JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM AND CIVIL AVIATION
KINGDOM OF NEPAL

THE STUDY OF TRIBHUVAN INTERNATIONAL AIRPORT MODERNIZATION PLAN IN NEPAL

FINAL REPORT

VOLUME III : APPENDICES

JUNE 1994

PACIFIC CONSULTANTS INTERNATIONAL

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM AND CIVIL AVIATION
KINGDOM OF NEPAL

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN
IN
NEPAL

FINAL REPORT

VOLUME III : APPENDICES

JUNE 1994

PACIFIC CONSULTANTS INTERNATIONAL

NOTE

The following exchange rate was adopted throughout this report :

US$ 1.00 = Rs.49.0 = Yen 109 (November, 1993)

Rs. 1.0 = Yen 2.3

LIST OF APPENDICES

APPENDIX TO CHAPTER 1

APPENDIX TO CHAPTER 3

APPENDIX TO CHAPTER 4

APPENDIX TO CHAPTER 5

APPENDIX TO CHAPTER 6

APPENDIX TO CHAPTER 7

APPENDIX TO CHAPTER 11

APPENDIX TO CHAPTER 14

APPENDIX TO CHAPTER 18

APPENDIX TO CHAPTER 19

APPENDIX TO CHAPTER 1

SCOPE OF WORK

ON

THE STUDY OF

TRIBHUVAN INTERNATIONAL AIRPORT

MODERNIZATION PLAN

IN

NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION

MINISTRY OF TOURISM AND CIVIL AVIATION

HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

FEBRUARY 5 TH, 1993

KATHMANDU

MR. B.B.DEOJA
DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM AND
CIVIL AVIATION
HIS MAJESTY'S
GOVERNMENT OF NEPAL

MR. TAKENORI MATSUMOTO
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

I. INTRODUCTION

In response to the request of His Majesty's Government of Nepal (hereinafter referred to as "HMG/N"), the Government of Japan (hereinafter referred to as "GOJ") has decided to conduct the Study of Tribhuvan International Airport Modernization Plan in Nepal (hereinafter referred to as "the Study "), in accordance with the relevant laws and regulations in force in HMG/N and GOJ.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of GOJ, will undertake the Study in close cooperation with the authorities concerned of HMG/N.

The Department of Civil Aviation of HMG/N (hereinafter referred to as"DCA") shall act as a counterpart body to the Japanese Study Team and also act as a coordinating body with other relevant organizations for the smooth implementation of the Study.

The present document sets forth the Scope of Work for the Study.

II. OBJECTIVE OF THE STUDY

The objectives of the Study are as follows:

1. To formulate a Master Plan for Modernization of the Tribhuvan International Airport (hereinafter referred to as "TIA").

2. To evaluate the feasibility of the above Master Plan.

III. SCOPE OF STUDY

The Study will comprise a study on improvement of aeronautical safety facilities, communication facilities, air traffic control facilities, and airport facilities (hereinafter referred to as "Plan for Safety Improvement"); and a study on improvement of TIA facilities, other than described above (hereinafter referred to as "Plan for Ground Facilities") - in order to accommodate the future increase in air traffic demands as an international airport, in TIA until 2010.

1. Collection and analysis of existing data, information, and reports concerned.

   In order to sort out backgrounds of the Study, existing data, information, and reports concerned on TIA shall be collected and analyzed.

2. Formulation of Social-economic framework.

Social-economic framework shall be formulated by collection and analysis of social-economic data.

3. Study of present condition, analysis, and evaluation on the following items..

① Aeronautical safety facilities, communication facilities, air traffic control facilities, airport facilities and others:

- Aeronautical safety facilities, communication facilities, air traffic control facilities, airport facilities, and operation/ maintenance of those facilities
- ATS route (instrument approach procedures and standard instrument departure routes) and airspace structure
- Air traffic services procedures
- Search and rescue organization and facilities
- Movement area
- Fire and rescue
- Others

② Air traffic services personnel (air traffic controller, communication officer, and radio engineering technician):

- Employment, training, and qualification system
- Training facilities and training equipment
- Others

③ Study of present condition, analysis, and evaluation

Evaluation shall be formulated by analysing present condition of capacity in respect of operation and others of TIA.

④ Conditions around TIA:

- Topographical conditions
- Present condition of land use and development plan
- Present condition of electric power supply and communication line and their development plan

4. Review of the previous development plan established in September, 1989 by JICA "The Development Study of Civil Aviation in Nepal."

5. Study of Environmental Impact

Initial Environmental Examination shall be conducted at an early stage of the study to minimize the potential environmental damage as a result of implementation of TIA Modernization Plan. The study of Environmental Impact Assessment shall be conducted if Initial Environmental Examination requires it.

6. Formulation of TIA Modernization Plan (Plan for Safety Improvement and Plan for Ground Facilities Improvement)

1. Plan for Safety Improvement:

1-1. Formulation of Plan for Safety Improvement

Based on the results of the above-mentioned studies, an optimal plan shall be formulated to improve air transportation of TIA. The following items shall be considered in the formulation of the optimal plan.

- Improvement of aeronautical safety facilities
- Improvement of communication facilities and air traffic control facilities
- Training of air traffic services personnel and strengthening of Civil Aviation Training Center
- Improvement of airport facilities which contributes to raise safety
- Improvement of ATS route (instrument approach procedures and standard instrument departure routes) and airspace structure
- Preliminary design
- Cost estimation
- Others

1-2. Technical evaluation

Technical feasibility of plan for Safety Improvement shall be evaluated.

Plan for Ground Facilities Improvement:

2-1. Formulation of Plan for Ground Facilities Improvement

Based on the results of the above-mentioned studies, an optimal plan shall be formulated on the improvement of ground facilities of TIA. The following items shall be considered in the formulation of the optimal plan.

① Air traffic demand forecast

② Demand and capacity analysis

③ Estimation of facility size

④ Preliminary design

⑤ Cost estimation

2-2. Feasibility Study of Plan for Ground Facilities Improvement

① Financial analysis

② Economic analysis

7. Project evaluation

8. Preparation of implementation programme

IV. REPORTS

JICA will prepare and submit the following reports in English to HMG/N:

- Inception Report: 30 copies
  Implement plan, frame-work of the study, scope of study, schedule, and others. This report will be submitted at the commencement of the Study.

- Progress Report 30 copies
  Study result on the existing condition of the airport. This report will be submitted within three months after the commencement of the Study.

- Interim Report (1) 30 copies
  Study result of the formulation of the plan for Safety Improvement. This report will be submitted within six months after the commencement of the Study.

- Interim Report (2) 30 copies
  Study result of the formulation of the plans and alternative Plan. This report will be submitted within nine months after the commencement of the Study.

- Draft Final Report 30 copies
  Result of the Study including the feasibility study. This report will be submitted within 11 months after the commencement of the Study.

- Final Report 50 copies
  Final Report Summary 50 copies
  This report will be submitted within two months after receipt of comments from Nepal side on the Draft Final Report.

V. STUDY SCHEDULE

The Study will be conducted in accordance with the attached tentative study schedule.

VI. UNDERTAKING OF HIS MAJESTY'S GOVERNMENT OF NEPAL

1. To facilitate the smooth implementation of the Study, HMG/N shall make necessary arrangements:

   1) To secure the safety of the Japanese Study Team.

   2) To permit the members of Japanese Study Team to enter, leave and sojourn in Nepal for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees.

   3) To exempt the members of Japanese Study Team from taxes, duties and other charges on equipment, machinery and other materials brought into Nepal for the implementation of the Study.

   4) To exempt the members of Japanese Study Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of Japanese Study Team for their services in connection with the implementation of the Study.

   5) To provide the necessary facilities to the Japanese Study Team for the remittances as well as utilization of funds introduced into Nepal from Japan in connection with the implementation of the Study.

   6) To secure permission for entry into private properties and restricted areas in connection with field survey in accordance to HMG procedures.

