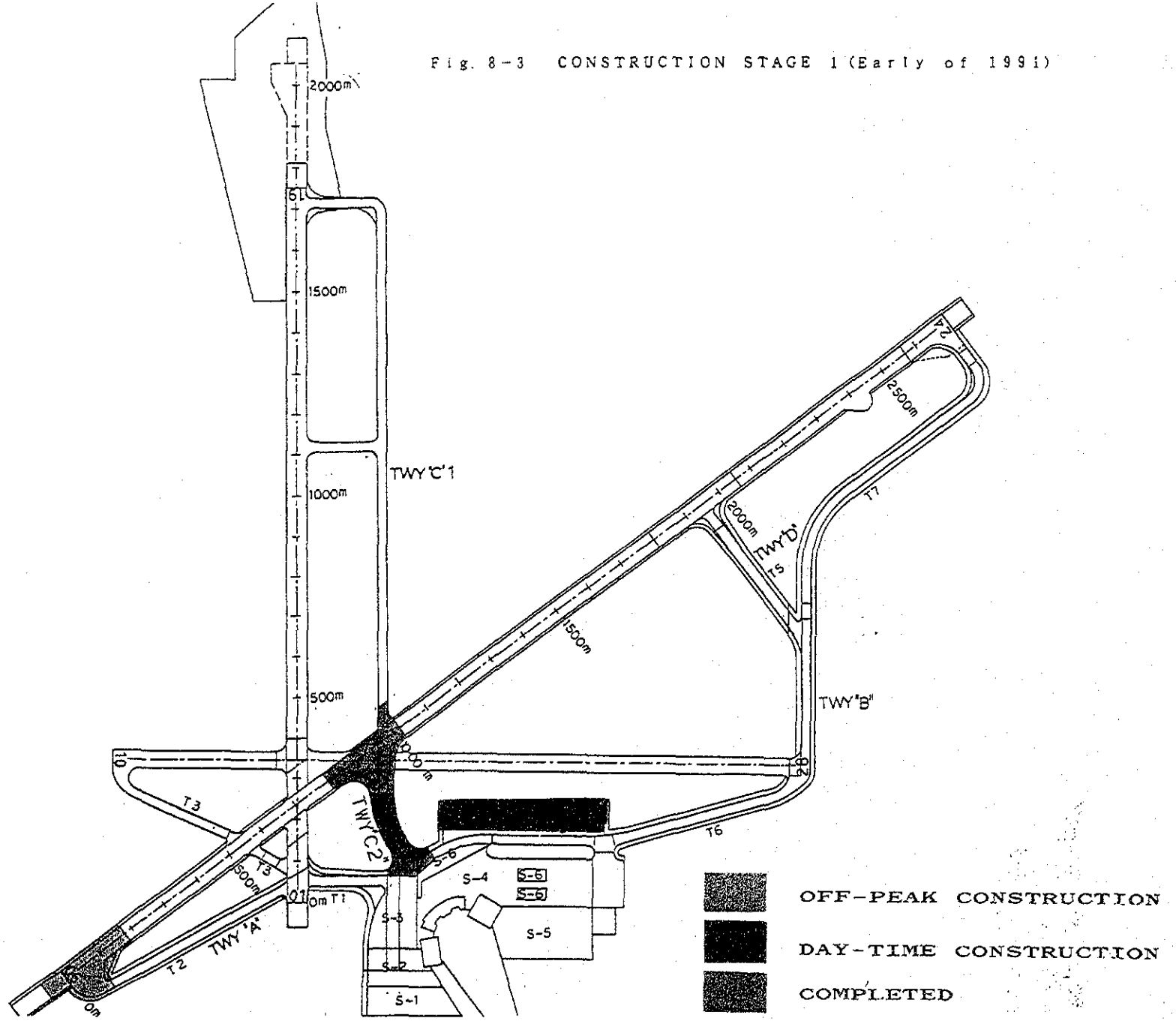
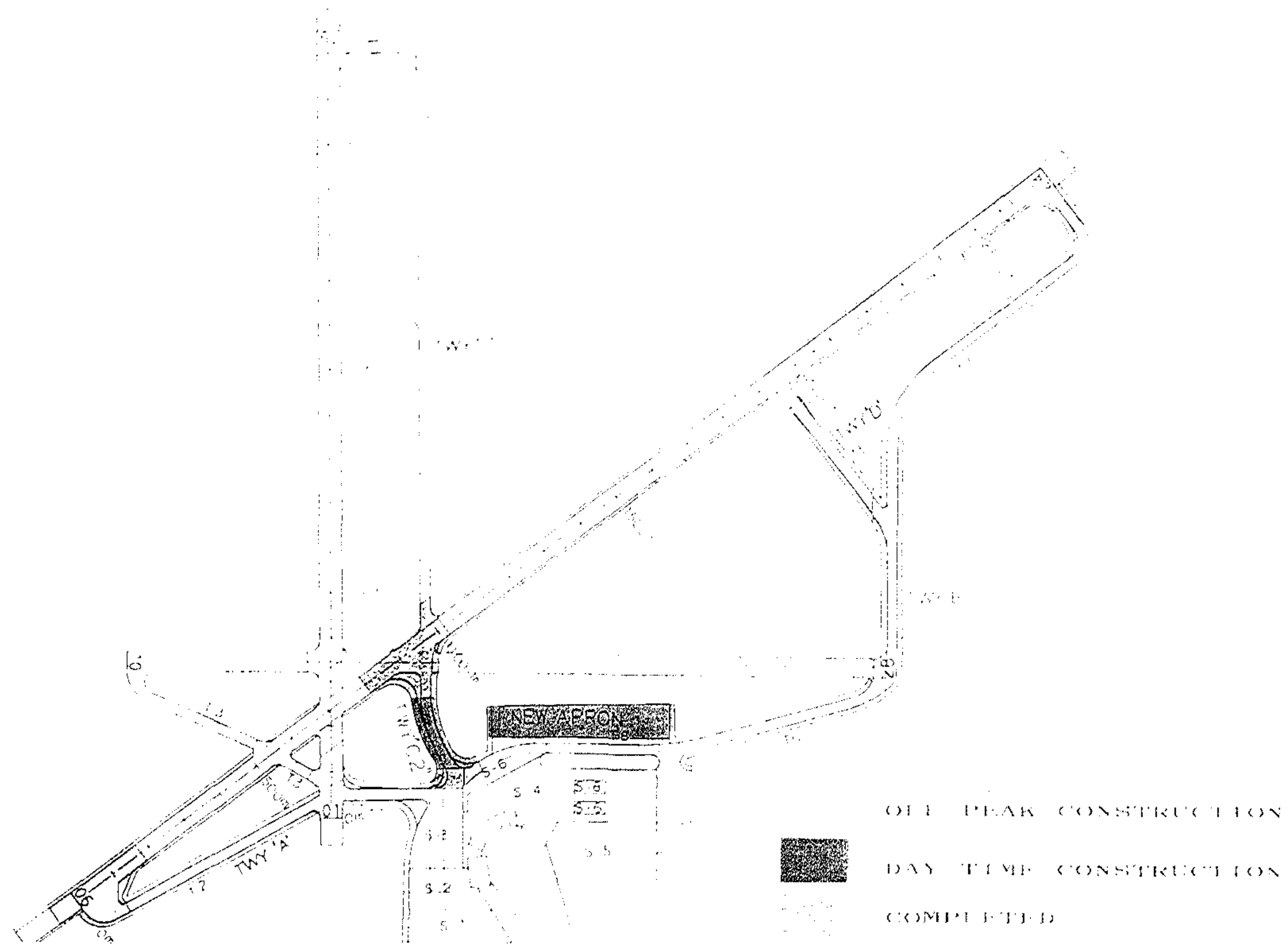


Fig. 8-3 CONSTRUCTION STAGE 1 (Early of 1991)





NEW APRON
TWY C2
TWY 'A'
TWY 'D'
06
01
28
10
OFF PEAK CONSTRUCTION
DAY TIME CONSTRUCTION
COMPLETED

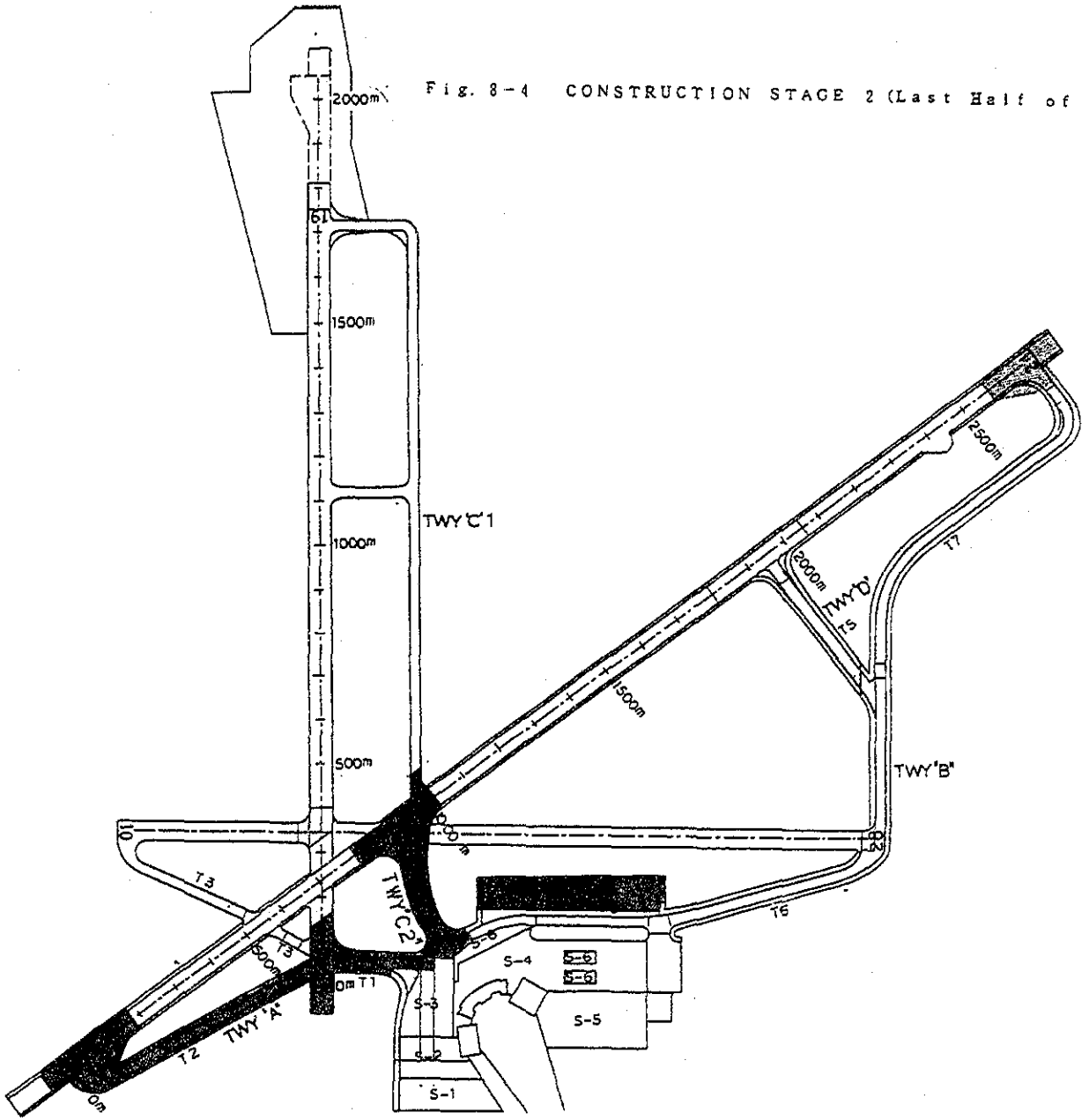


Fig. 8-4 CONSTRUCTION STAGE 2 (Last Half of 1991)

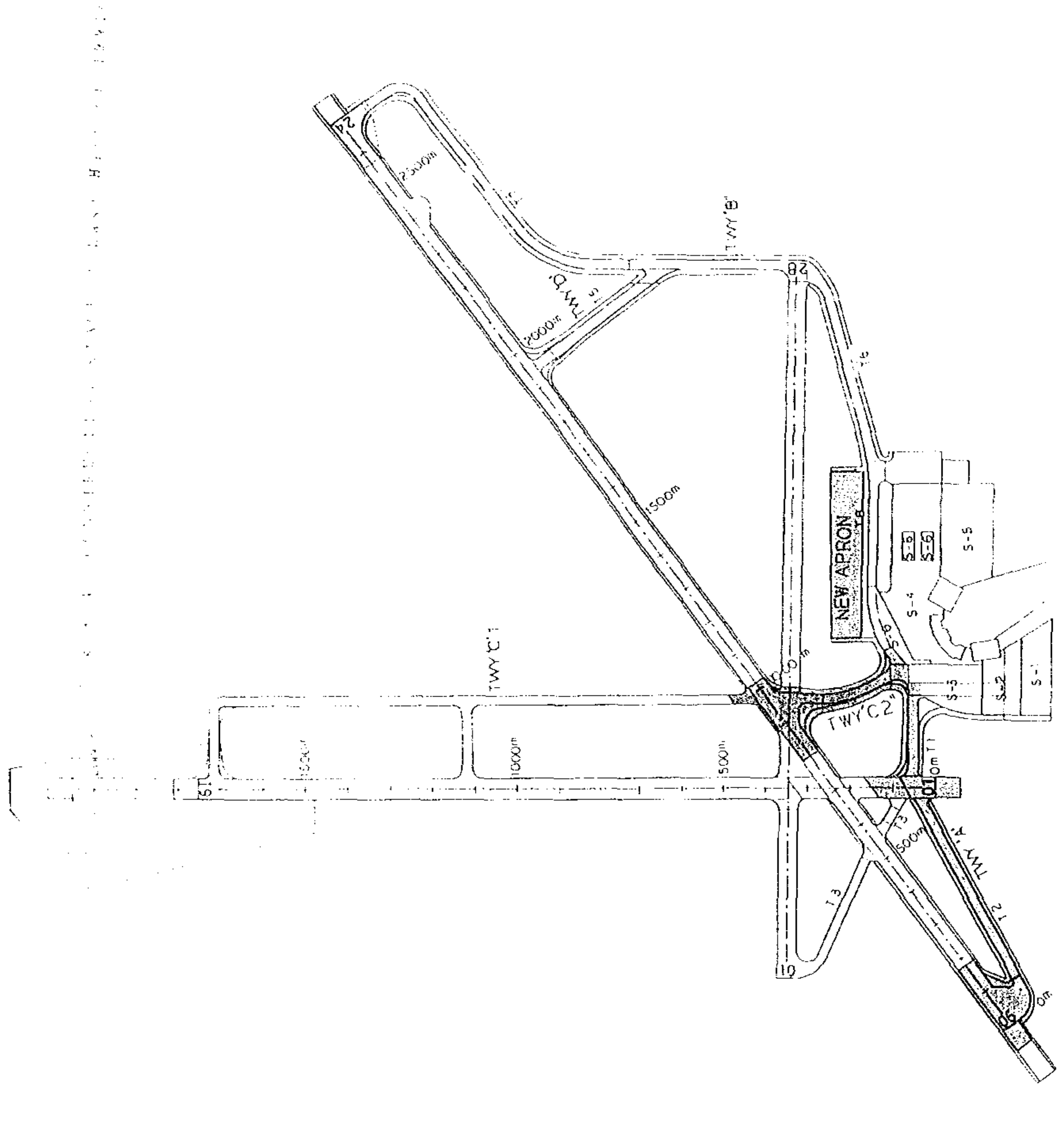
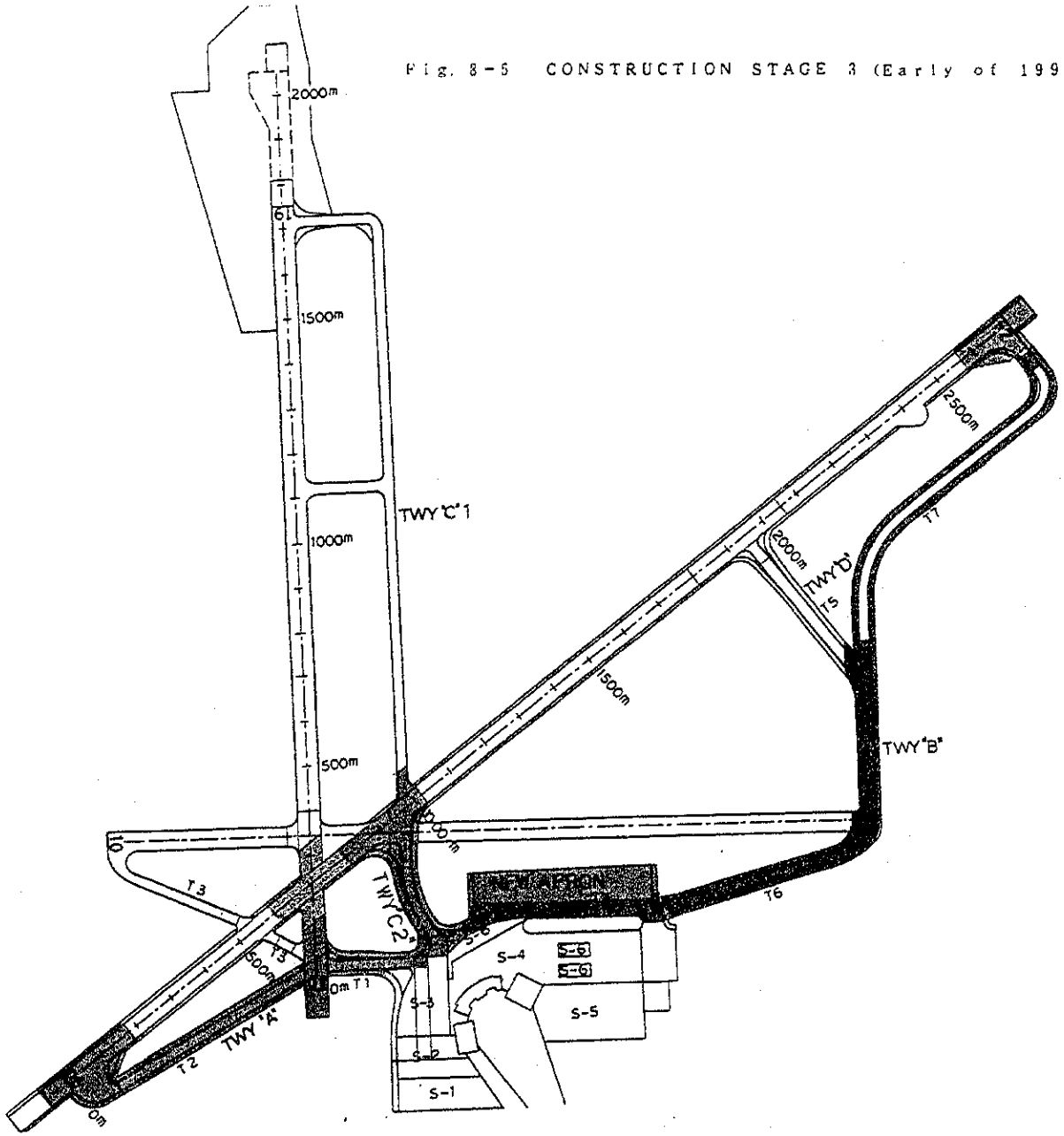
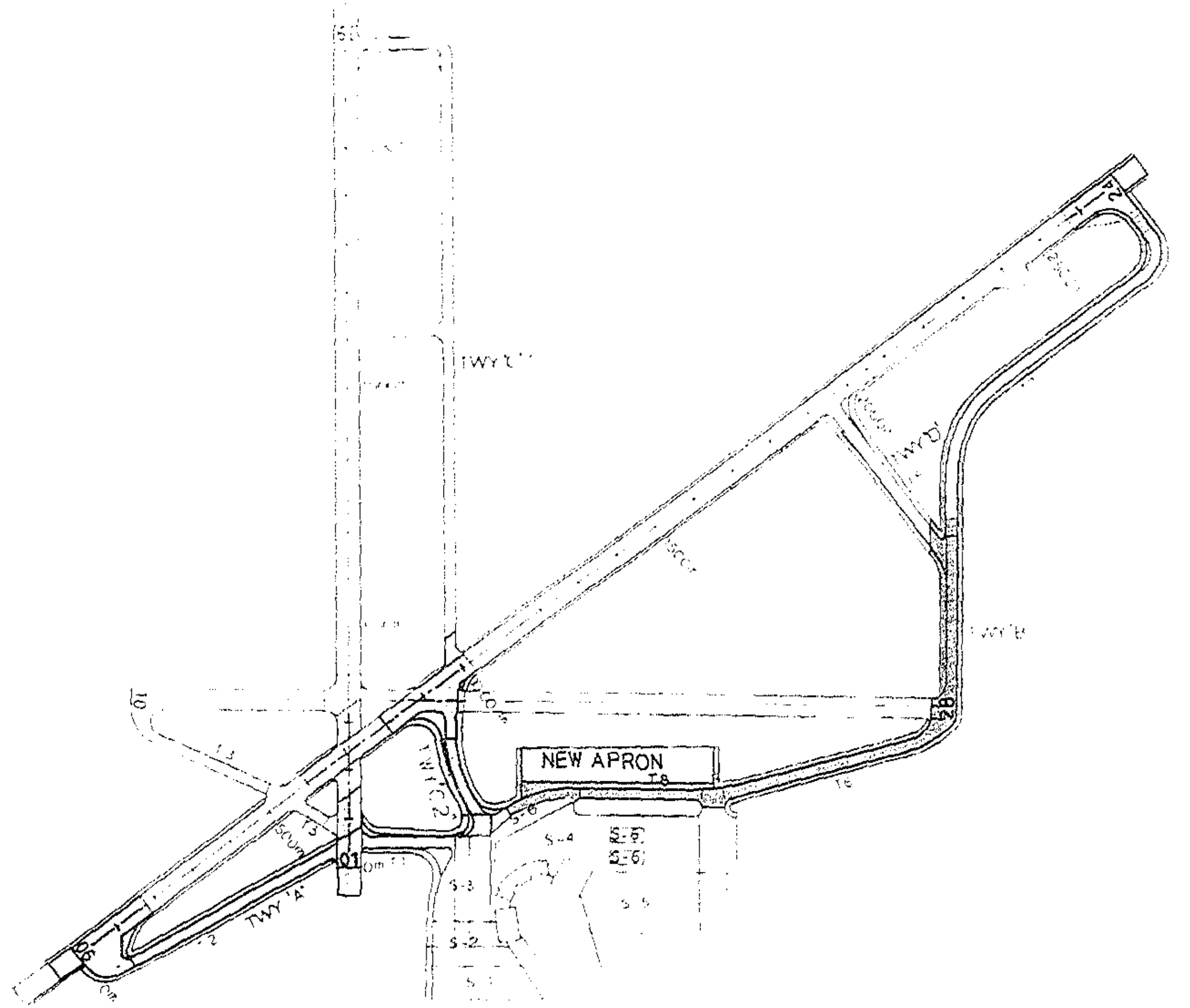

TWY'B'
TWY'D'
TWY'C'1
TWY'C2"
TWY'A'
NEW APRON
2500m
2000m
1500m
1000m
500m
0m
24
28
10
S-1
S-2
S-3
S-4
S-5
S-6
T1
T2
T3

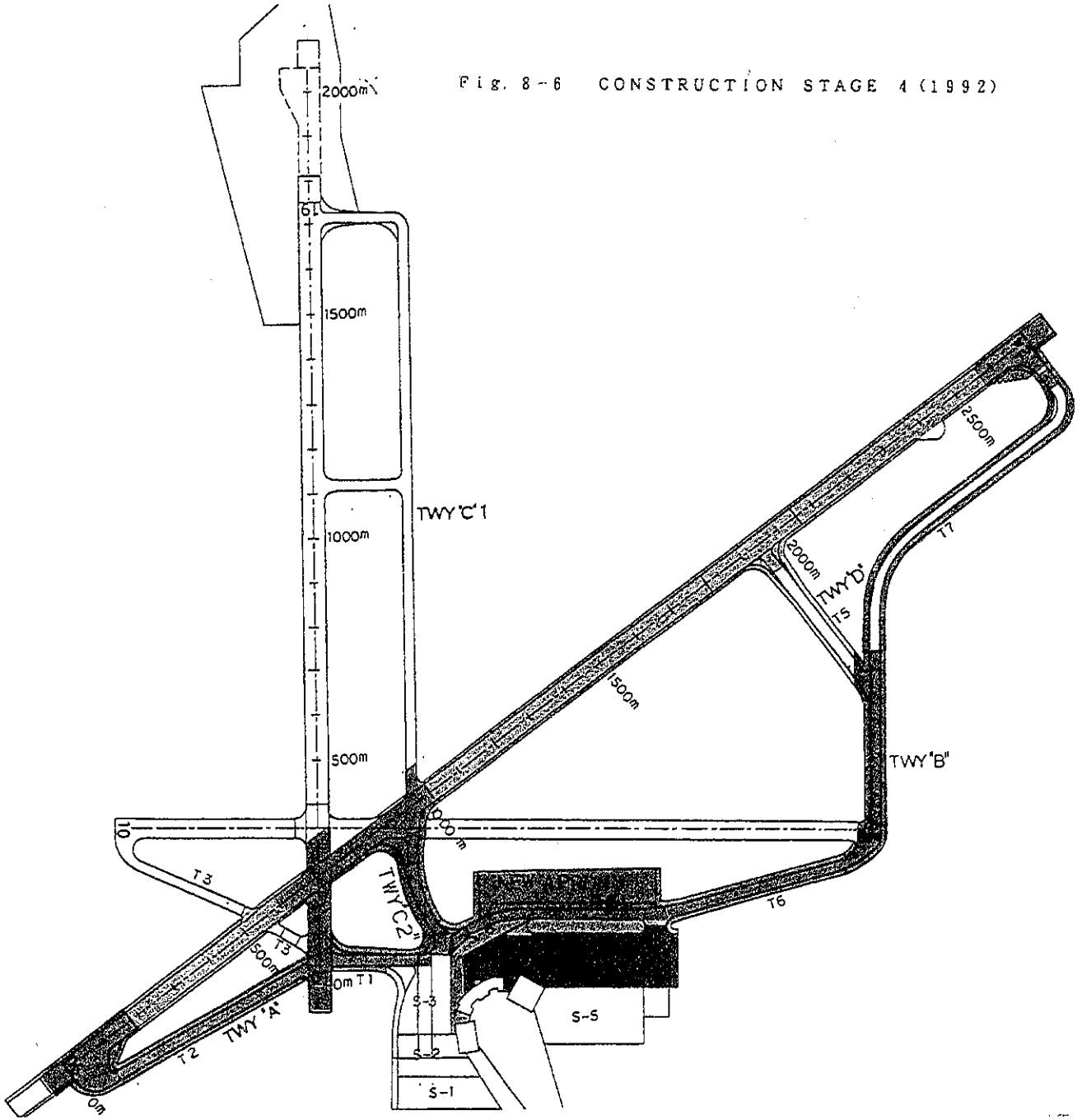
Fig. 8-5 CONSTRUCTION STAGE 3 (Early of 1992)

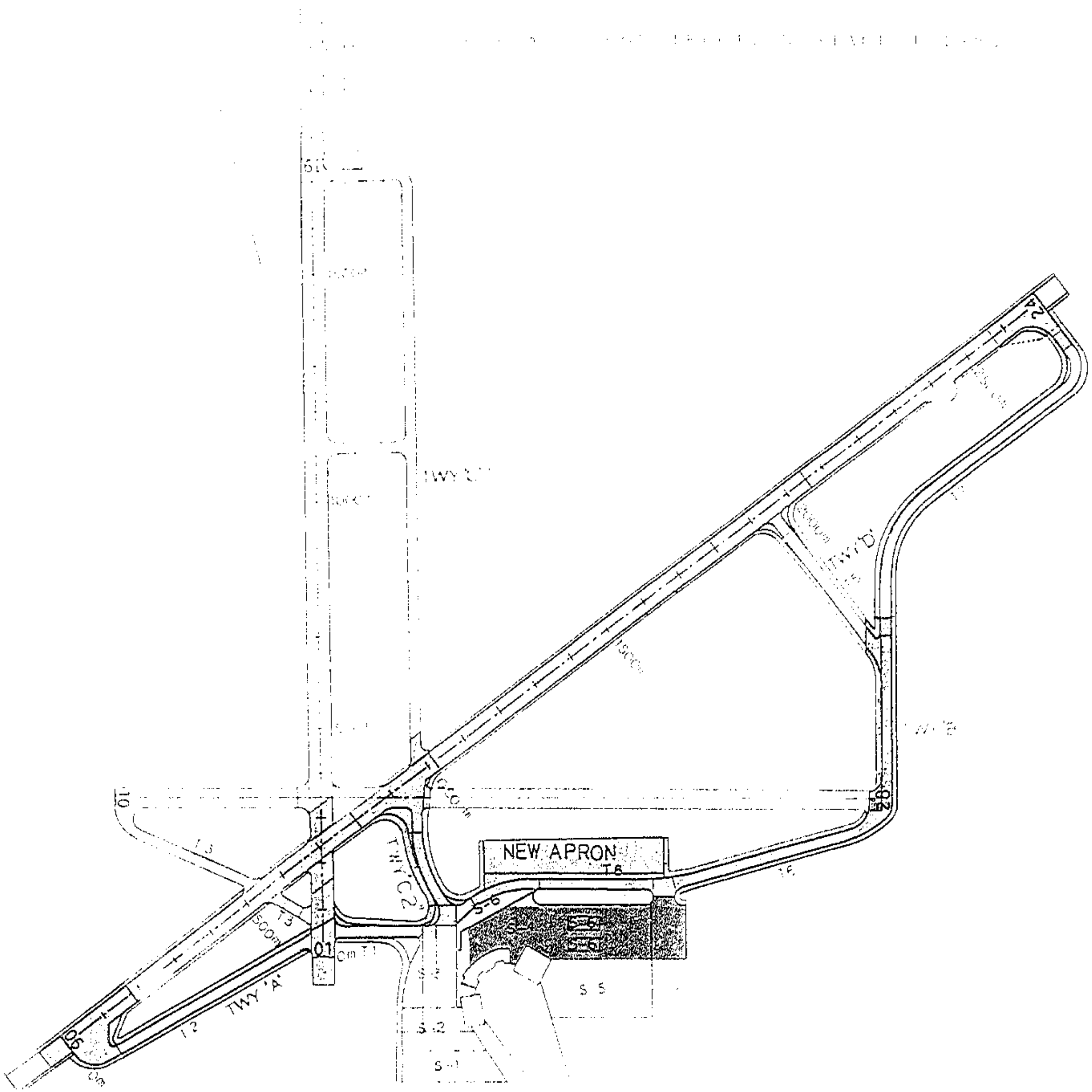




NEW APRON
TWY 'A'
TWY 'B'
TWY 'C'
TWY 'C2'
TWY 'D'
24
06
28
01
10

Fig. 8-6 CONSTRUCTION STAGE 4 (1992)