   7) To secure permission for Japanese Study Team to take all data and documents, including the dispositions and other aerial photographs, to the Project out of Nepal to Japan.

   8) To provide medical services as needed. Its expenses will be chargeable to the members of the Japanese Study Team.

2. HMG/N shall bear claims, if any arises against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the

implementation for the Study, except when such claim arise from gross negligence or willful misconduct on part of members of the Japanese Study Team.

3. To facilitate smooth conduct of the Study. DCA shall take necessary arrangement for the Japanese Study Team as follows, in cooperation with other relevant organizations:

   1) To secure permission for use of airport for the implementation of the Study,

   2) To arrange helicopter and/or aircraft for the Japanese Study Team on their expenses,

   3) To secure permission for the use of communication facilities including transceivers,

   4) To employ local laborers and drivers on their expenses.

4. DCA shall, at its own expense, provide the Japanese Study Team with following in cooperation with other related organizations:

   1) Available data and information related to the Study,

   2) Counterpart personnel,

   3) Credential or identification cards to the members of the Japanese Study Team.

VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures.

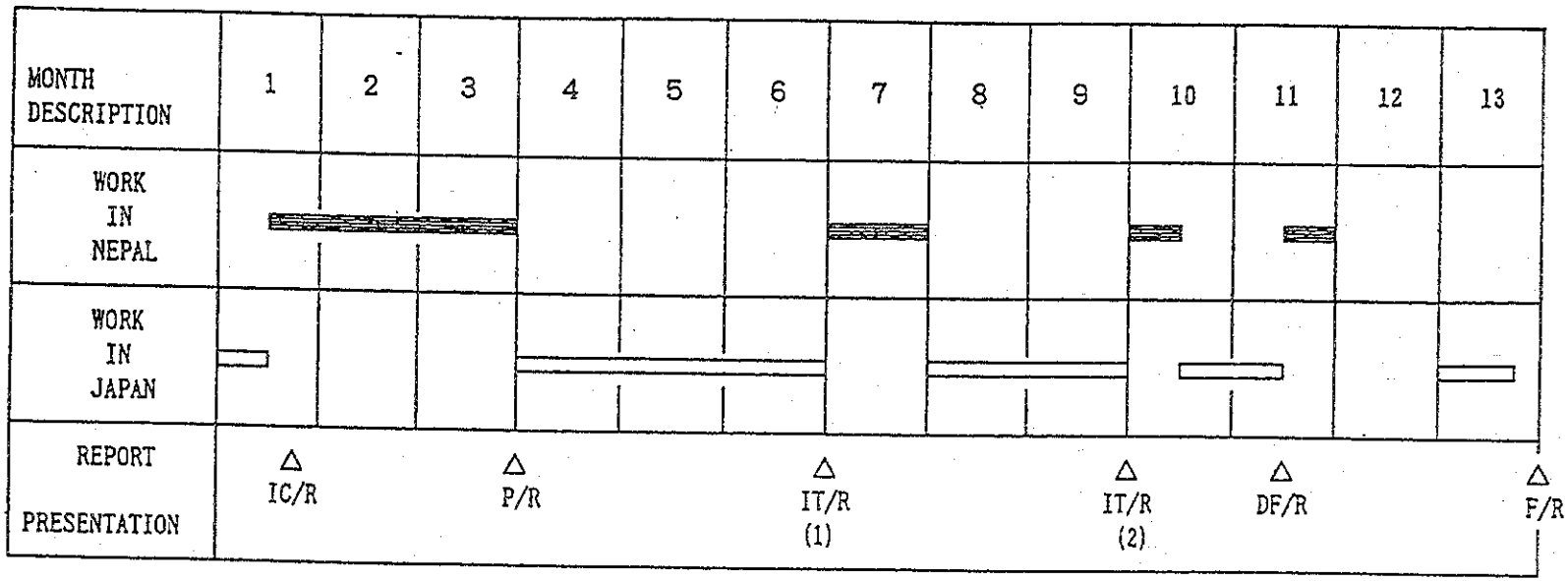
1. Dispatch, at its own expense, the Japanese Study Team to Nepal, for the field work,

2. Pursue technology transfer for the Nepalese counterpart personnel in the course of the Study.

VIII. CONSULTATIONS

JICA and DCA shall consult with each other in respect of any matter that may arise from or in connection with the Study.

TENTATIVE STUDY SCHEDULE



Note:
- IC/R : Inception Report
- P/R : Progress Report
- IT/R : Interim Report (1) and (2)
- DF/R : Draft Final Report
- F/R : Final Report

Appendix - 1.3 Record of Discussion on Scope of Work

RECORD OF DISCUSSION

ON

SCOPE OF WORK

ON THE STUDY OF

TRIBHUVAN INTERNATIONAL AIRPORT

MODERNIZATION PLAN

February 5th, 1993

Kathmandu, Nepal

MR. B.B. DEOJA
DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM
HIS MAJESTY'S GOVERNMENT OF NEPAL

MR. TAKENORI MATSUMOTO
LEADER,
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

Meetings were held between 2-5 February, 1993 at the conference hall, Department of Civil Aviation. The meeting was participated by followings:

Nepal	Japan
1. Mr. B.B. Deoja - Leader Director General Department of Civil Aviation	1. Mr.Takenori Matsumoto - Leader Director Flight Standards Division Civil Aviation Bureau
2. Mr. N.P. Ghimire - Alt. Leader Airport Manager Tribhuvan Int'l Airport	2. Mr.Soichiro Takatori -Member Deputy Director Construction Division Civil Aviation Bureau
3. Mr. R.R. Dali - Member Chief ATS Section, DCA	3. Mr.Hiroshi Matsumoto -Member Special Assist.to the Director Radio Engineering Division Civil Aviation Bureau
4. Mr. P.R. Lohani - Member Chief, Civil Maint.Section TIA	4. Mr.Takashi Arima -Member Chief Training & Exam.Section Air Traffic Control Division Civil Aviation Bureau
5. Mr. P.N. Sharma - Member Chief Engineering Section, DCA	5. Mr.Eiichi Asano -Member Associated Development Specialist First Development Study Division JICA
6. Mr. U.P. Dhungana - Member Chief Fire & Rescue Section, DCA	6. Mr.Yosinobu Ito -Member Consulting Engineer Air Traffic Specialist Oriental Consultants
7. Mr. K.K. Verma - Member Chief, Communication Section, DCA	7. Mr.Takeshi Goto -Member Consulting Engineer Environmental Analysis Oriental Consultants
8. Mr. N.B.S. Dongol - Advisor Deputy Director Technical, DCA	8. Mr.Yoshiki Miyazaki -Member Consulting Engineer Construction Oriental Consultants

Discussions were held as follows:

1. The Japanese team presented a draft Scope of Work relating to the modernization of TIA for discussion.

2. The Japanese team along with Nepalese counterpart team made the field survey of all the facilities at TIA and also CATC.

3. The Nepalese team provided to the Japanese team with a list of Major requirements (attached herewith) for the modernization of TIA. The Nepalese team expressed their concern to know the probability of funding by government of Japan for the works mentioned in the list in order to make timely improvement of TIA. It was emphasized by the Nepalese team that the donor mobilization for the work not to be undertaken by Japan, if any, in TIA would be complicated and unduly delayed in the absence of indications now, and in view of the thirteen months time for the completion of the study. The Japanese team noted the concern expressed by the Nepalese team. The Japanese team, then, informed that concern regarding to project implementation are beyond authority granted to the Japanese team, and therefore, it is not possible to make any committment on grant aid. The Japanese team also informed that the concern will be conveyed to the concerned Japanese Authorities.

4. Upon request by the Nepalese team, on non-committal basis, the Japanese team briefed an example of radar system implementation according to which it takes approximately two years and a half to start radar control services after budget allocation in case of radar installation at TIA. The Japanese team also briefed Japanese grant aid scheme.