NEW APRON
TWY 'C2'
TWY 'A'
TWY 'D'
24
06
01
10
S-6
S 5
S-2
S-1
T 8
T 3
T 2

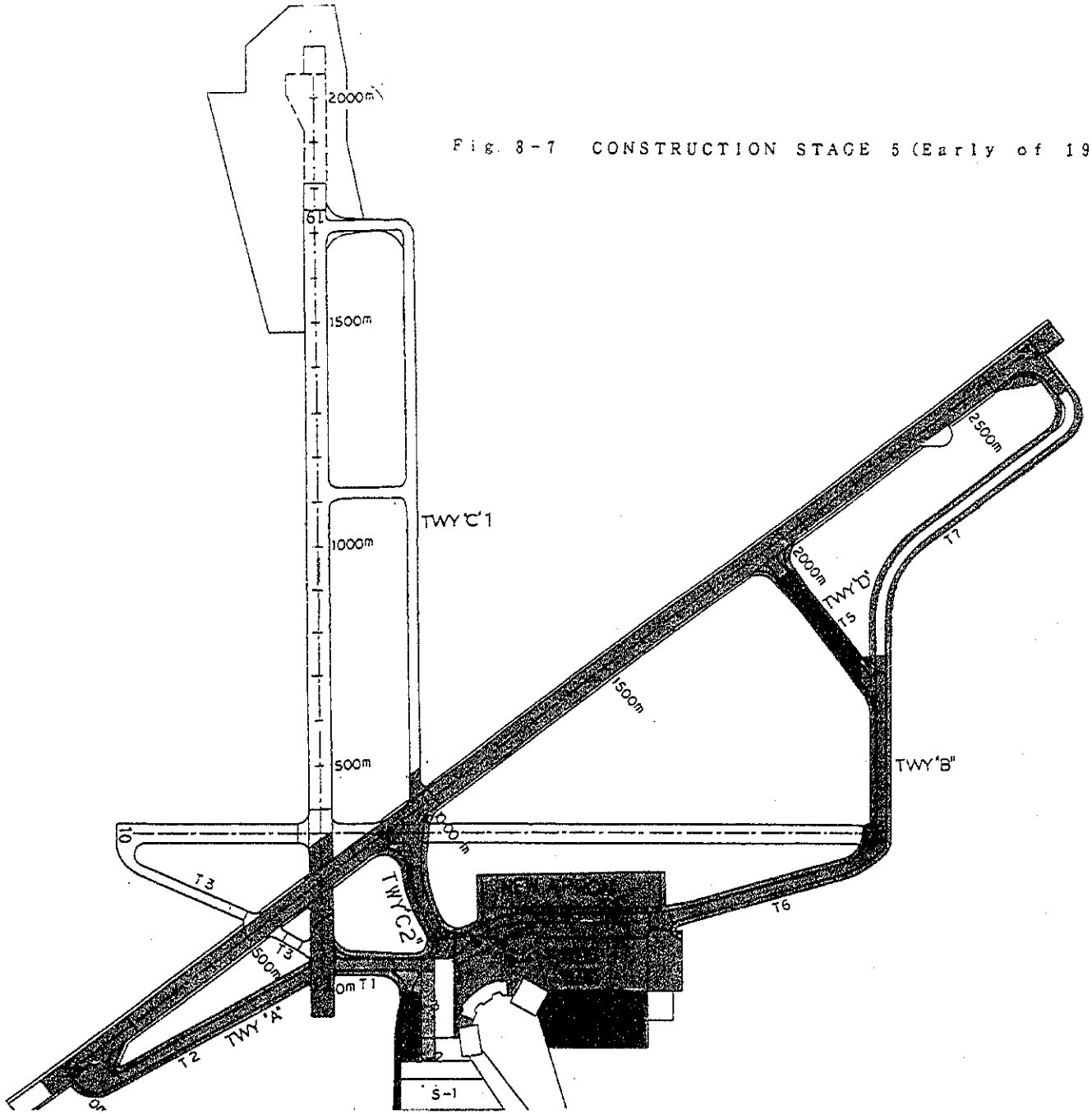


Fig. 8-7 CONSTRUCTION STAGE 5 (Early of 1993)

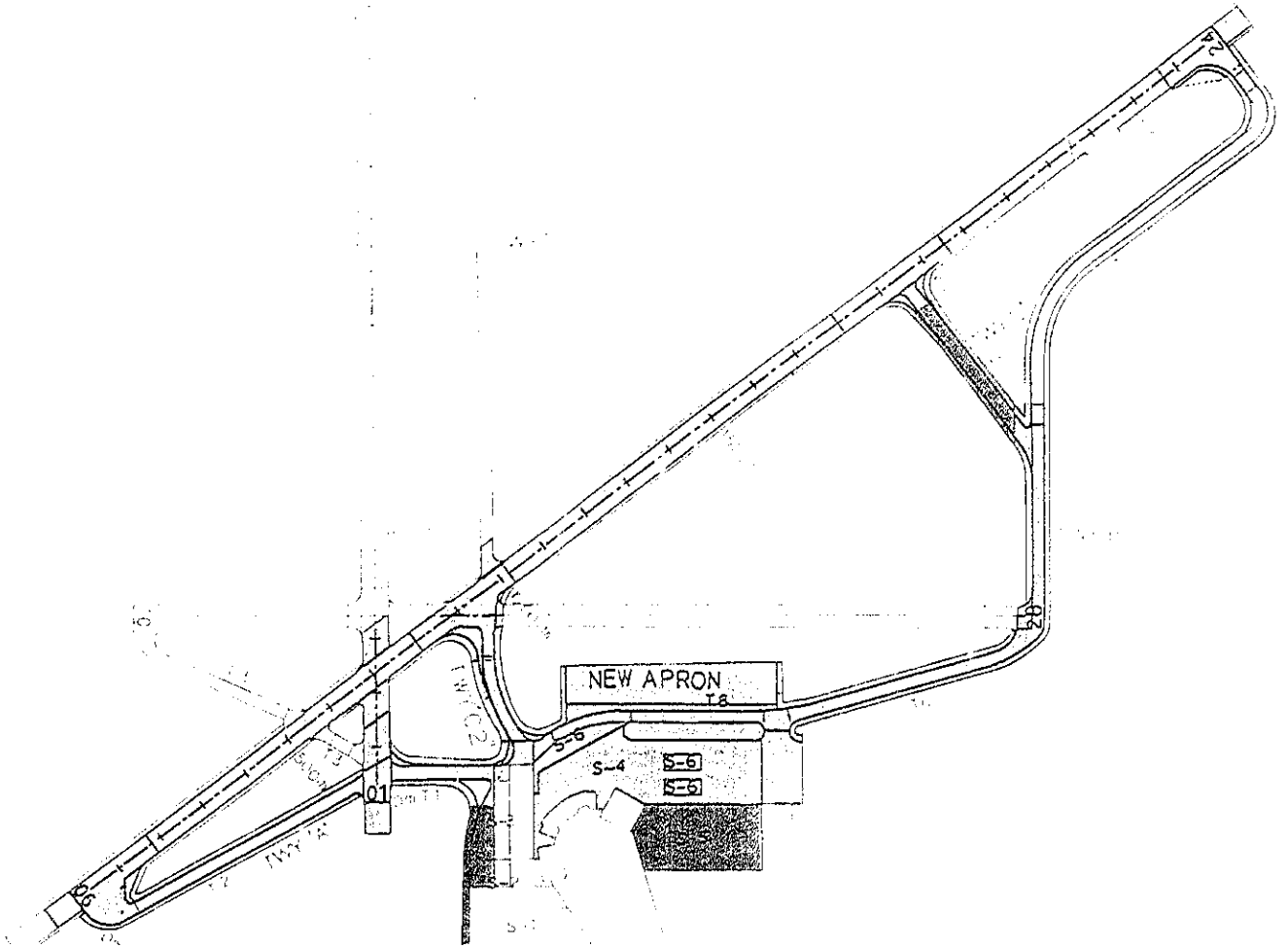
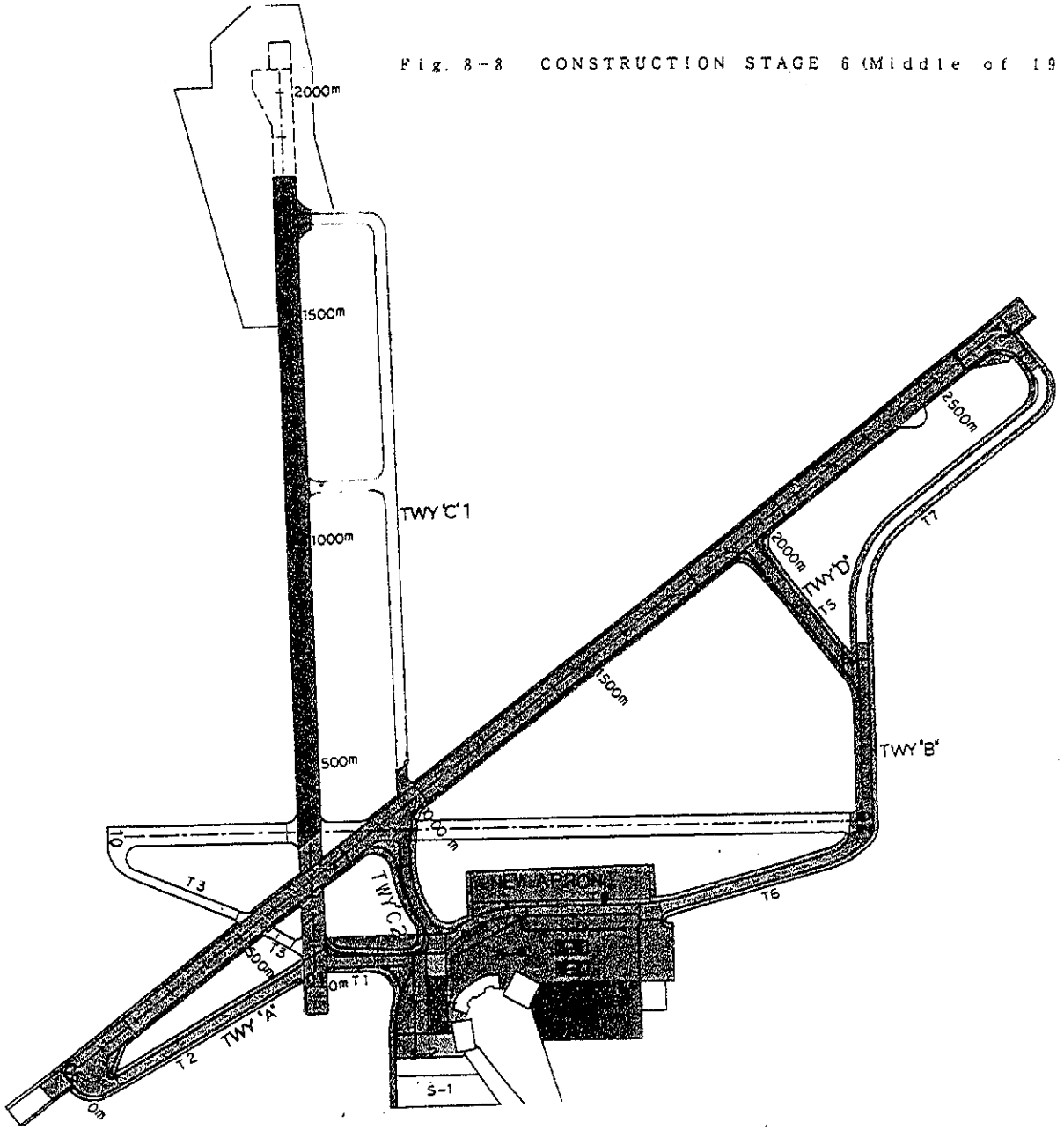
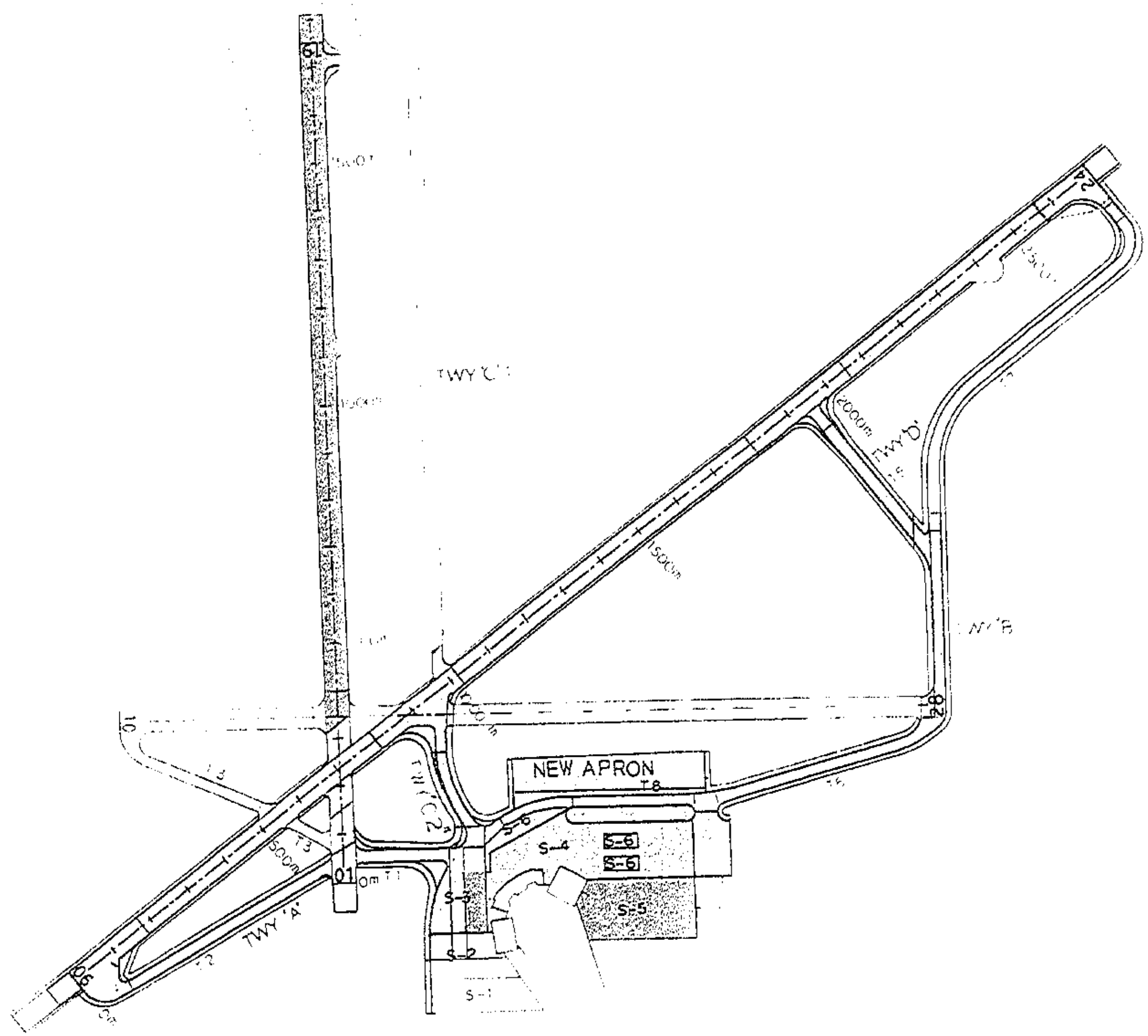

NEW APRON
S-6
S-4
S-6
S-6
01
24
20

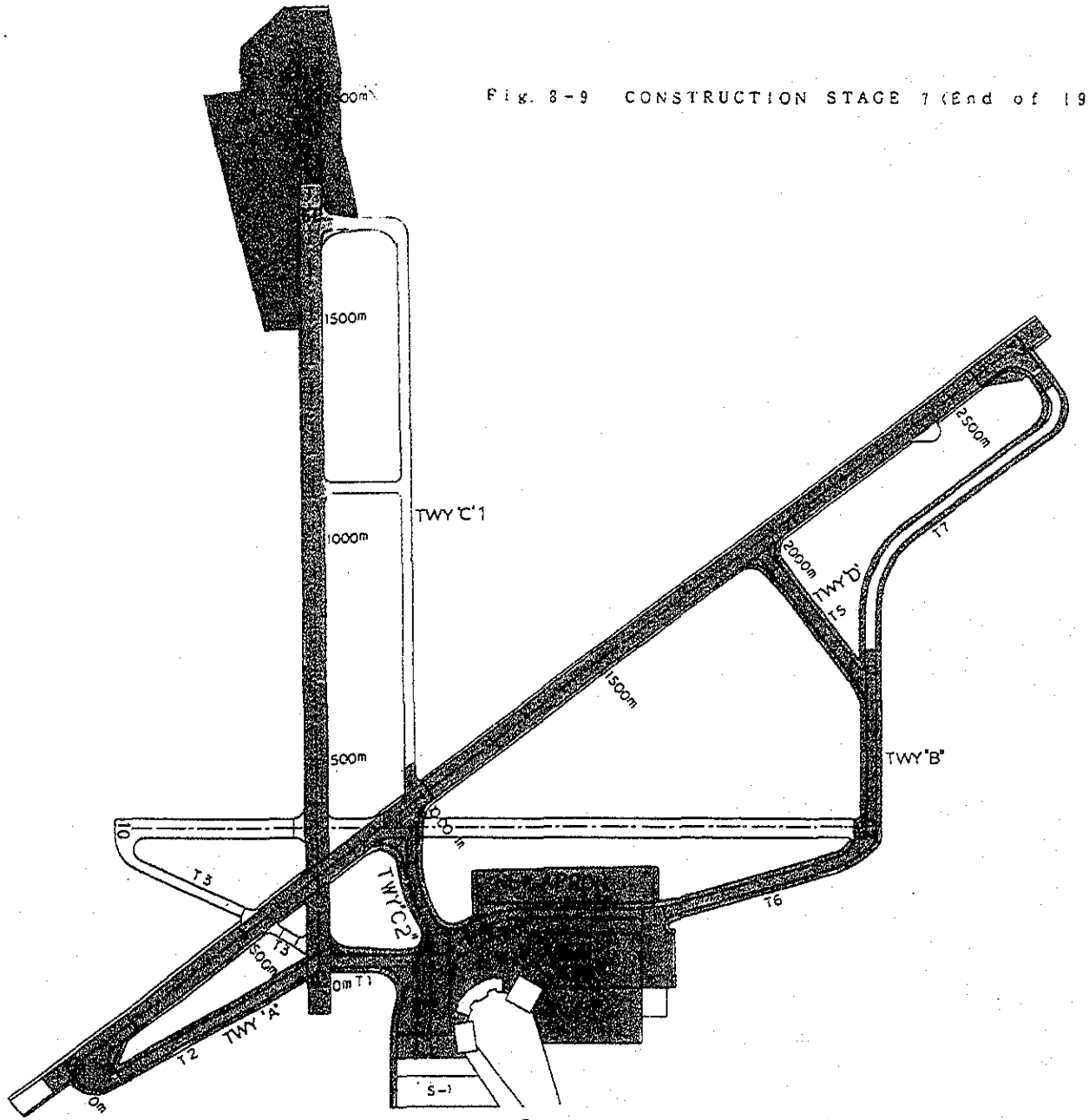
Fig. 8-8 CONSTRUCTION STAGE 6 (Middle of 1993)

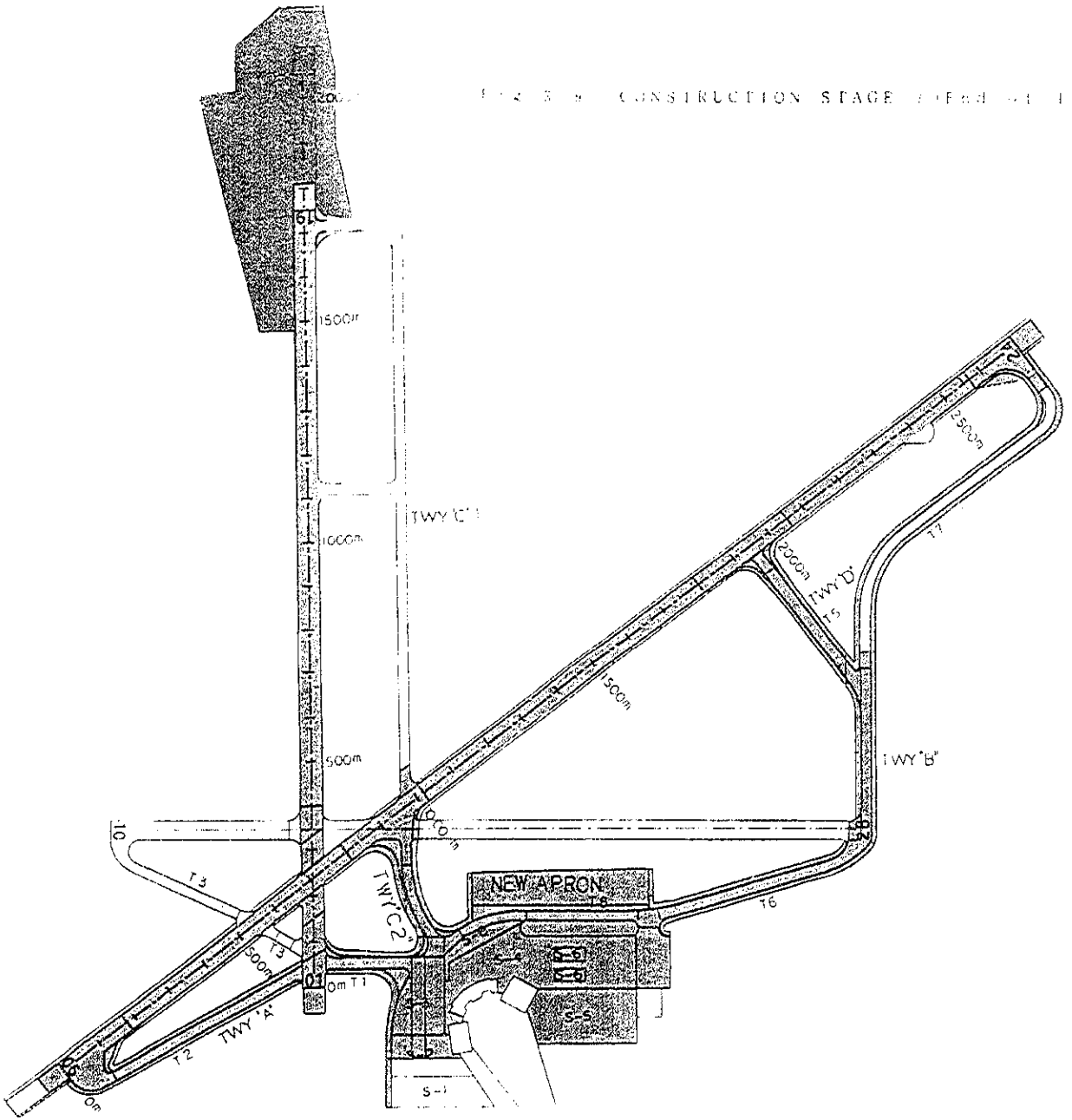




NEW APRON
T8
TWY 'A'
TWY 'D'
TWY 'C2'
500m
1500m
2000m
S-1
S-2
S-3
S-4
S-5
S-6
S-6
S-6
01
19
06
24
10
28

Fig. 8-9 CONSTRUCTION STAGE 7 (End of 1993 and 1994)




T19
1500m
TWY 'C'
1000m
500m
2300m
2200m
TWY 'D'
T5
T7
500m
TWY 'B'
T10
T3
TWY 'C2'
NEW APRON
T6
T3
500m
T1
TWY 'A'
T2
S-1

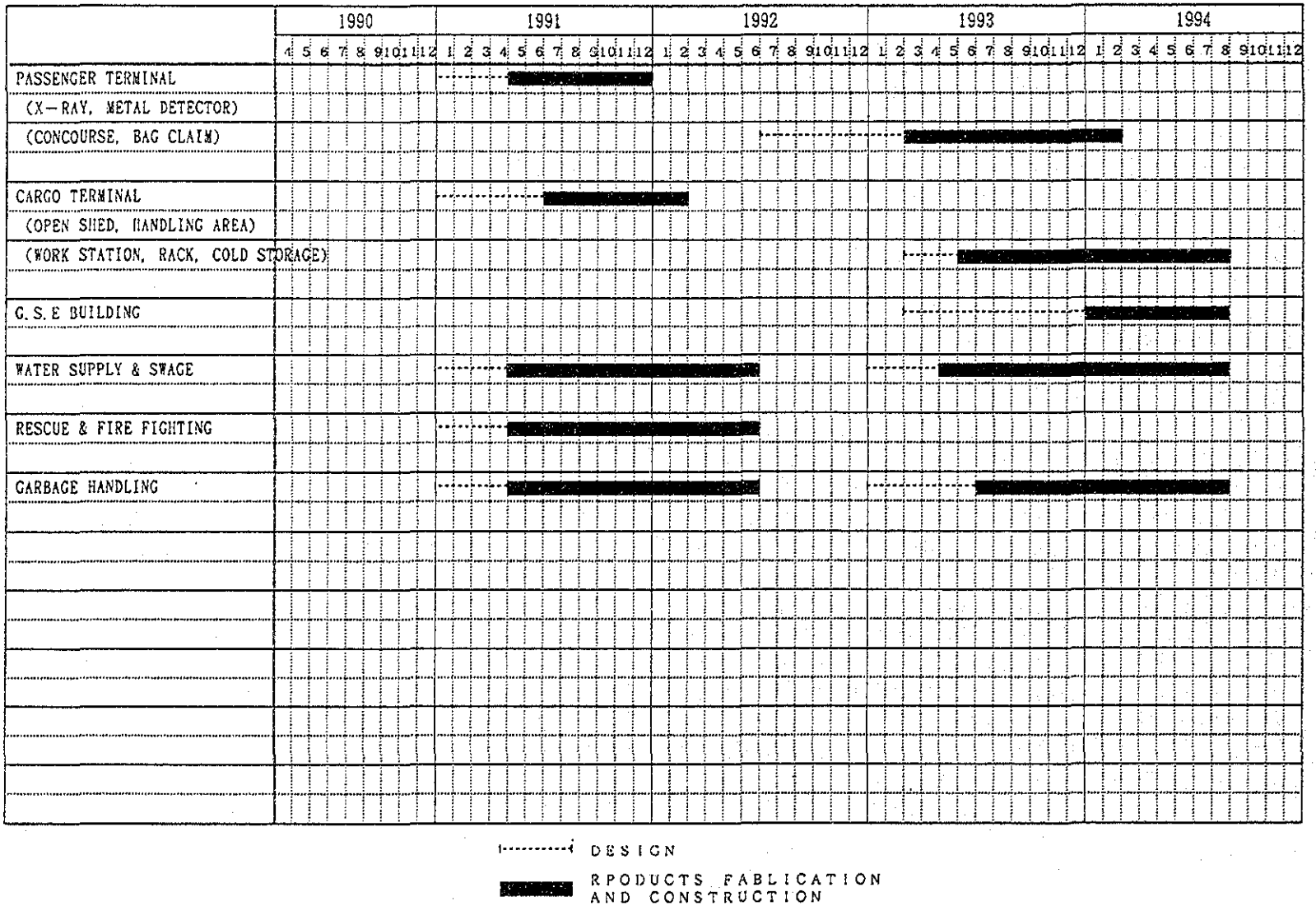
(2) Terminal Area Facilities

Construction schedule has been prepared so formulated as to avoid interrupting flow of passengers, baggage, cargo and ground handling vehicles. As well as due consideration with following points:

- install X-Ray and Metal detector as early as possible to threat of hi-jacking and terrorism
- maintain actual handling systems and capacity of the facilities
- minimize construction cost as practicable
- provide sufficient time for manufacturing and transportation of equipment and instruments to be imported

Construction schedule of terminal area facilities is shown in Fig. 8-10.

Fig. 8-10 CONSTRUCTION SCHEDULE OF TERMINAL AREA FACILITIES



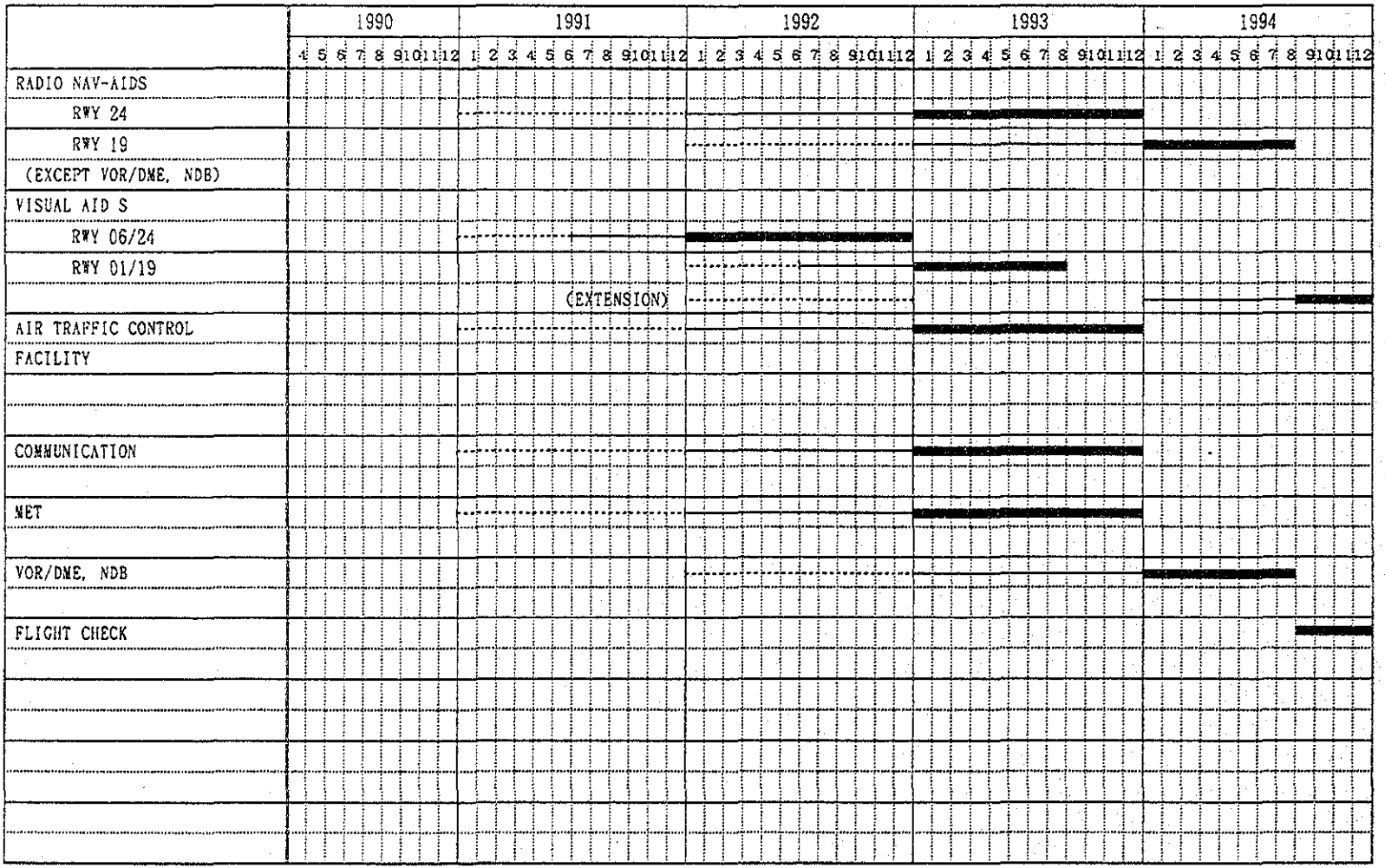
(3) Air Navigation Facilities

Construction schedule for the air navigation facilities has been developed, taking into consideration the periods required for products fabrication, transportation, and flight check.

A part of construction works related with runway, taxi-way and apron inprovement are to be executed simultaneously with these works.

Construction schedule of air navigation facilities is shown in Fig. 8-11.

Fig. 8-11 CONSTRUCTION SCHEDULE OF AIR NAVIGATION FACILITIES



8-3. COST ESTIMATE

Construction cost for Short-term development has been estimated for three different grades, and taking into consideration results of economic and financial analysis.

Grade 1: This plan covers the projected size and volume of facilities in full required by D.G.I.A. (See Finalized facility requirements in Chapter 5)
Grade 2: This plan excludes RWY01/19 extension and upgrading to ILS CAT-1 runway.
Grade-3: This plan represents the minimum projected size and volume of facilities to enable Carrasco airport to operate as the only international airport in Uruguay.

The present cost estimate is based on the following conditions:

(1) Unit prices used in the cost estimate are based on the data collected by the JICA Study Team in First and Second field surveys in 1989;

(2) Foreign portion of the construction cost includes following items:

a) Purchase cost of construction equipment,
b) Cost of imported materials and equipment such as bitumen, steel products, terminal, utility and air navigation equipment, etc.,
c) Foreign remittance portion of overhead and profit of the foreign contractor,
d) Wage of foreign labour, and
e) Fuel and lubricant cost of the construction machinery.

(3) Local portion of the construction cost includes the following items:

a) Operation cost of the construction equipment other than fuel and lubricant,
b) Construction materials procured in Uruguay such as cement, aggregate and wooden material, etc.,
c) Local portion of the foreign and local contractors' overhead cost and profits,
d) Wages of local labour.

(4) Engineering fee for detailed design, assistance in tendering and construction supervision is estimated at 5% of the construction cost.

(5) Physical contingency for variance in quantity of construction is estimated at 10% of the sum of the total cost.

(6) Conversion between US dollar and Pesos is based on the exchange rates as of April 1989 of US$1.00 = Peso 500 respectively.