5. The Nepalese team briefed the Japanese team about the proposed new bi-directional airway structure in accordance with the liberalized airspace and air route as envisaged in the eighth fifth year plan which will require the provision of enroute radar control services in order to enhance safe and expeditious flow of air traffic.

6. Detailed discussions on the draft scope of work were made and Scope of Work was agreed upon after necessary modification.

Major requirements for modernization of
TIA and CATC

A) Ground Facilities

1. Revision of TIA Master Plan

   - Move domestic airlines/termianl to Eastern Side including Apron and Taxiway construction

2. Extension of runway to north

3. Periphery road and tunnel for runway crossing

4. Cargo complex

5. Wide body hanger

6. Fire Station, Fire Tower & Fire Vehicles

7. Apron Improvement and Management

B) Civil Aviation Training Centre

1. New building at SANO THIMI

2. Simulator

3. Additional Modern Training Facilities

C) Flight Safety Standards

1. Preparation/Improvement of Airworthiness Manual

2. Preparation/Improvement Flight Operations Manual

3. Preparation/Improvement ATC Requirements

4. Preparation/Improvement ATC Manual

5. Com/Nav-aid Equipment Maintenance Manual

D) Air Space/Route Planning

1. Design of approach procedures to Kath.

   - From South
   - From East
   - From West

E) Providing and installing equipment including related training

1. Radar - Primary, Secondary
   Localizer/DME
   ILS/IGS/MLS
2. Earth Station/VSAT
3. Automated Message Switch With additional channels
4. Automation of ATS

Priority order

E D B C A.1 A.3 A.6 A.7	First Phase 1994 - 1996
A.4 A.5 A.2	Second Phase 1995 - 1998

MINUTES OF MEETING

ON

INCEPTION REPORT

OF

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN
IN
NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION,
MINISTRY OF TOURISM AND CIVIL AVIATION,
HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

JULY 13, 1993
KATHMANDU

MR. N. P. GHIMIRE
Leader
Counterpart Team
Department of Civil Aviation

MR. SHOTA MORITA
Leader
Study Team
Japan International Cooperation Agency

MR. B. B. DEOJA
Director General
Department of Civil Aviation,
Ministry of Tourism and Civil Aviation,
His Majesty's Government of Nepal

MR. TAKENORI MATSUMOTO
Chairman
Advisory Committee
Japan International Cooperation Agency

The JICA Study Team headed by Mr. Shota Morita arrived in Kathmandu on July 7, 1993 for the Study of Tribhuvan International Airport Modernization Plan (hereinafter referred to as "the Study"). The JICA Study Team made a courtesy call on Department of Civil Aviation (hereinafter referred to as "DCA") on July 8, 1993 and submitted thirty (30) copies of the Inception Report.

A series of meetings has been held between the JICA Study Team and the DCA Counterpart Team headed by Mr. N. P. Ghimire on the Inception Report of the Study since July 9,1993 in order to confirm the scope of work, the study schedule and outline of the study items.

The JICA advisory committee, headed by Mr. Takenori Matsumoto arrived in Kathmandu on July 9, 1993, made a brief site visit with the JICA Study Team on July 10, and joined the meetings from July 11, 1993.

Attendance at the meetings are listed in Attachment.

The Inception Report was accepted by DCA with the following confirmations.

1) Studies on the following facilities are confirmed to be included among others in the Study.

   (1) Radar system
   (2) International passenger terminal building
   (3) Search and rescue
   (4) Airport security
   (5) Facilities for facilitation
   (6) Present and future ATS route structure and approach procedure design

2) Locations of soil investigation will be determined taking the present and future conditions of TIA into account, and be submitted to DCA before hand.

3) The last paragraph of 2.1 Background 1) shall read "Two air crashes at the peripheral mountains of the Kathmandu valley in 1992 will likely impact tourism adversely unless immediate measures be taken to create positive image of TIA.".

4) The Master Plan shall identify activities for staged implementation such as modular construction and expansions of the various facilities, e.g. land acquisition, relocation of NOC, shifting of Army, land fill, relocation of CATC, cargo complex and wide body hangar, etc.

5) Short-Term and Long-Term Modernization Plan will be prepared to the demands to be anticipated in 2003 and 2010 respectively. Urgent Projects may be defined as works which are considered to be indispensable for ground and air safety to meet the present traffic needs.

6) For the improvement plan of ground facilities such as domestic terminal building, apron, runway pavement, perimeter road etc., urgency and priority of implementation will also be identified in the Study.

7) "206 thousand passengers" in the last sentence of P. 2-1 shall be replaced by "292 thousand passengers".

8) For collection of relevant data and information, detailed list of questionnaires and data will be submitted to DCA prior to the data collection work.

9) DCA pointed out that considerations be given to the recommendations made by ICAO including the future trend of air navigation system and accident investigation reports related to and concerned with TIA.

10) DCA informed that facilities including maintenance cost at TIA should thoroughly be reviewed and planned so that airport sustainability is evaluated.

11) DCA requested that the reports be submitted one week before the meeting. The JICA Study Team assured DCA that they would convey the request to the JICA Headquarters.

12) Technology transfer will mainly be conducted through on-the-job training (OJT) of the Study. Other possible means will be considered on the request of DCA in the course of study in Nepal and Japan.

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA

1. Mr. B. B. DEOJA	Director General, DCA	

1.2 DCA Counterpart Team

1. Mr. N. P. GHIMIRE	Leader	Deputy Director Technical, DCA
2. Mr. D. N. RANA	Member	Chief, Civil Engineering Section, DCA
3. Mr. R. R. DALI	Member	Chief Operation Officer, TIAO
4. Mr. D. S. RANA	Member	Chief, Civil Maintenance Section, TIAO
5. Mr. C. M. SHAKYA	Member	Chief, ATS Section, DCA
6. Mr. L. M. SHAKYA	Member	Chief, Electro-mechanical, Engineering Section, DCA
7. Mr. S. B. RAUT	Member	Assistant Technical Officer, TIAO
8. Mr. K. K. VERMA	Member	Assistant Communication Officer, DCA
9. Mrs. B. K. THAPA	Member	Section Officer, DCA
10. Mr. T. R. RAUT	Member	Account Officer, DCA

2. Japanese Side

2.1 JICA Study Team

1. Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2. Mr. MASATO TAMURA	Member	Airport Planner, PCI
3. Mr. AKIRA KADOGUCHI	Member	Air Navigation Systems Engineer, PCI
4. Mr. TADAMITSU ITO	Member	Air Traffic Control & Airspace Utilization Planner, PCI
5. Mr. TOKUJI TANAKA	Member	Coordinator, PCI

2.2 JICA Advisory Committee

1. Mr. TAKENORI MATSUMOTO	Chairman	Director, Flight Standards Div., JCAB
2. Mr. SOUICHIRO TAKATORI	Member	Deputy Director, Construction Div., JCAB
3. Mr. SEIJI TAKEMOTO	Member	Chief, Radio Engineering Div., JCAB
4. Mr. KOJI WADA	Member	Special Assistance to Director, Flight Procedure & Airspace Progress Office, JCAB
5. Mr. TOSHIYUKI EZUKA	Coordinator	Project Officer, Consultant Contract Div.,JICA

2.3 Embassy of Japan

1. Mr. HISAKI INDOU	Second Secretary

2.4 JICA Nepal Office

1. Mr. NORIO NAITO	Assistant Resident Representative

MINUTES OF MEETING

ON

PROGRESS REPORT

ON

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN
IN
NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION,
MINISTRY OF TOURISM AND CIVIL AVIATION,
HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

AUGUST 31, 1993
KATHMANDU

MR. N. P. GHIMIRE
for Deputy Director General
Department civil Aviation,
Ministry of Tourism and Civil Aviation,
His Majesty's Government of Nepal

MR. SHOTA MORITA
Leader
Study Team
Japan International Cooperation Agency

MINUTES OF MEETING
ON THE PROGRESS REPORT
ON THE STUDY OF TRIBHUVAN INTERNATIONAL AIRPORT MODERNIZATION PLAN IN NEPAL

1. JICA Study Team submitted 30 copies of the Progress Report of the Study to the Department of Civil Aviation (DCA) of Nepal on August 27, 1993.

2. Meetings between the DCA Counterpart Team and the JICA Study Team were held on August 29 and 30, 1993 for a presentation and discussion on the Progress Report of the Study.
A list of attendants is indicated in Attachment-A.

3. After the presentation and the discussions, the Nepalese side accepted the Progress Report in principle with their comments on the progress report to be provided to JICA Study Team in 10 days.

4. The Nepalese side expressed their satisfaction with the progress of the study and looked forward to further progress of the Study.

5. As for the Urgent Project, DCA itemized the following five works in order of priority. JICA Study Team promised that these essential requirements of Nepalese side will be conveyed together with the views of JICA Study Team as stated in 6 to the JICA headquarters for their consideration.

    1) ASR / SSR at TIA and SSR at Mt. Phulchouki together with manpower training of operation and maintenance personnel, training facility at CATC and TIA, and maintenance plan
    2) LLZ/ DME
    3) Domestic apron and domestic terminal building
    4) Cargo terminal building
    5) Instrument approach for RWY 20

6. JICA Study Team stated the following standpoints for the above five works in terms of whether those works to be categorized in the urgent project and how those works to be planned.

1) Although ASR/SSR to be sited at TIA is of urgent need, a compatible SSR to be located outside TIA such as at Mt. Phulchouki will require to be studied taking into account the Nepalese side requirement to cater for the approach and departure from east and west of TIA as a consequence of proposed bidirectional routes which is expected to be implemented shortly. Necessity of training facilities at both CATC and TIA may be evaluated from the viewpoint of economy.

2) Although the domestic terminal complex is not directly related with the air safety improvement, this is considered not to cope with even the present traffic needs and to be immediately improved. The development site and plan of the domestic terminal complex should be determined taking into account the practicability and the cost-effectiveness in the succeeding stage of the Study.

3) It is understood that the cargo terminal complex is insufficient to the present needs and requires an immediate improvement although this improvement is not directly related with the air safety improvement.

4) In view of the nature of the air safety improvement which is derived from the recent aircraft accidents, the instrument approach for RWY 20 is not considered to be categorized in the urgent project. IGS approach procedure may be adopted because an ordinary instrument approach procedure from the north is not considered practical due to its high MDA resulting from the obstacles. IGS approach procedure will be studied in accordance with ICAO protected area in the succeeding stage of the Study.

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA Counterpart Team

1.	Mr. N. P. GHIMIRE	Leader	Deputy Director Technical, DCA
2.	Mr. D. N. RANA	Member	Chief, Civil Engineering Section, DCA
3.	Mr. D. S. RANA	Member	Chief, Civil Maintenance Section, TIAO
4.	Mr. C. M. SHAKYA	Member	Chief, ATS Section, DCA
5.	Mr. L. M. SHAKYA	Member	Chief, Electro-mechanical, Engineering Section, DCA
6.	Mr. S. B. RAUT	Member	Assistant Technical Officer, TIAO
7.	Mr. K. K. VERMA	Member	Assistant Communication Officer, DCA

1.2 ATDP

1. KAMAL K. C.

2. Japanese Side

2.1 JICA Study Team

1.	Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2.	Mr. MASATO TAMURA	Member	Airport Planner, PCI
3.	Mr. AKIRA KADOGUCHI	Member	Air Navigation Systems Engineer, PCI
4.	Mr. YOSHIO TSUDA	Member	Navigation System Engineer, JAL
5.	Mr. TETSUYA OH-ISHI	Member	Environmental Specialist, PCI

MINUTES OF MEETING
ON
INTERIM REPORT (1)
OF

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT MODERNIZATION PLAN
IN
NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION,
MINISTRY OF TOURISM AND CIVIL AVIATION,
HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

NOVEMBER 4, 1993
KATHMANDU

MR. N. P. GHIMIRE
Leader
Counterpart Team
Department of Civil Aviation

MR. SHOTA MORITA
Leader
Study Team
Japan International Cooperation Agency

MR. B. B. DEOJA
Director General
Department of Civil Aviation,
Ministry of Tourism and Civil Aviation
His Majesty's Government of Nepal

MR. SOICHIRO TAKATORI
Member
Advisory Committee
Japan International Cooperation Agency

AGREED MINUTES OF MEETING
ON INTERIM REPORT (1)
OF THE STUDY OF TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN

1. JICA Study Team submitted thirty (30) copies of the Interim Report (1) of the Study to the Department of Civil Aviation (DCA) of Nepal on October 31, 1993.

2. A series of meetings between the DCA Counterpart Team and the JICA Study Team were held on November 2 and 3, 1993 for a presentation and discussion on the Interim Report (1) of the Study.
   A list of attendants is indicated in Attachment-A.

3. After the presentation and the discussions, the Nepalese side accepted in principle the Interim Report (1) provided that their comments on the Report be provided to JICA Study Team in three (3) weeks and be incorporated in the Interim Report (2) together with the previous comments on the Progress Report and the record of present discussions on the Interim Report (1) to be finalized in three weeks time.

4. The Nepalese side accepted the Urgent Improvement Plan which consists of ASR/SSR, LDA or LLZ/DME, and CATC training facilities, and the Urgent Project which consists of ASR/SSR together with human resource development of operation and maintenance personnel, training facility at CATC, an OJT facility at TIA, and maintenance plan.

5. The Nepalese side stressed on the importance of Japanese cooperation to complete both the Urgent Project and the other items of the Urgent Improvement Plan in order to accomplish the objectives of the immediate air safety improvement plan. The Nepalese side also stressed on the requirement of the total CATC training facilities to be completed at Thimi within the Urgent Improvement Plan.

   JICA Study Team understood their request and promised to convey to the JICA headquarters for their consideration.

Attachment-A

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA

1. Mr. B. B. DEOJA		Director General, DCA

1.2 DCA Counterpart Team

1. Mr. N. P. GHIMIRE	Leader	Deputy Director General, DCA
2. Mr. R. R. DALI	Member	Deputy Director General, DCA
3. Mr. D. N. RANA	Member	Chief Civil Engineer, DCA
3. Mr. D. S. RANA	Member	Chief, Civil Maintenance Section, TIAO
4. Mr. C. M. SHAKYA	Member	Air Traffic Control Officer, DCA
5. Mr. L. M. SHAKYA	Member	Senior Divisional Engineer, DCA
6. Mrs. B. K. THAPA	Member	Marketing Manager, DCA
7. Mr. K. K. VERMA	Member	Communication Officer, DCA

2. Japanese Side

2.1 JICA Study Team

1. Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2. Mr. MASATO TAMURA	Member	Airport Planner, PCI
3. Mr. AKIRA KADOGUCHI	Member	Air Navigation Systems Engineer, PCI
4. Mr. TADAMITSU ITO	Member	Air Traffic Control & Airspace Utilization Planner, PCI
5. Mr. SUMIO HAYAKAWA	Member	Airport Mechanical & Electrical Engineer, PCI
6. Mr. YOSHIO TSUDA	Member	Navaids System Engineer, JAL
7. Mr. SHIN-ICHI SAKABE	Member	Construction & Cost Estimates Engineer, PCI
8. Mr. MASATOSHI KANEKO	Member	Economic & Financial Analyst, PCI

2.2 JICA Advisory Committee

1. Mr. SOICHIRO TAKATORI	Member	Deputy Director, Construction Div., JCAB
2. Mr. SEIJI TAKEMOTO	Member	Chief, Radio Engineering Div., JCAB
3. Mr. TAKESHI IMAGOME	Member	Chief, Air Traffic Control Div., JCAB

2.3 JICA Headquarters

1. Mr. YUICHI SEKIGUCHI	Coordinator

2.4 JICA Nepal Office

1. Mr. TOSHIKAZU MASAKI	Assistant Resident Representative

November 24, 1993

Record of Discussions
on Interim Report (1)
of the Study of Tribhuvan International Airport
Modernization Plan

1. A series of meetings between the DCA Counterpart Team and the JICA Study Team were held on November 2, 3 and 24, 1993 for presentation and discussion on the Interim Report (1) of the Study.