Table 8-1 Summary of Construction Cost (Grade-I)

(thousand US$)

Project	Construction(US$)			1991		1992		1993		1994	
	Foreing Portion	Local Portion	Grand Total	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion
Grade-I											
A. AIRFIELD FACILITIES	5,570	28,110	33,680	1,550	6,980	2,490	10,750	1,290	6,540	240	3,840
B. TERMINAL AREA FACILITIES	1,887	2,182	4,069	551	197	470	418	718	381	148	1,186
C. AIR NAVIGATION FACILITIES	17,433	2,596	20,029	4,973	746	8,108	1,018	2,808	88	1,544	744
TOTAL	24,890	32,888	57,778	7,074	7,923	11,068	12,186	4,816	7,009	1,932	5,770
ENGINEERING	1,245	1,645	2,890	354	396	553	609	241	351	97	289
CONTINGENCY	2,614	3,453	6,067	743	832	1,162	1,279	506	736	203	606
GRAND TOTAL	28,749	37,986	66,735	8,171	9,151	12,783	14,074	5,563	8,096	2,232	6,665

Table 8-2 Summary of Construction Cost (Grade-II)

(thousand US$)

Project	Construction(US$)			1991		1992		1993		1994	
	Foreing Portion	Local Portion	Grand Total	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion
Grade-II											
A. AIRFIELD FACILITIES	5,330	23,820	29,150	1,550	6,980	2,490	10,750	1,290	6,090	---	---
B. TERMINAL AREA FACILITIES	1,887	2,182	4,069	551	197	470	418	718	381	148	1,186
C. AIR NAVIGATION FACILITIES	15,349	2,252	17,601	4,973	746	8,108	1,018	2,058	88	210	400
TOTAL	22,566	28,254	50,820	7,074	7,923	11,068	12,186	4,066	6,559	358	1,586
ENGINEERING	1,128	1,412	2,540	354	396	553	609	203	328	18	79
CONTINGENCY	2,370	2,967	5,337	743	832	1,162	1,279	427	689	38	167
GRAND TOTAL	26,064	32,633	58,697	8,171	9,151	12,783	14,074	4,696	7,576	414	1,832

Table 8-3 Summary of Construction Cost (Grade-III)

(thousand US$)

Project	Construction(US$)			1991		1992		1993		1994	
	Foreing Portion	Local Portion	Grand Total	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion	Foreign Portion	Local Portion
Grade-III											
A. AIRFIELD FACILITIES	4,390	20,990	25,380	1,410	6,560	2,490	10,750	490	3,680	---	---
B. TERMINAL AREA FACILITIES	1,887	2,182	4,069	551	197	470	418	718	381	148	1,186
C. AIR NAVIGATION FACILITIES	11,872	1,864	13,736	4,672	625	5,600	839	1,390	0	210	400
TOTAL	18,149	25,036	43,185	6,633	7,382	8,560	12,007	2,598	4,061	358	1,586
ENGINEERING	908	1,252	2,160	332	369	428	600	130	204	18	79
CONTINGENCY	1,907	2,629	4,536	697	776	899	1,260	273	426	38	167
GRAND TOTAL	20,964	28,917	49,881	7,662	8,527	9,887	13,867	3,001	4,691	414	1,832

CHAPTER 9

ECONOMIC ANALYSIS

9-1. Basic Concept

The purpose of the economic analysis in this Study is to make a comprehensive evaluation of the economic feasibility of the Carrasco International Airport Development Project, by means of cost-benefit analysis, from the viewpoint of the national economy of Uruguay. In line with the Scope of Work of the Study, the analysis is made only of the Short-term Development Plan.

9-1-1 Method of Evaluation

The economic evaluation is based on the Economic Internal Rate of Return (EIRR) of the Project, derived from the cost-benefit analysis. Cost-benefit analysis is usually made on the "With-and-without Principle", that is to say, by comparing the two cases where the project is and is not implemented. The EIRR is calculated on the basis of the cash flow of the economic costs and the tangible direct benefits of both the "With Case" and the "Without Case", by using the discounted cash flow method. In such an analysis, whatever positive values, identified on a comparative basis as being saved or gained on account of the implementation of the Project, are defined as the benefits of the Project. On the other hand, any negative values, accruing from the implementation of the Project, are defined as the costs of the Project.

This evaluation deals only with the Short-term Development Plan of the Project, based on the social discount rate of the country.

(1) Definition of Internal Rate of Return
The internal rate of return is defined as the discount rate satisfying the following equation:

$$\sum_{t=1}^{T} \frac{Bt - Ct}{(1 + r)^t} = 0$$

where, Bt = Benefit in the year t
Ct = Cost in the year t
T = Period of economic calculation
r = Discount rate

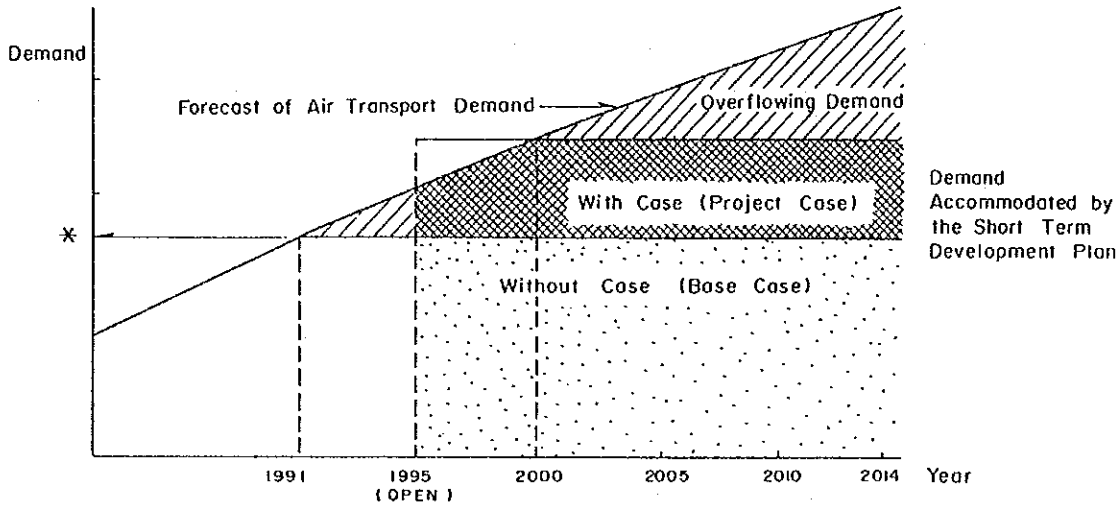
9-1-2 The With and Without Cases

In the present Study, the "Without Case" is defined as the Base Case in which the existing Carrasco International Airport is to continue operating at the present facility level without any new investment made therein, except in the renewal of equipment indispensable for the upkeep and normal operation of the Airport. The "With Case" is

defined as the Project Case in which the Airport is developed according to the Short-term Development plan.

In the Base Case, air traffic at the Carrasco International Airport is assumed to have reached the saturation point in 1991 (See Chapter 3), and to remain unchanged thereafter throughout the project life.

If the Short-term Development Plan is implemented, it can accommodate the forecast air transport demand up to the year 2000 over and above the 1991 saturation point in the Base Case.



* Physical Capacity Limit of Existing Carrasco International Airport

9-1-3 Period of Analysis

The project life is assumed to be 20 years, based on the useful life of the facilities to be introduced under the Short-term Development Plan. Accordingly, the analysis covers the construction period and the ensuing 20 years.

9-1-4 Shadow Pricing

In this economic analysis, economic feasibility of the Project is studied by using the shadow prices calculated on the basis of the world prices (border prices).

All costs calculated as above are based on the market prices, either world or domestic, but all benefits and costs are calculated by the world prices. Therefore, the domestic market prices are converted to the shadow prices.

The method of estimating shadow prices is as follows:

(1) Generally, all benefits and costs are divided into labour, traded goods and non-traded goods.
Further, labour is divided into skilled and unskilled labour. The labour cost is calculated by multiplying its market price by a ratio of the Shadow Wage Rate (SWR) and the Standard Conversion Factor (SCF), both defined later.
Traded goods are expressed by CIF value for import.
Prices for non-traded goods are derived by multiplying appropriate conversion factors.

(2) In this analysis, the local portion of the construction costs is divided into labour and goods. The shadow price for labour is calculated by the same method as for the above item (1) and that for goods is obtained by multiplying their market price by SCF.

(3) Standard Conversion Factor (SCF)
Standard conversion factor (SCF) is calculated by the following formula based on the Import and Export and Customs Statistics.

$$SCF = \frac{I + E}{I + Di + E - De}$$

where I = Total amount of import
E = Total amount of export
Di = Total amount of import duties
De = Total amount of export duties

The standard conversion factor for 1988 is about 0.727 in Uruguay.

(4) Shadow Wage Rate

Skilled and unskilled labour to be engaged in the construction of the Project are supposed to be workers from the provinces in the vicinity of Montevideo. Shadow Wage Rate is estimated by Oficina de Planeamiento.

The Shadow Wage Rates for labour in Uruguay are as follows:

Shadow Wage Rate for unskilled labour = 0.566
shadow Wage Rate for skilled labour = 0.727

9-2. Estimate of Economic Costs

9-2-1 Investment Costs

In cost-benefit analysis, indirect taxes and customs duties are usually regarded as transfers to the Government, from the national economic point of view.

The construction costs estimated in Chapter 8 are based on the market prices, but indirect taxes and customs duties are deducted.

Annual economic costs (Grade-3) of the investment for the Project are shown in Table 9-1.

Table 9-1 Annual Economic Costs of Investment

(In US$ thousand at 1989 value)

Year	Foreign Portion	Local Portion	Total
1991	6,965	5,382	12,347
1992	8,988	8,719	17,707
1993	2,728	2,966	5,694
1994	376	969	1,345
Total	19,057	18,036	37,093

9-2-2 Maintenance and Operation Costs

Annual economic costs of maintenance and operation for the Project are estimated for the assumed project life of 20 years in the following manner:

(1) Maintenance cost of Newly Introduced Facilities are estimated at 3.3% of the investment costs.

(2) Operation Cost

In the Project Case, the wages are assumed to increase in proportion to the number of employees estimated in Chapter 7, with the wage rate remaining unchanged at an average per employee of US$3,572 in 1989.

The three years average record (1986 - 1988) of the maintenance and operation costs of the existing DGIA facilities at the Carrasco International Airport is summarized in Table 9-2.

Table 9-2 Maintenance and Operation Cost of Existing Facilities at Carrasco International Airport

(In US$ at 1988 value)

Salaries (wages)	2,108,660
General Expenses	116,874
Maintenance (P.I.P.)	1,808,403
TOTAL EXPENSES	4,033,937

In the Base Case, the cost of both maintenance and operation of the airport facilities are assumed to remain unchanged throughout the project life. In the Project Case, the general expenses are assumed to increase in proportion to the number of passengers estimated in Chapter 7, with the general expenses rate remaining unchanged at an average per thousand passenger of U.S.$183 for 1986 to 1988.

Table 9-3 shows the annual economic costs (shadow costs) of maintenance and operation in the Project Case(Grade-3).

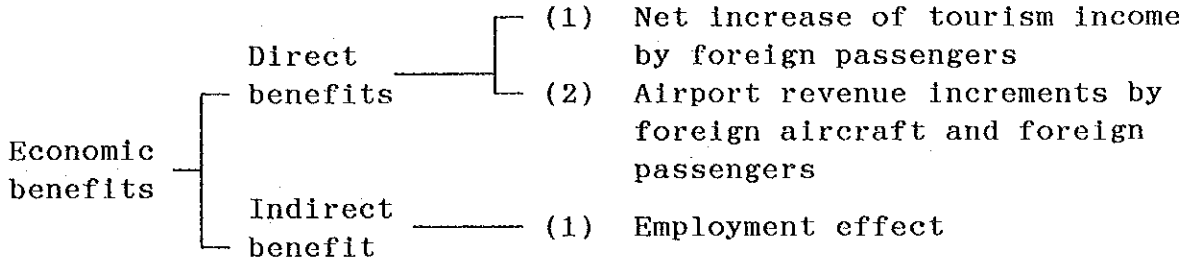
Table 9-3 Annual Economic Costs of Maintenance and Operation

(In US$ thousand at 1989 value)

	Item	1995	1996	1997	1998	1999	2000 - 2014
(1)	Maintenance	1,224	1,224	1,224	1,224	1,224	1,224
(2)	Operation						
	1) Wages	132	132	132	132	132	132
	2) General Expenses	6	12	18	24	31	36
(3)	Total	1,362	1,368	1,374	1,380	1,387	1,392

9-3. Estimate of Economic Benefits

The economic benefits considered derivable from the Short-term Development Plan from the point of view of the national economy of Uruguay are the direct benefits and the indirect benefits as shown in the following:



9-3-1 Net Increase of Tourism Income

As stated in Section 9-1-2, those overflowing international air passengers in the Base Case can be accommodated by the Airport if the project is implemented. The average expenditure of foreign tourist according to the Statistics of Turismo in Uruguay in 1988, is U.S.$246 per tourist.

Assuming the value-added income ratio of Uruguayan tourism industry to be at 50% (50% - 60% in Japan), calculation was made of the net increase in the Uruguayan tourism income to be generated by the increase in arriving non-resident air passengers. The results are shown in Table 9-4.

9-3-2 Airport Revenue Increments

As discussed in Section 9-1-2, the future aircraft movements are expected to overflow after 1991, when the Airport's capacity would reach the saturation point.

Assuming that 58% of all aircraft movements will continue to be foreign airlines as they are today, the incremental airport revenues that would be paid by foreign airlines if the Project is implemented are considered to be the economic benefits of the Project in terms of foreign exchange earnings, along with the expected increase in international passenger service charges.

The incremental airport revenues are estimated on the basis of Uruguayan Regulations for the Application of Tariffs for the Air NAV, Landing, Parking, Airport Tax (Passenger Service) and Cargo Terminal Service. On the basis of the current airport charges at Carrasco International Airport estimation is made on incremental airport revenues accruing from the foreign passengers and foreign aircraft movements to be accommodated by the Project. The results are shown in Table 9-5.

Table. 9-4 Incremental Net Tourism Income

(In US$ thousand at 1989)

Year	1) Regional	Other South America	North America	Europe	Others	(A)Gross Tourism Income	Net Addition to GNP 2) (A)×50%
1995	8,364	246	246	492	2,214	11,562	5,781
1996	10,332	492	246	738	2,706	14,514	7,257
1997	12,300	738	492	984	3,198	17,712	8,856
1998	14,268	984	492	1,230	3,690	20,664	10,332
1999	16,236	1,230	492	1,230	4,428	23,616	11,808
2000	18,204	1,722	738	1,476	4,920	27,060	13,530
2001	18,204	1,722	738	1,476	4,920	27,060	13,530
2002	18,204	1,722	738	1,476	4,920	27,060	13,530
2003	18,204	1,722	738	1,476	4,920	27,060	13,530
2004	18,204	1,722	738	1,476	4,920	27,060	13,530
2005	18,204	1,722	738	1,476	4,920	27,060	13,530
2006	18,204	1,722	738	1,476	4,920	27,060	13,530
2007	18,204	1,722	738	1,476	4,920	27,060	13,530
2008	18,204	1,722	738	1,476	4,920	27,060	13,530
2009	18,204	1,722	738	1,476	4,920	27,060	13,530
2010	18,204	1,722	738	1,476	4,920	27,060	13,530
2011	18,204	1,722	738	1,476	4,920	27,060	13,530
2012	18,204	1,722	738	1,476	4,920	27,060	13,530
2013	18,204	1,722	738	1,476	4,920	27,060	13,530
2014	18,204	1,722	738	1,476	4,920	27,060	13,530
Total	334,560	29,520	13,038	26,814	90,036	493,968	246,984

1) Argentina, Paraguay, Brazil

2) The Value-added income ratio

Table. 9 – 5 Incremental Airport Operating Revenues

(In US$ thousand at 1989)

Year	Air NAV Charge	Landing Charge	Parking Charge	Airport Tax	Cargo Service Charge	Total Revenues
1995	236	318	8	458	480	1,500
1996	299	387	10	507	563	1,766
1997	364	456	12	556	646	2,034
1998	431	525	14	605	729	2,304
1999	499	594	16	654	812	2,575
2000	568	661	17	702	897	2,845
2001	568	661	17	702	897	2,845
2002	568	661	17	702	897	2,845
2003	568	661	17	702	897	2,845
2004	568	661	17	702	897	2,845
2005	568	661	17	702	897	2,845
2006	568	661	17	702	897	2,845
2007	568	661	17	702	897	2,845
2008	568	661	17	702	897	2,845
2009	568	661	17	702	897	2,845
2010	568	661	17	702	897	2,845
2011	568	661	17	702	897	2,845
2012	568	661	17	702	897	2,845
2013	568	661	17	702	897	2,845
2014	568	661	17	702	897	2,845
Total	10,349	12,195	315	13,310	16,685	52,854

9-3-3 Employment Effect

The Carrasco International Airport Development Project is expected to contribute to the national income of Uruguay by providing increased employment opportunities, both during and after the construction of the facilities. These benefits are quantifiable, but have been treated as indirect benefits according to the general practice. Consequently, they are not included in the present study.

9-4. Economic Evaluation

9-4-1 Results of Economic Cost-Benefit Analysis

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

The economic internal rate of return (EIRR) is 19.9% for the Project (Grade-3) in Table 9-6. This figure indicates that the Project is economically feasible from the viewpoint of the Uruguayan national economy, in which the Opportunity cost of capital is understood to be 12% (estimated by Oficina de Planeamiento).

In case of the Grade-1 and Grade-2, the economic internal rate of return are 16.1% and 17.5% respectively, in the same manner economically feasible.