   The attendants were same as ones to the Minutes of Meeting.

2. The discussion were held as follows:

(1) Airport Modernization Master Plan

a) The Nepalese side expressed the difficulty of removing the existing maintenance, hangars and the military area immediately due to the financial constraints and duration of five years implementation. Therefore, the urgency to deal with the DCA-proposed domestic terminal and apron to the south end of Runway 02/20 was emphasized as the possible immediate solution for domestic airlines.

The Japanese side agreed to study another alternative terminal development plan of a remote domestic terminal at the southern site of the airport taking into account the conditions mentioned above.

b) The Nepalese side requested to adopt the following larger figures of the unit floor area per peak hour passenger for planning of passenger terminal buildings to provide much more comfortable service level to passengers.

International PTB	:	25 to 30 sq.m/person
Domestic PTB	:	16 to 20 sq.m/person

The Japanese side agreed to take these figures into consideration in planning.

c) The Japanese side proposed alternatives of remote domestic terminal in line with 2 (1) a).

The Nepalese side agreed to communicate, regarding the northern site for new domestic terminal in master planning within one (1) week.

d) The Japanese side proposed the modified master plan caused by the change of planning condition, in relation with 2 (1) a).

The Nepalese side agreed to communicate, regarding the modified master plan as the basic concept of planning.

(2) Air Safety Improvement Plan

a) The Nepalese side expressed the necessity of a library, a canteen and other functions in a layout plan of the radar training building at Thimi because of its purpose and its location. Moreover, the inclusion of the relocation of the entire CATC to Thimi has been emphasized.

The Japanese side agreed to take into full consideration of the requirements.

b) Both sides agreed that the undertaking work by Nepal is excluded from the principal acceptance of the Interim Report (1) by the Nepalese side, because the undertaking is a matter of the Basic Design for the Grant Aid.

c) Both sides agreed to describe the spare parts provision in the Urgent Project which the Nepalese side showed strong concern.

d) The Japanese side assured to study the proposed bidirectional routes, based on data and explanation provided by DCA within the scope of the Study.

3. The Japanese side submitted the papers and the figures for presentation on remote domestic terminal alternatives and modified airport modernization master plan in line with 2 (1) a).

MINUTES OF MEETING
ON
INTERIM REPORT (2)
OF

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT MODERNIZATION PLAN
IN
NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION,
MINISTRY OF TOURISM AND CIVIL AVIATION,
HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

JANUARY 21, 1994
KATHMANDU

MR. N. P. GHIMIRE
Leader
Counterpart Team
Department of Civil Aviation

MR. SHOTA MORITA
Leader
Study Team
Japan International Cooperation Agency

MR. H. B. SHRESTHA
Deputy Director General
Department of Civil Aviation,
Ministry of Tourism and Civil Aviation
His Majesty's Government of Nepal

MR. SOICHIRO TAKATORI
Member
Advisory Committee
Japan International Cooperation Agency

AGREED MINUTES OF MEETING
ON INTERIM REPORT (2)
OF THE STUDY OF TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN

1. JICA Study Team submitted thirty (30) copies of the Interim Report (2) of the Study to the Department of Civil Aviation (DCA) of Nepal on January 14, 1994.

2. A series of meetings between the DCA Counterpart Team and the JICA Study Team were held from January 16 to 20, 1994 for a presentation and discussion on the Interim Report (2) of the Study, which consists of the Establishment of Air Safety Improvement Plan, the Establishment of Urgent Project, the Establishment of Airport Modernization Master plan and the Phasing of the Master Plan.

   A list of attendants is indicated in Attachment-A.

3. After the presentation and the discussions, the Nepalese side accepted in principle the Interim Report (2) with the strong emphasis on establishment and implementation of the Human Resources Development Plan in order to improve the air safety.

4. Discussions on the Interim Report (2) will be continued between the DCA Counterpart Team and the JICA Study Team within the period of the field survey of the JICA Study Team, and will be recorded in the Record of Discussions which is to be an integral part of the Minutes of Meeting and be incorporated in the Draft Final Report.

Attachment-A

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA

1. Mr. H. B. SHRESTHA		Deputy Director General, DCA

1.2 DCA Counterpart Team

1. Mr. N. P. GHIMIRE	Leader	Deputy Director General, DCA
2. Mr. R. R. DALI	Member	Chief, ATSC
3. Mr. L. M. SHAKYA	Member	Senior Divisional Engineer, DCA
4. Mr. D. S. RANA	Member	Chief, Civil Maintenance Section, TIAO
5. Mr. C. M. SHAKYA	Member	Air Traffic Control Officer, DCA
6. Mr. KAMAL K.C.	Member	Officer, Project In-charge, ATDP, DCA
7. Mr. S. B. RAUT	Member	Technical Officer, TIAO
8. Mrs. B. K. THAPA	Member	Marketing Manager, ATSC
9. Mr. T. RAUT	Member	Chief, Accountant, DCA

2. Japanese Side

2.1 JICA Study Team

1. Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2. Mr. MASATO TAMURA	Member	Airport Planner, PCI
3. Mr. AKIRA KADOGUCHI	Member	Air Navigation Systems Engineer, PCI
4. Mr. TADAMITSU ITO	Member	Air Traffic Control & Airspace Utilization Planner, PCI
5. Mr. SUMIO HAYAKAWA	Member	Airport Mechanical & Electrical Engineer, PCI
6. Mr. YOSHIO TSUDA	Member	Navaids System Engineer, JAL
7. Mr. SHIN-ICHI SAKABE	Member	Construction & Cost Estimates Engineer, PCI
8. Mr. TOKUJI TANAKA	Member	Coordinator, PCI

2.2 JICA Advisory Committee

1. Mr. SOICHIRO TAKATORI	Member	Deputy Director, Construction Div., JCAB
2. Mr. SEIJI TAKEMOTO	Member	Chief, Radio Engineering Div., JCAB
3. Mr. TAKESHI IMAGOME	Member	Chief, Air Traffic Control Div., JCAB

2.3 JICA Headquarters

1. Mr. EIICHI YOSHIDA	Coordinator

2.4 JICA Nepal Office

1. Mr. TOSHIKAZU MASAKI	Assistant Resident Representative

Appendix - 1.5 Record of Discussion on Interim Report (2)

January 25, 1994

Record of Discussions
on Interim Report (2)
of the Study of Tribhuvan International Airport
Modernization Plan

1. A series of meetings between the DCA Counterpart Team and the JICA Study Team were held from January 16 to 24, 1994 for presentation and discussion on the Interim Report (2) of the Study.

   A list of attendants is indicated in Attachment.

2. The discussions were held as follows;

   1) Human resources development plan of Air Safety Improvement Plan

      a. The Nepalese side expressed the following and requested to apply them as the basis of the planning.

         - The ultimate purpose of having the radar at TIA is to provide the full-scale radar approach control service with radar vectoring and with sustainable operation and maintenance plan.
         - The license and rating of air traffic radar controller will be introduced.
         - The rating of maintenance personnel will be introduced.

      b. The Japanese side expressed the following, referring to the Japanese policy of the Urgent Project.

         - The primary purpose of the installation of the radar of the Urgent Project is monitoring and advisory service.
         - The conditions required to commence the radar vector are as follows;

           (1) thorough familization with the radar control techniques

           (2) enough and adequate training

           (3) satisfactory radar coverage

      c. Through the discussions, the Japanese side understood the authority and the responsibility of Nepal on the matter and then agreed to take the Nepalese idea into consideration in reviewing the Plan.