9-4-2 Sensitivity Analysis

Sensitivity analysis for the Grade-3 is made of the EIRR value for certain fluctuations in key factors of the economic costs and the direct tangible economic benefits. The results are shown below.

Assumed Fluctuation	EIRR
1) 10% decrease in demand	18.3%
2) 10% increase in demand	21.4%
3) 10% increase in costs	18.5%
4) 10% decrease in costs	21.5%
5) 10% decrease in demand and 10% increase in costs	17.1%
6) 15% decrease in demand	17.5%

Table 9-6 CASH FLOW OF ECONOMIC COST AND BENEFITS

(In US$ thousand at 1989)

YEAR	Economic Cost of The Project (A)		Economic Cost of Base Case (B)		Incre-Mental Cost (C=A-B)	Economic Benefits			Net Benefits (E = D-C)
	Invest Cost	Mainte Operat Cost	Invest Cost	Mainte Operat Cost		Net Addition to GNP of Incremental T-Income	Incremental Airport Revenue	Total Benefits (D)	
1991	12,347	2,956	0	2,956	12,347	0	0	0	-12,347
1992	17,707	2,956	0	2,956	17,707	0	0	0	-17,707
1993	5,694	2,956	0	2,956	5,694	0	0	0	-5,694
1994	1,345	2,956	0	2,956	1,345	0	0	0	-1,345
1995	0	4,318	0	2,956	1,362	5,781	1,500	7,281	5,919
1996	0	4,324	0	2,956	1,368	7,257	1,766	9,023	7,655
1997	0	4,330	0	2,956	1,374	8,856	2,034	10,890	9,516
1998	0	4,336	0	2,956	1,380	10,332	2,304	12,636	11,256
1999	0	4,343	0	2,956	1,387	11,808	2,575	14,383	12,996
2000	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2001	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2002	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2003	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2004	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2005	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2006	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2007	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2008	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2009	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2010	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2011	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2012	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2013	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
2014	0	4,348	0	2,956	1,392	13,530	2,845	16,375	14,983
TOTAL	37,093	98,695	0	70,944	64,844	246,984	52,854	299,838	234,994

EIRR = 0.1988777

CHAPTER 10

FINANCIAL ANALYSIS

10-1. General

The purpose of this financial analysis is to examine the financial feasibility of the Carrasco International Airport Development Project based on the assumption that the airport would be administered on a self-supporting accounting principle.

The evaluation is made in terms of the financial internal rate of return (FIRR), which is derived from the financial cost-benefit analysis, by using the cash flow of the financial costs and the financial benefits, and by comparing the Project with the Base Case as defined in Chapter 9.

10-2. Estimate of Financial Costs

10-2-1 Investment Cost

The construction costs estimated in Chapter 8 are based on the market prices, and are, therefore, used as the financial costs of the investment in the Project. The financial cost (Grade-3) of the Project Case is estimated as shown in Table 10-1.

Table 10-1 Annual Financial Costs of Investment

(In US$ thousand at 1989 value)

Year	Foreign Portion	Local Portion	Total
1991	7,662	8,527	16,189
1992	9,887	13,867	23,754
1993	3,001	4,691	7,692
1994	414	1,832	2,246
Total	20,964	28,917	49,881

10-2-2 Maintenance and Operation Costs

Estimates are made of the annual financial costs(Grade-3) of maintenance and operation of the airport in the Project Case for the assumed project life of 20 years, in the same manner as described in Chapter 9 of the preceding chapter. The results are shown in Table 10-2.

Table 10-2 Annual Financial Costs of Maintenance and Operation

(In US$ thousand at 1989 value)

	Item	1995	1996	1997	1998	1999	2000 - 2014
(1)	Maintenance	1,646	1,646	1,646	1,646	1,646	1,646
(2)	Operation						
	1) Wages	250	250	250	250	250	250
	2) General Expenses	8	17	25	33	42	50
(3)	Total	1,904	1,913	1,921	1,929	1,938	1,946

10-3. Estimate of Financial Benefits

Financial benefits of the Project are the airport revenue increments based on the present airport tariff.

10-3-1 Airport Tariff Revenue

The airport tariff revenues are based on the five charge items of Air NAV, Landing, Parking, Cargo Terminal Service and Passenger service, based on the current airport tariff structure of Uruguay. The tariff revenue increments are estimated for the Project case in comparison with the Base Case, not only from foreign users as described in Section 9-3-2, but from domestic users of the airport.

(1) Landing Charges

Basis: Maximum take-off weight

A. International flights and domestic flights by aircraft registered abroad:

Aircraft Type	Charge (U.S.$)
(Foreign)	
B747	394.00
DC10	394.00
B707	289.00
B767	289.00
B727	289.00
B737	205.00
(Uruguayan)	
B737	24.11
B707	40.16

B. Domestic flights by aircraft registered in Uruguay:

Aircraft Type	Charge (U.S.$)
F27	12.33
CS12	8.05
C95	8.05

(2) Airport Tax (Passenger Service Charges)

Payable by the passenger.

U.S.$3.50 per passenger for international boarding service.

(3) Parking Charges

First 3 hours and first hour respectively, free.

On apron:

5% of the applicable daytime landing charge per hour or fraction thereof.

Off the apron:

2.5% of the applicable daytime landing charge per hour or fraction thereof.

(4) Cargo Terminal Service Charge

Calculation of Cargo Service Charge is presented hereunder.

U.S.$180/Ton

(5) Air Navigation Facility Charge

Basis: Maximum take-off weight.

Aircraft weight (tonnes)	Charge (US$)
Up to 10	64.00
over 10 to 70	170.00
over 70	250.00

Table 10-3 shows the annual airport tariff revenue increments estimated on the above conditions for the assumed project life of 20 years.

Table 10-3 Incremental Airport Tariff Revenue

(In U.S.$ thousand at 1989)

Year	Air NAV Charge	Landing Charge	Parking Charge	Airport Tax	Cargo Service Charge	Total Benefits (D)
1995	236	344	14	832	960	2,386
1996	299	415	17	921	1,127	2,779
1997	364	486	20	1,010	1,294	3,174
1998	431	557	23	1,099	1,461	3,571
1999	499	628	26	1,188	1,628	3,969
2000	568	697	30	1,276	1,795	4,366
2001	568	697	30	1,276	1,795	4,366
2002	568	697	30	1,276	1,795	4,366
2003	568	697	30	1,276	1,795	4,366
2004	568	697	30	1,276	1,795	4,366
2005	568	697	30	1,276	1,795	4,366
2006	568	697	30	1,276	1,795	4,366
2007	568	697	30	1,276	1,795	4,366
2008	568	697	30	1,276	1,795	4,366
2009	568	697	30	1,276	1,795	4,366
2010	568	697	30	1,276	1,795	4,366
2011	568	697	30	1,276	1,795	4,366
2012	568	697	30	1,276	1,795	4,366
2013	568	697	30	1,276	1,795	4,366
2014	568	697	30	1,276	1,795	4,366
TOTAL	10,349	12,885	550	24,190	33,395	81,369

10-4. Financial Evaluation

10-4-1 Results 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, by comparing the Project with the Base Case, in the same manner as in the economic analysis.

The financial internal rate of return (FIRR) for the Project is minus under the current airport tariff structure.

To obtain a higher FIRR value it is necessary either to reduce the financial costs, especially the initial construction cost, or to increase the airport revenues. It would be impractical to expect any reduction in the construction cost. On the other hand, in order to increase the revenue, airport tariffs should be raised beyond the current level.

The level of the current airport tariff of Carrasco Airport is very low compared with the neighbouring countries (See Table 10-4).

If the tariff was raised to 100% of the current level, the FIRR for the Project (Grade-3) would yield 7.7% as shown in Table 10-5. (In case of the Grade-1 and Grade-2, the FIRR for the Project would yield 4.3% and 5.7% respectively.)

It is therefore concluded that the Project is financially feasible under the new airport tariff (raising of the tariff level by 100%), on the basis of the loan interest rate (under 4.4%), because the weighted average depreciation rate for the Project is 3.3%.

Raising of the tariff level will require careful deliberation as to its rate and timing so as not to cause reduction in the airport revenue by discouraging foreign airlines from serving the Carrasco airport.

10-4-2 Sensitivity Analysis

Sensitivity analysis for the Grade-3 is made of the FIRR value for certain fluctuations in key factors of the financial costs and benefits. The results are shown below.

	Assumed Fluctuation	FIRR
1)	10% decrease in revenue	6.3%
2)	10% increase in revenue	8.9%
3)	10% increase in costs	6.5%
4)	10% decrease in costs	9.0%
5)	10% decrease in demand and 10% increase in Cost	5.1%
6)	15% decrease in revenue	5.6%

Table 10-4 Comparison of Representative Charges

Country	(A) Landing Charges (US$)			(B) Airport Tax (US$)	(C) Air Navigation Facility Charge (US$)			Ratio (2 - 6)/1		
	DC-9	B707	B747	(Passenger Service charges)	AW (tonnes) up to 10	over 10 to 70	over 70	(A) B747	(B)	(C) 10 to 70
1 Uruguay	205	289	394	3.5	64.0	170.0	250.0			
2 Argentina	198	805	1,938	5.0				4.9	1.4	
3 Bolivia	479	1,888	4,212	15.0				10.7	4.3	
4 Brazil	186	617	1,338	8.8	up to 12 99.8	up to 100 748.8	over 100 1,497.6	3.4	2.5	4.4
5 Chile	119	672	1,457	12.5				3.7	3.6	
6 Paraguay	134	407	864	5.0	up to 12 200.0	up to 100 600.0	over 100 720.0	2.2	1.4	3.5

Source: "Manual of Airport and Air Navigation FAcility Tariffs" 1986 Edition, ICAO.

Table 10-5 Cash Flow of Financial Cost and Benefits

(In US$ thousand at 1989)

YEAR	Financial Cost of The Project (A)		Financial Cost of Base Case (B)		Incre-Mental Cost	Benefits (New Tariff: 100% up)						Net Finance Benefits
	Invest Cost	Mainte Operat Cost	Invest Cost	Mainte Operat Cost	(C=A-B)	Air NAV Charge	Landing Charge	Parking Charge	Airport Tax	Cargo Service Charge	Total Benefits (D)	(D-C)
1991	16,189	4,066	0	4,066	16,189	0	0	0	0	0	0	-16,189
1992	23,754	4,066	0	4,066	23,754	0	0	0	0	0	0	-23,754
1993	7,692	4,066	0	4,066	7,692	0	0	0	0	0	0	-7,692
1994	2,246	4,066	0	4,066	2,246	0	0	0	0	0	0	-2,246
1995	0	5,970	0	4,066	1,904	472	688	28	1,664	1,920	4,772	2,868
1996	0	5,979	0	4,066	1,913	598	830	34	1,842	2,254	5,558	3,645
1997	0	5,987	0	4,066	1,921	728	972	40	2,020	2,588	6,348	4,427
1998	0	5,995	0	4,066	1,929	862	1,114	46	2,198	2,922	7,142	5,213
1999	0	6,004	0	4,066	1,938	998	1,256	52	2,376	3,256	7,938	6,000
2000	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2001	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2002	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2003	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2004	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2005	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2006	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2007	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2008	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2009	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2010	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2011	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2012	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2013	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
2014	0	6,012	0	4,066	1,946	1,136	1,394	60	2,552	3,590	8,732	6,786
TOTAL	49,881	136,379	0	97,584	88,676	20,698	25,770	1,100	48,380	66,790	162,738	74,062

FIRR = 0.0768145

CHAPTER 11

PROJECT IMPLEMENTATION PROGRAMME

11-1. Airport Administration Organization

Airport administration is under the jurisdiction of the Direccion Nacional Aviacion Civil & Infraestructura Aeronautica (DINACIA) in charge of the airport.

Commercial airports including the Carrasco International Airport are managed and operated by DGIA (Direccion General de Infraestructura Aeronautica).

11-2. Project Implementation Organization

In order to ensure efficient implementation of the Carrasco International Airport Development Project, it is recommended that a special team exclusively in charge of the project implementation be established within DGIA.

It is also recommended that DGIA conclude either a single or separate contract(s) with some consultants suitably qualified and experienced in airport engineering for the design and supervision of construction.

Fig. 11-1 shows the outline of the recommended organization of the Project Implementation Office. Outlined below are the major tasks to be carried out either directly by the Project Implementation Office or through the consultants under appropriate consulting contract.

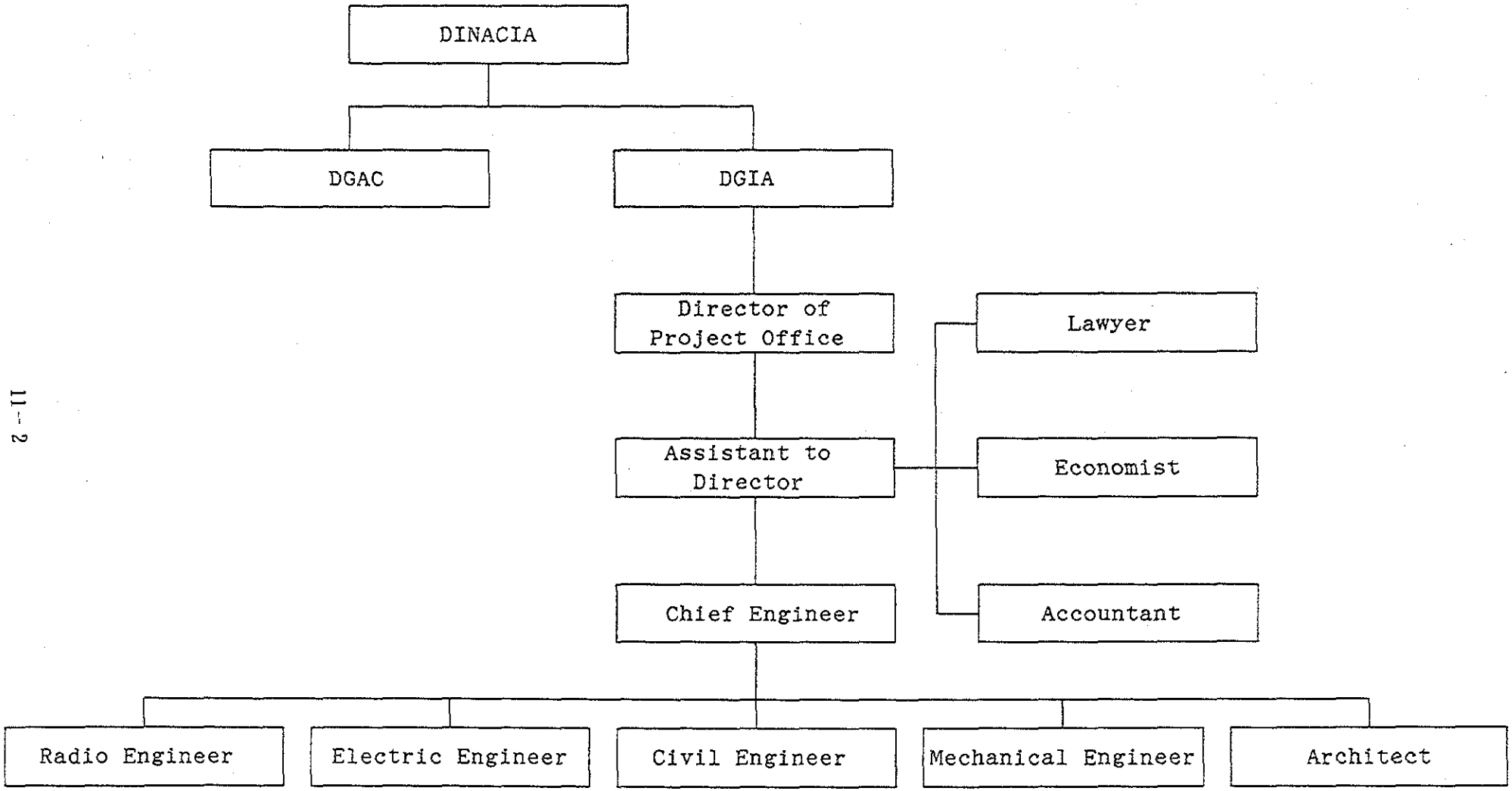


Fig. 11-1 Proposed Project Implementation Organization

(1) Preparations for Design Tender

The first thing to be done at this stage is to prepare the "Terms of Reference" for the design, describing the background and scope of works of the Project. To optimize the project management in terms of cost, schedule and quality control, it is desirable for the Project Implementation Office to conduct the necessary land survey and geological exploration at this stage, and supply the information obtained to the consultants.

(2) Selection of Consultants

When the design tenders are received, the Project Implementation Office should evaluate them negotiate with the top-ranking consultants and enter into contracts with the consultants of its choice. It is recommended to include in the scope of consultancy services not only design and cost estimate of the Project but also tender assistance services including preparation of tender documents, evaluation of tenders and assistance in contract negotiation.

(3) Design

For the sake of satisfactory and on-schedule implementation of the project, the Project Implementation Office should be required to comment on and approve the consultant's works at successive design stages.

(4) Selection of Contractor

The Project Implementation Office should with the assistance of consultants, invite construction tenders, evaluate them, negotiate with top-ranking tenderer(s) and conclude a construction contract.

(5) Construction Supervision

By the time the construction contract is concluded, a contract for the construction supervision should be concluded preferably with the consultants who prepared the design.

11-3. Financing Plan for the Project

11-3-1 General

The objective of this section is to produce a forecast of the cash flow during the period 1991 - 2014 for the implementation of the Project (Grade-3), based on the assumed conditions of the necessary financing.

11-3-2 Assumptions

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

(1) Conditions of Funds

The conditions of funds available are assumed as shown in Table 11-1.

Table 11-1 Conditions of Funds Available

Portion	Type of Funds	Interest Rate	Grace Period	Repaymment Period
Foreign	Soft Loan	4.0%	7 years	25 years
	Hard Loan	8.0%	4 years	15 years
Local	Domestic Bank	2.0%	7 years	25 years
	Government Finance	0.0%	---	---

(2) Case of Forecasting

Forecast of the cash flow is made for the three cases as shown in Table 11-2.

Table 11-2 Case of Cash-flow Forecast

Case	Portion	Type of Funds	Ratio (%)
Case 1	Foreign	Soft Loan	100
		Hard Loan	-
	Local	Domestic Bank	-
		Government Finance	100
Case 2	Foreign	Soft Loan	-
		Hard Loan	100
	Local	Domestic Bank	-
		Government Finance	100
Case 3	Foreign	Soft Loan	50
		Hard Loan	50
	Local	Domestic Bank	-
		Government Finance	100
Case 4	Foreign	Soft Loan	100
		Hard Loan	-
	Local	Domestic Bank	100
		Government Finance	-
Case 5	Foreign	Soft Loan	-
		Hard Loan	100
	Local	Domestic Bank	100
		Government Finance	-
Case 6	Foreign	Soft Loan	50
		Hard Loan	50
	Local	Domestic Bank	100
		Government Finance	-

11-3-3 Results of Forecast

Based on the above assumptions, the results of forecast are obtained as shown in Table 11-3.

Table 11-3 Forecast of Cash Flow

Case	Turning Point for Surplus	
	Annual Surplus	Cumulative Cash Surplus
1	Year 1995	Year 1998
2	Year 1999	Year 2004
3	Year 1997	Year 2001
4	Year 1996	Year 2004
5	Year 2003	Year 2012
6	Year 2000	Year 2010

Case 1 is shown in Table 11-4 (1), (2), (3).
Case 2 is shown in Table 11-5 (1), (2), (3).
Case 3 is shown in Table 11-6 (1), (2), (3).
Case 4 is shown in Table 11-7 (1), (2), (3).
Case 5 is shown in Table 11-8 (1), (2), (3).
Case 6 is shown in Table 11-9 (1), (2), (3).

It is concluded, therefore, that the Project could be financed by a hard loan of the foreign portion, if the local portion would be financed by the Uruguayan Government without any repayment.

Table.11-4-(1) CASH FLOW STATEMENT (Case 1)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,729	376	0	0	0	0
	LOCAL	7,751	12,607	4,265	1,565	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,867	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	306	702	822	939	839	839	839	822
	Repayment	0	0	0	0	0	0	0	426
	Sub total	306	702	822	939	839	939	839	1,247
Hard Loan	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Domestic Bank	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Total	Interest	306	702	822	839	839	839	839	822
	Repayment	0	0	0	0	0	0	0	426
	Subtotal	306	702	822	839	839	839	839	1,247
* Total Fund Required *		16,495	24,456	8,514	3,085	839	839	839	1,247
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,558	6,348	7,142
Operating Expenses		0	0	0	0	3,385	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing :Soft Loan		7,662	9,887	3,001	414	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0	0
:Sub total		7,662	9,887	3,001	414	0	0	0	0
Government Finance		8,527	13,867	4,691	1,832	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,306	-,702	-,822	-,839	71	770	1,473	1,771
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,306	-1,008	-1,830	-2,669	-2,598	-1,828	-,355	1,416

Table.11-4-(2) CASH FLOW STATEMENT (Case 1)

(In US$ thousand at 1989)

		1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	783	737	690	644	597	551	504	457	411
	Repayment	975	1,142	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Sub total	1,757	1,879	1,855	1,808	1,762	1,715	1,669	1,622	1,575
Hard Loan	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Domestic Bank	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	Interest	783	737	690	644	597	551	504	457	411
	Repayment	975	1,142	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Subtotal	1,757	1,879	1,855	1,808	1,762	1,715	1,669	1,622	1,575
* Total Fund Required *		1,757	1,879	1,855	1,808	1,762	1,715	1,669	1,622	1,575
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		1,968	2,553	2,577	2,623	2,670	2,717	2,763	2,810	2,856
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative P&L		3,384	5,937	8,514	11,137	13,807	16,524	19,287	22,097	24,953

Table.11-4-(3) CASH FLOW STATEMENT (Case 1)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	364	318	271	224	178	131	85
	Repayment	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Sub total	1,529	1,482	1,436	1,389	1,342	1,296	1,249
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Domestic Bank	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	Interest	364	318	271	224	178	131	85
	Repayment	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Subtotal	1,529	1,482	1,436	1,389	1,342	1,296	1,249
* Total Fund Required *		1,529	1,482	1,436	1,389	1,342	1,296	1,249
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		2,903	2,950	2,996	3,043	3,089	3,136	3,182
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		27,856	30,806	33,802	36,845	39,934	43,070	46,252

Table. 11-5-(1) CASH FLOW STATEMENT (Case 2)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,728	376	0	0	0	0
	LOCAL	7,751	12,697	4,265	1,665	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,957	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Hard Loan	Interest	613	1,404	1,644	1,677	1,621	1,494	1,344	1,192
	Repayment	0	0	0	0	697	1,595	1,868	1,906
	Sub total	613	1,404	1,644	1,677	2,318	3,089	3,212	3,098
Domestic Bank	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Total	Interest	613	1,404	1,644	1,677	1,621	1,494	1,344	1,192
	Repayment	0	0	0	0	697	1,595	1,868	1,906
	Subtotal	613	1,404	1,644	1,677	2,318	3,089	3,212	3,098
* Total Fund Required *		16,802	25,158	9,336	3,923	2,318	3,089	3,212	3,098
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,558	6,348	7,142
Operating Expenses		0	0	0	0	3,385	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing	:Soft Loan	0	0	0	0	0	0	0	0
	:Hard Loan	7,662	9,887	3,001	414	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0	0
	:Sub total	7,662	9,887	3,001	414	0	0	0	0
Government Finance		8,527	13,867	4,691	1,832	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,613	-1,404	-1,644	-1,677	-1,408	-1,481	-,901	-80
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,613	-2,017	-3,661	-5,338	-6,746	-8,227	-9,128	-9,208

Table.11-5-(2) CASH FLOW STATEMENT (Case 2)

(In US$ thousand at 1989)

		1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Hard Loan	Interest	1,039	887	734	582	430	277	125	28	3
	Repayment	1,906	1,906	1,906	1,906	1,906	1,906	1,906	1,209	310
	Sub total	2,945	2,793	2,640	2,489	2,335	2,183	2,030	1,237	313
Domestic Bank	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	Interest	1,039	887	734	582	430	277	125	28	3
	Repayment	1,906	1,906	1,906	1,906	1,906	1,906	1,906	1,209	310
	Subtotal	2,945	2,793	2,640	2,488	2,335	2,183	2,030	1,237	313
* Total Fund Required *		2,945	2,793	2,640	2,488	2,335	2,183	2,030	1,237	313
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		780	1,639	1,792	1,944	2,096	2,249	2,401	3,195	4,118
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative P&L		-8,428	-6,789	-4,997	-3,053	-957	1,292	3,693	6,888	11,006

Table.11-5-(3) CASH FLOW STATEMENT (Case 2)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012 -	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	38	0	0	0	0	0	0
	Sub total	38	0	0	0	0	0	0
Domestic Bank	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	Interest	0	0	0	0	0	0	0
	Repayment	38	0	0	0	0	0	0
	Subtotal	38	0	0	0	0	0	0
* Total Fund Required *		38	0	0	0	0	0	0
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		4,394	4,432	4,432	4,432	4,432	4,432	4,432
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		15,400	19,832	24,264	28,696	33,128	37,560	41,992

Table. 11-6-(1) CASH FLOW STATEMENT (Case 3)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,728	376	0	0	0	0
	LOCAL	7,751	12,607	4,265	1,665	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,867	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	153	351	411	419	419	419	419	411
	Repayment	0	0	0	0	0	0	0	213
	Sub total	153	351	411	419	419	419	419	624
Hard Loan	Interest	306	702	822	839	811	747	672	596
	Repayment	0	0	0	0	348	798	934	953
	Sub total	306	702	822	839	1,159	1,545	1,606	1,549
Domestic Bank	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Total	Interest	460	1,053	1,233	1,258	1,230	1,166	1,091	1,007
	Repayment	0	0	0	0	348	798	934	1,166
	Subtotal	460	1,053	1,233	1,258	1,578	1,964	2,026	2,172
* Total Fund Required *		16,649	24,807	8,925	3,504	1,578	1,964	2,026	2,172
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,558	6,348	7,142
Operating Expenses		0	0	0	0	3,385	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing :Soft Loan		3,831	4,944	1,501	207	0	0	0	0
:Hard Loan		3,831	4,944	1,501	207	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0	0
:Sub total		7,662	9,887	3,001	414	0	0	0	0
Government Finance		8,527	13,867	4,691	1,832	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,460	-1,053	-1,233	-1,258	-,668	-,356	286	845
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,460	-1,513	-2,746	-4,004	-4,672	-5,028	-4,742	-3,897

Table.11-6-(2) CASH FLOW STATEMENT (Case 3)

(In US$ thousand at 1989)

		1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	391	368	345	322	299	275	252	229	205
	Repayment	487	571	582	582	582	582	582	582	582
	Sub total	879	939	927	904	881	858	834	811	788
Hard Loan	Interest	520	443	367	291	215	139	62	14	2
	Repayment	953	953	953	953	953	953	953	605	155
	Sub total	1,473	1,396	1,320	1,244	1,168	1,091	1,015	619	157
Domestic Bank	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	Interest	911	812	712	613	513	414	314	243	207
	Repayment	1,440	1,524	1,535	1,535	1,535	1,535	1,535	1,187	738
	Subtotal	2,351	2,336	2,248	2,148	2,049	1,949	1,850	1,430	944
* Total Fund Required *		2,351	2,336	2,248	2,148	2,049	1,949	1,850	1,430	944
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
* Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		1,374	2,096	2,184	2,284	2,383	2,483	2,582	3,002	3,487
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative P&L		-2,523	-,427	1,757	4,041	6,424	8,907	11,489	14,491	17,978

Table.11-6-(3) CASH FLOW STATEMENT (Case 3)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	182	159	136	112	89	66	42
	Repayment	582	582	582	582	582	582	582
	Sub total	764	741	718	695	671	648	625
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	19	0	0	0	0	0	0
	Sub total	19	0	0	0	0	0	0
Domestic Bank	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	Interest	182	159	136	112	89	66	42
	Repayment	601	582	582	582	582	582	582
	Subtotal	783	741	718	695	671	648	625
* Total Fund Required *		783	741	718	695	671	648	625
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		3,649	3,691	3,714	3,737	3,761	3,784	3,807
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		21,627	25,318	29,032	32,769	36,530	40,314	44,121

Table. 11-7-(1) CASH FLOW STATEMENT (Case 4)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,728	376	0	0	0	0
	LOCAL	7,751	12,607	4,265	1,665	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,867	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	306	702	822	839	839	839	839	822
	Repayment	0	0	0	0	0	0	0	426
	Sub total	306	702	822	839	839	839	839	1,247
Hard Loan	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Domestic Bank	Interest	171	448	542	578	578	578	578	569
	Repayment	0	0	0	0	0	0	0	474
	Sub total	171	448	542	578	578	578	578	1,043
Total	Interest	477	1,150	1,364	1,417	1,417	1,417	1,417	1,390
	Repayment	0	0	0	0	0	0	0	899
	Subtotal	477	1,150	1,364	1,417	1,417	1,417	1,417	2,290
* Total Fund Required *		16,666	24,904	9,056	3,663	1,417	1,417	1,417	2,290
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,558	6,348	7,142
Operating Expenses		0	0	0	0	3,385	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing	:Soft Loan	7,662	9,887	3,001	414	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0	0
	:Domestic Bank	8,527	13,867	4,691	1,832	0	0	0	0
	:Sub total	16,189	23,754	7,692	2,246	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,477	-1,150	-1,364	-1,417	-,507	191	894	728
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,477	-1,627	-2,991	-4,408	-4,915	-4,724	-3,830	-3,102

Table. 11-7-(2) CASH FLOW STATEMENT (Case 4)

(In US$ thousand at 1989)

		1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	783	737	690	644	597	551	504	457	411
	Repayment	975	1,142	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Sub total	1,757	1,879	1,855	1,808	1,762	1,715	1,669	1,622	1,575
Hard Loan	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Domestic Bank	Interest	544	514	482	450	417	385	353	321	289
	Repayment	1,244	1,505	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,788	2,019	2,088	2,056	2,024	1,992	1,960	1,928	1,895
Total	Interest	1,327	1,251	1,172	1,093	1,015	936	857	778	700
	Repayment	2,219	2,646	2,771	2,771	2,771	2,771	2,771	2,771	2,771
	Subtotal	3,546	3,897	3,943	3,864	3,786	3,707	3,628	3,550	3,471
* Total Fund Required *		3,546	3,897	3,943	3,864	3,786	3,707	3,628	3,550	3,471
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		180	535	489	567	646	725	803	882	961
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative P&L		-2,922	-2,387	-1,898	-1,331	-,685	40	843	1,725	2,686

Table. 11-7-(3) CASH FLOW STATEMENT (Case 4)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	364	318	271	224	178	131	85
	Repayment	1,165	1,165	1,165	1,165	1,165	1,165	1,165
	Sub total	1,529	1,482	1,436	1,389	1,342	1,296	1,249
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Domestic Bank	Interest	257	225	193	160	128	96	64
	Repayment	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,863	1,831	1,799	1,767	1,735	1,703	1,671
Total	Interest	621	542	464	385	306	227	149
	Repayment	2,771	2,771	2,771	2,771	2,771	2,771	2,771
	Subtotal	3,392	3,313	3,235	3,156	3,077	2,999	2,920
* Total Fund Required *		3,392	3,313	3,235	3,156	3,077	2,999	2,920
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		1,040	1,118	1,197	1,276	1,354	1,433	1,512
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		3,726	4,844	6,041	7,317	8,671	10,104	11,616

Table. 11-8-(1) CASH FLOW STATEMENT (Case 5)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,728	376	0	0	0	0
	LOCAL	7,751	12,607	4,265	1,665	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,867	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0
Hard Loan	Interest	613	1,404	1,644	1,677	1,621	1,494	1,344	1,192
	Repayment	0	0	0	0	697	1,595	1,868	1,906
	Sub total	613	1,404	1,644	1,677	2,318	3,089	3,212	3,098
Domestic Bank	Interest	171	448	542	578	578	578	578	569
	Repayment	0	0	0	0	0	0	0	474
	Sub total	171	448	542	578	578	578	578	1,043
Total	Interest	784	1,852	2,186	2,255	2,200	2,072	1,923	1,761
	Repayment	0	0	0	0	697	1,595	1,868	2,380
	Subtotal	784	1,852	2,186	2,255	2,896	3,667	3,791	4,140
* Total Fund Required *		16,973	25,606	9,878	4,501	2,896	3,667	3,791	4,140
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,588	6,348	7,142
Operating Expenses		0	0	0	0	3,385	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing	:Soft Loan	0	0	0	0	0	0	0	0
	:Hard Loan	7,662	9,887	3,001	414	0	0	0	0
	:Domestic Bank	8,527	13,867	4,691	1,832	0	0	0	0
	:Sub total	16,189	23,754	7,692	2,246	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,784	-1,852	-2,186	-2,255	-1,986	-2,059	-1,480	-1,122
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,784	-2,636	-4,822	-7,077	-9,063	-11,122	-12,602	-13,724