         And both parties agreed that the reviewed Plan will be expressed on the basis of the general standard and ideas of techniques.

      d. The Nepalese side expressed their strong expectation for the continuous cooperation and support of Japan to implement the Project and the Air Safety Improvement Plan.

2) Ground facilities improvement plan of Modernization Plan

a. In the previous discussions of Interim Report (1), the Nepalese side requested to change the planning condition as the timing of the relocation of the existing aircraft maintenance area and hangars will not be sure at the time being.

Then the Japanese side modified and proposed the Modernization Plan.

The Nepalese side accepted the modified one as the master plan in principle last November.

In Interim Report (2), the Japanese side showed the reviewed Modernization plan.

b. The Nepalese side expressed the need to relocate the existing aircraft maintenance area and hangars as soon as possible in order to pursue the ideal master plan for better airport operation and better airport planning.

For this purpose, the Nepalese side submitted the DCA's "Terminal Area (West), TIA Development Plan" (two sketches including Stage 1) dated 14 December, 1993, and explained the justifications behind it.

The Japanese side understood the situation and agreed to submit it as another alternative with appropriate phased planning.

The Nepalese side expressed that "Terminal Area (West), TIA Development Plan" should be considered as the final master plan in the Draft Final Report with necessary phasing. The Japanese side agreed to take this into consideration.

3) The Nepalese side also submitted general written comments on the Interim Report (2), and the Japanese side agreed to incorporate at appropriate places in the Draft Final Report.

Attachment

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA

1. Mr. H. B. SHRESTHA		Deputy Director General, DCA

1.2 DCA Counterpart Team

1. Mr. N. P. GHIMIRE	Leader	Deputy Director General, DCA
2. Mr. R. R. DALI	Member	Chief, ATSC
3. Mr. D. N. RANA	Member	Chief Civil Engineer, DCA
4. Mr. L. M. SHAKYA	Member	Senior Divisional Engineer, DCA
5. Mr. D. S. RANA	Member	Chief, Civil Maintenance Section, TIAO
6. Mr. C. M. SHAKYA	Member	Air Traffic Control Officer, DCA
7. Mr. S. B. RAUT	Member	Technical Officer, TIAO
8. Mrs. B. K. THAPA	Member	Marketing Manager, ATSC
9. Mr. T. RAUT	Member	Chief Accountant, DCA

1.3 DCA Observer

1. Mr. KAMAL K.C.	Member	Officer, Project In-charge, ATDP, DCA
2. Mr. R. S. MALLA	Member	Technical Officer, DCA

2. Japanese Side

2.1 JICA Study Team

1. Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2. Mr. MASATO TAMURA	Member	Airport Planner, PCI
3. Mr. AKIRA KADOGUCHI	Member	Air Navigation Systems Engineer, PCI
4. Mr. TADAMITSU ITO	Member	Air Traffic Control & Airspace Utilization Planner, PCI
5. Mr. SUMIO HAYAKAWA	Member	Airport Mechanical & Electrical Engineer, PCI
6. Mr. YOSHIO TSUDA	Member	Navaids System Engineer, JAL
7. Mr. SHIN-ICHI SAKABE	Member	Construction & Cost Estimates Engineer, PCI
8. Mr. TOKUJI TANAKA	Member	Coordinator, PCI

2.2 JICA Advisory Committee

1. Mr. SOICHIRO TAKATORI	Member	Deputy Director, Construction Div., JCAB
2. Mr. SEIJI TAKEMOTO	Member	Chief, Radio Engineering Div., JCAB
3. Mr. TAKESHI IMAGOME	Member	Chief, Air Traffic Control Div., JCAB

2.3 JICA Headquarters

1. Mr. EIICHI YOSHIDA	Coordinator

2.4 JICA Nepal Office

1. Mr. TOSHIKAZU MASAKI	Assistant Resident Representative

MINUTES OF MEETING
ON
DRAFT FINAL REPORT
OF

THE STUDY
OF
TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN
IN
NEPAL

AGREED UPON BETWEEN

DEPARTMENT OF CIVIL AVIATION,
MINISTRY OF TOURISM AND CIVIL AVIATION,
HIS MAJESTY'S GOVERNMENT OF NEPAL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

MARCH 21, 1994
KATHMANDU

MR. N. P. GHIMIRE
Leader
Counterpart Team
Department of Civil Aviation

MR. SHOTA MORITA
Leader
Study Team
Japan International Cooperation Agency

MR. H. B. SHRESTHA
Deputy Director General
Department of Civil Aviation,
Ministry of Tourism and Civil Aviation
His Majesty's Government of Nepal

MR. TAKEMI ISHIZUKA
Chairman
Advisory Committee
Japan International Cooperation Agency

AGREED MINUTES OF MEETING
ON DRAFT FINAL REPORT
OF THE STUDY OF TRIBHUVAN INTERNATIONAL AIRPORT
MODERNIZATION PLAN

1. JICA Study Team submitted thirty (30) copies of the Draft Final Report of the Study to the Department of Civil Aviation (DCA) of Nepal on March 16, 1994.

2. A series of meetings between the DCA Counterpart Team and the JICA Study Team was held from March 17 to 21, 1994 for a presentation and discussion on the Draft Final Report of the Study, with the attendant of the JICA Advisory Committee headed by Mr. Takemi Ishizuka.

   A list of attendants is indicated in the Attachment.

3. After the presentation and the discussions, the Nepalese side accepted in principle the Draft Final Report. At the same time, the Nepalese side strongly requested the Japanese side to take necessary measures for the immediate completion of the Urgent Improvement Plan within 1996 as well as Short-term and Long-term Plans to enhance the air safety.

   The Japanese side stated that they are not in a position to make any commitment on the time schedule to complete within 1996, but assured to convey their request to the JICA headquarters for its implementation, and recommended the Nepalese side to make an official request to the Government of Japan through the official diplomatic channel.

4. Both sides agreed that an additional SSR at a suitable location such as the top of Mt. Phulchouki be completed in the Urgent Improvement Plan together with ASR/SSR to be installed at TIA in order to complete the radar coverage on the terminal control area and to cater for the approaches from directions other than Simara. Necessary amendment in the report should be made accordingly.

   The additional SSR will enable radar control in terminal control area and also cope with future reorganization of air routes from/to TIA. However, the terminal radar control should be commenced in accordance with the ICAO standards such as completing sufficient personnel training for its purpose.

5. Both sides agreed the following process to finalize the Final Report.

   (1) Further comments of the Nepalese side, if any, will be given to the Study Team in Japan within one (1) month through JICA Nepal Office, and will be incorporated in the Final Report, wherever appropriate.

   (2) The Final Report will be submitted through JICA to the Nepalese side within two (2) months after receiving the comments.