Table.11-8-(2) CASH FLOW STATEMENT (Case 5)

(In US$ thousand at 1989)

		-1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	0	0	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Hard Loan	Interest	1,039	887	734	582	430	277	125	28	3
	Repayment	1,906	1,906	1,906	1,906	1,906	1,906	1,906	1,209	310
	Sub total	2,945	2,793	2,640	2,488	2,335	2,183	2,030	1,237	313
Domestic Bank	Interest	544	514	482	450	417	385	353	321	289
	Repayment	1,244	1,505	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,788	2,019	2,088	2,056	2,024	1,992	1,960	1,928	1,895
Total	Interest	1,583	1,401	1,216	1,032	847	662	478	349	292
	Repayment	3,150	3,411	3,512	3,512	3,512	3,512	3,512	2,816	1,917
	Subtotal	4,733	4,811	4,729	4,544	4,359	4,175	3,990	3,165	2,209
* Total Fund Required *		4,733	4,811	4,729	4,544	4,359	4,175	3,990	3,165	2,209
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		-1,008	-,380	-,297	-,112	72	257	442	1,267	2,223
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative PAL		-14,732	-15,112	-15,409	-15,521	-15,449	-15,192	-14,750	-13,483	-11,260

Table. 11-8-(3) CASH FLOW STATEMENT (Case 5)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	0	0	0	0	0	0	0
	Repayment	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	38	0	0	0	0	0	0
	Sub total	38	0	0	0	0	0	0
Domestic Bank	Interest	257	225	193	160	128	96	64
	Repayment	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,863	1,831	1,799	1,767	1,735	1,703	1,671
Total	Interest	257	225	193	160	128	96	64
	Repayment	1,644	1,607	1,607	1,607	1,607	1,607	1,607
	Subtotal	1,901	1,831	1,799	1,767	1,735	1,703	1,671
* Total Fund Required *		1,901	1,831	1,799	1,767	1,735	1,703	1,671
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing :Soft Loan		0	0	0	0	0	0	0
:Hard Loan		0	0	0	0	0	0	0
:Domestic Bank		0	0	0	0	0	0	0
:Sub total		0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		2,531	2,601	2,633	2,665	2,697	2,729	2,761
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		-8,729	-6,128	-3,495	-,830	1,867	4,596	7,357

Table.11-9-(1) CASH FLOW STATEMENT (Case 6)

(In US$ thousand at 1989)

		1991	1992	1993	1994	1995	1996	1997	1998
1.Funds Required									
Investment	FOREIGN	6,965	8,988	2,728	376	0	0	0	0
	LOCAL	7,751	12,607	4,265	1,665	0	0	0	0
	Sub total	14,716	21,595	6,993	2,041	0	0	0	0
Price Contingency	FOREIGN	697	899	273	38	0	0	0	0
	LOCAL	776	1,260	426	167	0	0	0	0
	Sub total	1,473	2,159	699	205	0	0	0	0
Total	FOREIGN	7,662	9,887	3,001	414	0	0	0	0
	LOCAL	8,527	13,867	4,691	1,832	0	0	0	0
	Sub total	16,189	23,754	7,692	2,246	0	0	0	0
2.Debt Service									
Soft Loan	Interest	153	351	411	419	419	419	419	411
	Repayment	0	0	0	0	0	0	0	213
	Sub total	153	351	411	419	419	419	419	624
Hard Loan	Interest	306	702	822	839	811	747	672	596
	Repayment	0	0	0	0	348	798	934	953
	Sub total	306	702	822	839	1,159	1,545	1,606	1,549
Domestic Bank	Interest	171	448	542	578	578	578	578	569
	Repayment	0	0	0	0	0	0	0	474
	Sub total	171	448	542	578	578	578	578	1,043
Total	Interest	630	1,501	1,775	1,836	1,808	1,745	1,670	1,576
	Repayment	0	0	0	0	348	798	934	1,639
	Subtotal	630	1,501	1,775	1,836	2,157	2,542	2,604	3,215
* Total Fund Required *		16,819	25,255	9,467	4,082	2,157	2,542	2,604	3,215
3.Funds Available									
Operating Revenues		0	0	0	0	4,772	5,558	6,348	7,142
Operating Expenses		0	0	0	0	3,335	3,394	3,402	3,410
Net Surplus(Aft.Tax 10%)		0	0	0	0	910	1,608	2,311	3,018
Borrowing	:Soft Loan	3,831	4,944	1,501	207	0	0	0	0
	:Hard Loan	3,831	4,944	1,501	207	0	0	0	0
	:Domestic Bank	8,527	13,867	4,691	1,832	0	0	0	0
	:Sub total	16,189	23,754	7,692	2,246	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0
Total Funds Available		16,189	23,754	7,692	2,246	910	1,608	2,311	3,018
Annual Surplus(Deficit)		-,630	-1,501	-1,775	-1,836	-1,247	-,934	-,293	-,197
Government Subsidy		0	0	0	0	0	0	0	0
Cumulative P&L		-,630	-2,131	-3,906	-5,742	-6,989	-7,923	-8,216	-8,413

Table.11-9-(2) CASH FLOW STATEMENT (Case 6)

(In US$ thousand at 1989)

		1999	2000	2001	2002	2003	2004	2005	2006	2007
1.Funds Required										
Investment	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0	0	0
2.Debt Service										
Soft Loan	Interest	391	368	345	322	299	275	252	229	205
	Repayment	487	571	582	582	582	582	582	582	582
	Sub total	879	939	927	904	881	858	834	811	788
Hard Loan	Interest	520	443	367	291	215	139	62	14	2
	Repayment	953	953	953	953	953	953	953	605	155
	Sub total	1,473	1,396	1,320	1,244	1,168	1,091	1,015	619	157
Domestic Bank	Interest	544	514	482	450	417	385	353	321	289
	Repayment	1,244	1,505	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,788	2,019	2,088	2,056	2,024	1,992	1,960	1,928	1,895
Total	Interest	1,455	1,326	1,194	1,062	931	799	668	564	496
	Repayment	2,684	3,028	3,142	3,142	3,142	3,142	3,142	2,793	2,344
	Subtotal	4,139	4,354	4,336	4,204	4,073	3,941	3,809	3,357	2,840
* Total Fund Required *		4,139	4,354	4,336	4,204	4,073	3,941	3,809	3,357	2,840
3.Funds Available										
Operating Revenues		7,938	8,732	8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,419	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0	0	0
Total Funds Available		3,725	4,432	4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		-,414	78	96	228	359	491	623	1,075	1,592
Government Subsidy		0	0	0	0	0	0	0	0	0
Cumulative P&L		-8,827	-8,749	-8,653	-8,425	-8,066	-7,575	-6,952	-5,877	-4,285

Table.11-9-(3) CASH FLOW STATEMENT (Case 6)

(In US$ thousand at 1989)

		2008	2009	2010	2011	2012	2013	2014
1.Funds Required								
Investment	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Price Contingency	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
Total	FOREIGN	0	0	0	0	0	0	0
	LOCAL	0	0	0	0	0	0	0
	Sub total	0	0	0	0	0	0	0
2.Debt Service								
Soft Loan	Interest	182	159	136	112	89	66	42
	Repayment	582	582	582	582	582	582	582
	Sub total	764	741	718	695	671	648	625
Hard Loan	Interest	0	0	0	0	0	0	0
	Repayment	19	0	0	0	0	0	0
	Sub total	19	0	0	0	0	0	0
Domestic Bank	Interest	257	225	193	160	128	96	64
	Repayment	1,607	1,607	1,607	1,607	1,607	1,607	1,607
	Sub total	1,863	1,831	1,799	1,767	1,735	1,703	1,671
Total	Interest	439	384	328	273	217	162	106
	Repayment	2,208	2,189	2,189	2,189	2,189	2,189	2,189
	Subtotal	2,647	2,572	2,517	2,462	2,406	2,351	2,295
* Total Fund Required *		2,647	2,572	2,517	2,462	2,406	2,351	2,295
3.Funds Available								
Operating Revenues		8,732	8,732	8,732	8,732	8,732	8,732	8,732
Operating Expenses		3,427	3,427	3,427	3,427	3,427	3,427	3,427
Net Surplus(Aft.Tax 10%)		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Borrowing	:Soft Loan	0	0	0	0	0	0	0
	:Hard Loan	0	0	0	0	0	0	0
	:Domestic Bank	0	0	0	0	0	0	0
	:Sub total	0	0	0	0	0	0	0
Government Finance		0	0	0	0	0	0	0
Total Funds Available		4,432	4,432	4,432	4,432	4,432	4,432	4,432
Annual Surplus(Deficit)		1,785	1,859	1,915	1,970	2,026	2,081	2,137
Government Subsidy		0	0	0	0	0	0	0
Cumulative P&L		-2,501	-,641	1,274	3,244	5,270	7,351	9,488

CHAPTER 12

STAFF TRAINING PROGRAMME

Staff Training Programme

It will be necessary to establish and implement a special staff training programme. This training will be carried out in two categories: namely, 1) training for airport management and operation, and 2) training for construction supervision of the Project.

1. Training Programme for the Airport Management and Operation

This training will be divided into three groups as follows;

1) Regulations of airport administration

- administration of fundamental facilities
- administration of air navigation facilities
- airport regulations
- report and information
- site inspection
- etc.

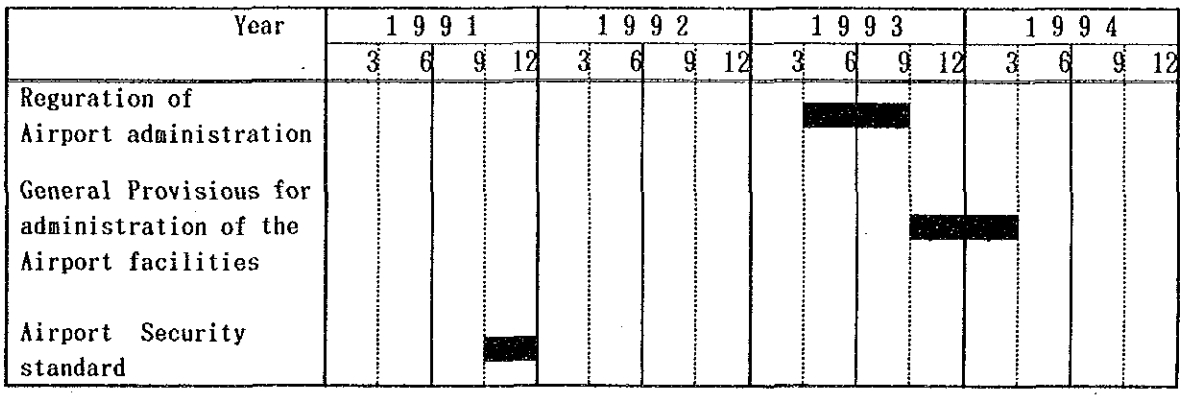
2) General provisions for administration of the airport facilities

- use of airport facilities
- airport tariff and charge
- etc.

3) Airport security standard

- restricted area
- control of enter
- prohibited actions
- vehicle traffic control
- inspection of equipment
- etc.

The proposed schedule of the training programme is summarized in following table.



2. Training Programme for Construction Supervision of the Project

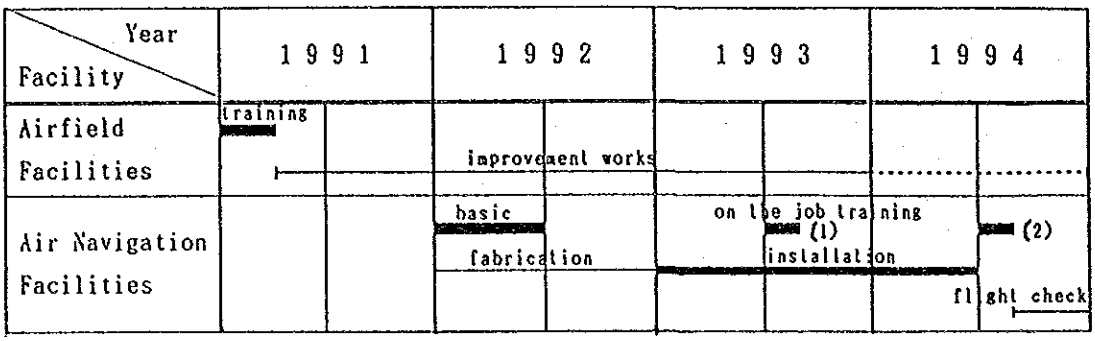
1) Airfield facilities.

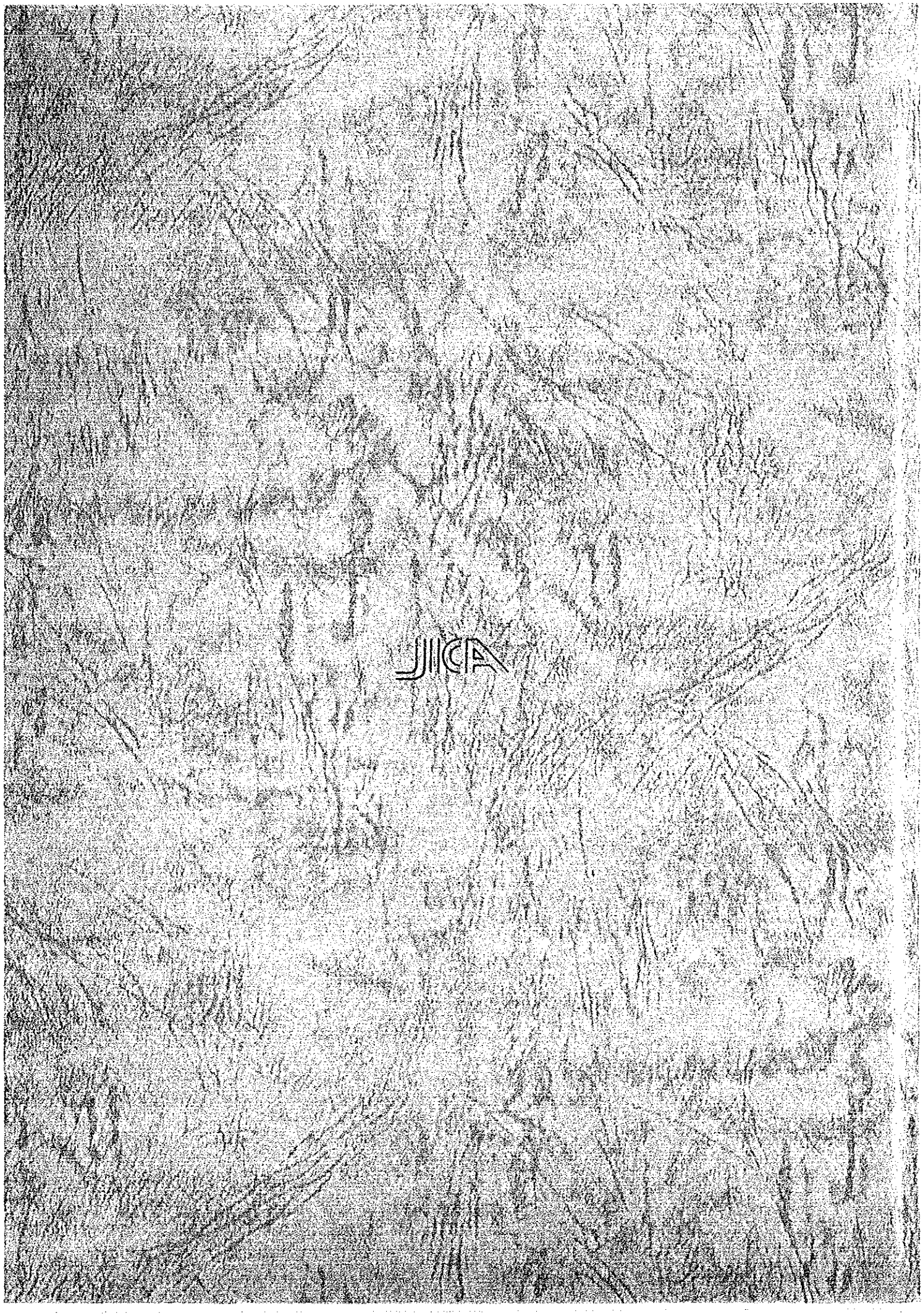
In the Basic training the trainees will receive mainly programme of construction supervision for the airfield facility, prior to the commencement of the pavement improvement works.

2) Air navigation facilities.

The training is divided into two parts, one basic and the other on-the-job. Basic training will be made at manufacturer's factory where fabrication of equipment will be on-going. On-the-job training will be given in Uruguay to the trainees who have completed the basic training at the manufacturer's factory.

The proposed schedule of the training programme is summarized in following Table.

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