LIST OF ATTENDANTS

1. Nepalese Side

1.1 DCA

1. Mr. H. B. SHRESTHA		Deputy Director General, DCA

1.2 DCA Counterpart Team

1. Mr. N. P. GHIMIRE	Leader	Deputy Director General, DCA
2. Mr. R. R. DALI	Member	Chief, ATSC
3. Mr. D. N. RANA	Member	Chief Civil Engineer, DCA
4. Mr. L. M. SHAKYA	Member	Senior Divisional Engineer, DCA
5. Mr. C. M. SHAKYA	Member	Air Traffic Control Officer, DCA
6. Mr. K. K. VERMA	Member	Communication Officer, DCA
7. Mr. S. B. RAUT	Member	Technical Officer, TIAO
8. Mrs. B. K. THAPA	Member	Marketing Manager, ATSC
9. Mr. T. R. RAUT	Member	Chief Accountant, DCA

1.3 DCA Observer

1. Mr. U. P. DHITAL		Senior Divisional Engineer, DCA
2. Mr. R. S. MALLA		Technical Officer, DCA

2. Japanese Side

2.1 JICA Study Team

1. Mr. SHOTA MORITA	Leader	Airport Planner, PCI
2. Mr. MASATO TAMURA	Member	Airport Planner, PCI
3. Mr. AKIRA KADOGUCHI	Member	Air Navigation System Engineer, PCI
4. Mr. YOSHIO TSUDA	Member	Navaids System Engineer, JAL
5. Mr. MASATOSHI KANEKO	Member	Economic & Financial Analyst, PCI
6. Mr. TETSUYA OH-ISHI	Member	Environmental Specialist, PCI

2.2 JICA Advisory Committee

1. Mr. TAKEMI ISHIZUKA	Chairman	Director, Flight Standards Div., JCAB
2. Mr. SEIJI TAKEMOTO	Member	Chief, Radio Engineering Div., JCAB
3. Mr. TAKESHI IMAGOME	Member	Chief, Air Traffic Control Div., JCAB

2.3 JICA Headquarters

1. Mr. EIICHIRO MITAKE	Cooperation Planner
2. Mr. YUICHI SEKIGUCHI	Coordinator

2.4 JICA Nepal Office

1. Mr. HIROSHI MURAKAMI	Deputy Resident Representative

APPENDIX TO CHAPTER 3

Appendix - 3 Interview from Airlines Companies

Interview from airlines companies

1. RNAC (Royal Nepal Airlines Corporation)

1) aircraft fleet plan till 1994

Int	B-757	2	Dom	HS-748	3
	B-727	2		DHC-6	9
				PC-6	1

From October in 1993, 1 B-767 will be introduced as wet lease to replace 2 B-727, which are 22 years old .

A new route to Paris will be inaugurated via Delhi, Dubai and Frankfurt operations a week with B-767 from October.

From October 1994, a new route to new Kansai international airport will be opened via Hongkong with B-757.

Replacement of HS-748 into ATP, ATR and or FK-50 has been discussed.

2) maintenance

Line maintenance of B-757 and B-767 is and will be done by BA at TIA. major check is done in Hongkong.

There is a crew training center in USA, but it is discussed to remove into Europe, because of vicinity.

RNAC requests to DCA to build a maintenance hangar for 1 B-757 and 1 B-767.

3) management

RNAC is 100 % governmental company. There is an opinion to open 49 %of the stock to the public.

Concerning the domestic transport, as there was an emergence of private companies from last year, there happened hard competition between new comers. And then the former monopolist RNAC is losing the share so that it is going to review the domestic activity.

RNAC has conducted mountain flight with B-757 3 times a day. But smaller aircraft of private companies, which is able to get closer to mountains, attracts tourist. So that the market share of RNAC was deprived by the private sector.

2. Everest Air

1) Since June 1992, they has emerged into civil aviation.

2) They has 3 Do-228 "Dornier" with a seat capacity of 19, 16 and 15.

3) They has no plan to expand the activity, but requests to DCA to lease a maintenance hangar and an office.

4) activity from June 1992 till May 1993

passenger	total	47,569
	local	31,526
	foreign	16,043
flying hours		2,582 hrs by 3 Do-228

notes : After this interview, there occured an air crash on 31st of July.

3. Necon Air

1) Since September 1992, Necon Air has begun the business in civil aviation with 3 HS-748 (44 seats).

2) They has planned to introduce two more fleet of Cessna Caravan (cargo) October 1993 and March 1994.

3) They maintain by themselves in open apron. Therefore, they asked for DCA to lease a land. And also they expect to have their own new office in TIA. These buildings will be constructed by their own finance.

4) activity from September 1992 till May 1993

passenger	total	57,021
	local	43,722
	foreign	13,299
L/F (load factor)	average	61 %
mountain flight		3 / day during dry season

4. Nepal Airways

1) Nepal airways is the first private company to emerge into civil aviation since April 1992.

2) They expect their business will be expanded based on the following prospect;

a. the Nepali government has undertaken the liberal policy which open business chance to private sector.

b. the Nepali economy has a potential to grow as a developing country.

c. the liberal sky policy which permits chartered flight of foreign airlines, increse foreign tourist to visit Nepal.

d. according to their experience, the demand always follow the increased seat capacity provided.

3) aircraft fleet

At present	Y-12	(Chinese)	for pax	1	(16 seats)
			for cargo	1	

	HS-748		1	(44 seats)
Sept. 1993	Y-12	(pax)	1	

For the future, they are planning to introduction of HS-748 class type.

4) activity

a. passenger

		local	foreign	total	
1992	May	834	219	1053	1 Y-12
	Jun	1548	246	1794	
	Jul	1310	237	1547	
	Aug	1634	503	2137	
	Sep	1604	607	2211	
	Oct	1738	2381	4119	
	Nov	1242	1405	2647	
	Dec	1214	791	2005	
1993	Jan	858	534	1392	
	Feb	1391	469	1860	
	Mar	3334	1989	5323	1 HS-748
	Apr	2904	2604	5508	added
	total	19,611	11,985	31,596	

October is the peak month not only to foreign tourist but also to local people for DASAIN festival.

average L/F of passenger 60 ~ 70 %

b. flight hours (hours:minutes/day)

		Y-12 (pax)	HS-748
1993	Jan	3 : 30	
	Feb	4 : 54	
	Mar	4 : 45	4 : 05
	Apr	4 : 31	3 : 52
	May	5 : 02	3 : 36
	Jun	4 : 26	

4 hours 30 minutes is estimated as the maximum available flight hours in day-time operation, because of necessary maintenance hours.

5) For construction of aircraft maintenance, they ask to DCA to lease a land. They have an idea to build a hangar and a workshop by themselves.

6) Their business seems to aim at foreign tourist, because of increasing demand and distinguished higher fare of foreigners who have to use air transport instead of cars if they want to go to regions.

(ex)	KTM ~ Simura	fare for local	Nrs. 470
		fare for foreigner	$ 44 (Nrs. 2110)

And domestic cargo transport still remains in small profit business, because of the almost one-way transport structure from Kathmandu to regions and also fixed fare applied to every route.

Appendix - 3 Aircraft Parking at Night, TIA

Aircraft Parking at Night, TIA

airlines	aircraft fleet	parking at TIA	remarks
RNAC	B-757 (int) 2	2	due to schedule
	B-727 (int) 2	2	ditto *
	B-767 (int) 1	1	ditto *
	HS-748 3	3	
	DHC-6 9	5	2 or 3 in hangars
	PC-6 1	1	
Necon Air	HS-748 3	2**	
	Cessna Caravan 2		cargo *
Everest Air	Do-228 3	2**	1 lost at July 31
Nepal Airways			
	Y-12 (pax) 1	1	
	Y-12 (cag) 1	1	
	HS-748 1		
	Y-12 (pax) 1		*
ATSC, DCA	DHC-6 1	1	parking at its A/p
others	helicopter 4	4	parking in hangars

notice :

(1)* RNAC's 2 B-727 will be replaced with 1 B-767 after this October, 1993.
(2)* 1 Y-12 for PAX will be added to the fleet of Nepal Airways on September, 1993.
(3)* Necon Air will increase the fleet by adding 2 Cessna Caravan (cargo) October 1993 and March 1994 respectively.
(4)** Because of the instruction from TIAO to limit the number of parking position, these aircraft stay out of TIA.
(5) The Army fleet is excluded.
(6) The observation was done on 1st of August, 1993.

Aircraft Parking Observation at Night, TIA (observed on Aug. 3, 1993)

1. international apron

RA	B-757	1	
RA	B-727	1	
Heavy Lift	B-707	1	special flight for air lift from UK

2. domestic apron

RA	DHC-6	2	
RA	HS-748	1	

3. on the grass

7E	Y-12	2	
E2	Do-12	1	
RA	PC-6	1	

4. maintenance apron

RA	HS-748	2	

5. VVIP apron

3Z	HS-748	2	
R Army	HS-748	2	

6. in hangars

H/G1	R Army	Sky Van	2	
		helocopter	2	
H/G2	RA	DHC-6	3	
H/G3		helocopter	4	R Army 2, civil 2
H/G4		helicopter	2	civil

7. ATSC apron (at the east end of old R/W)

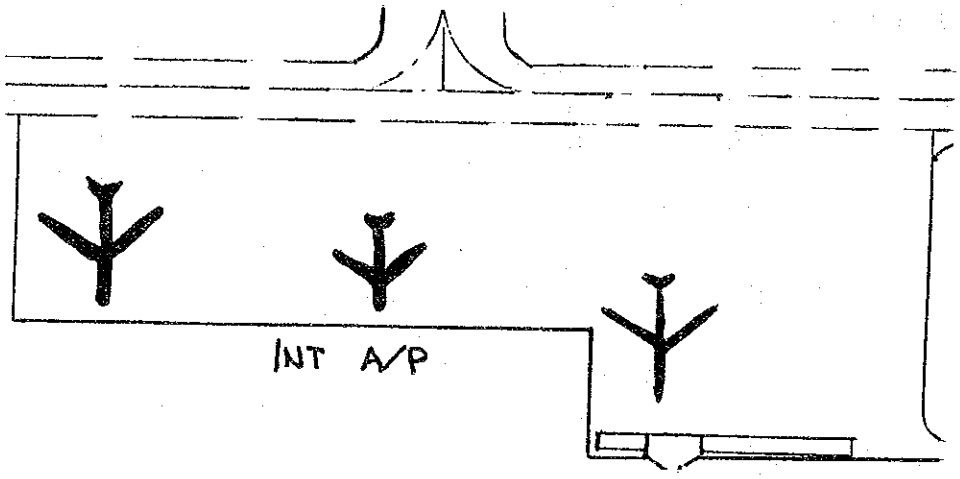
ATSC,DCA	DHC-6	1	

notice :

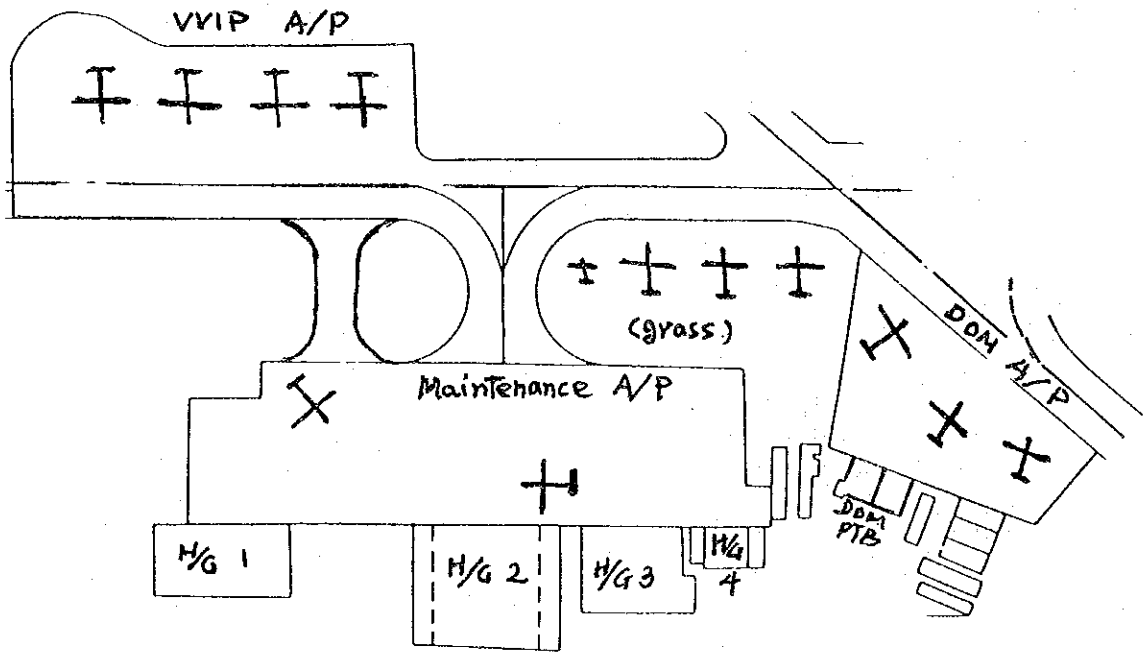
RA : Royal Nepal Airlines Corporation
E2 : Everest Air
7E : Nepal Airways
3Z : Necon Air

R Army : Royal Nepal Army

international apron



domestic apron



Appendix - 3.5.1 Passenger Traffic Survey

1. Interview Survey

A passenger interview survey was carried out at Tribhuvan International Airport according to the following procedures.

1.1 Survey Items

Survey items for passengers are as follows:

(1) Nationality
(2) Original place of Departure
(3) Sex
(4) Age
(5) Occupation
(6) Purpose
(7) Accommodation
(8) Length of stay in Kathmandu
(9) Transportation to the airport
(10) Time arrival at the airport before departure
(11) Status of Travel
(12) Well-wishers
(13) Baggage
(14) Expenditure at the terminal
(15) Expenditure in Nepal
(16) Route of the Trip
(17) Airport facility

1.2 Period of the Survey

The survey was carried out during the following period.

(1) Date : July 29 (Thu.), 30 (Fri.), 31(Sat.), 1993
(2) Time : 9:00 - 18:00
(3) Place : International and Domestic departure lobbies at Tribhuvan International Airport

1.3 Method of Survey

The survey was carried out by interview directly with the departure passengers at the international and domestic departure lobbies. The interview sheets were prepared by three languages, Nepalese, English and Japanese as attached below.

1.4 Result of Survey

Total number of passenger interviewed was 750 persons and the preliminary result of the survey is shown in the following tables.

1.NATIONALITY (PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
NEPAL	102	111	98	311	30	16	19	65	376
East Asia									
Japan	6	-	3	9	4	5	12	21	30
Korea	2	-	2	4		2	-	2	6
Taiwan		-	-		1	1	-	2	2
Hong Kong	1	-	-	1	-	-	-		1
Singapore	1	-	-	1	-	-	2	2	3
Thailand	1	-	-	1	-	-	-		1
Others		-	-		5	1	1	7	7
Sub-total	11		5	16	10	9	15	34	50
South Asia									
India	16	13	10	39	13	47	13	73	112
Others					7	4	3	14	14
Sub-total	16	13	10	39	20	51	16	87	126
Pacific									
Australia		1		1	1	1		2	3
New Zealand	1	1		2			1	1	3
Others									
Sub-total	1	2		3	1	1	1	3	6
The Americas									
USA	3		6	9	2	3	7	12	21
Canada	1			1		3	3	6	7
Others	2			2	3	6	8	17	19
Sub-total	6		6	12	5	12	18	35	47
Europe									
UK	4	7	1	12	4	3	7	14	26
France		1	1	2	16	9	5	30	32
Germany	2	3	1	6		1	7	8	14
Italy	1	1	1	3	2	2	10	14	17
Austria					1		1	2	2
Others	8	3	3	14	4	18	14	36	50
Sub-total	15	15	7	37	27	33	44	104	141
Middle East					2	2		4	4
Africa									
Others									
n.a									
Total	151	141	126	418	95	124	113	332	750

2.ORIGINAL PLACE OF DEPARTURE

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
NEPAL									
Kathmandu	26	10	17	53	43	26	35	104	157
Central Nepal	40	45	34	119	2	3	-	5	124
East Nepal	31	35	18	84	2	4	2	8	92
West Nepal	36	30	34	100	-	-	-		100
Others	5	-	1	6					6
Sub-total	138	120	104	362	47	33	37	117	479
Foreigner									
Own country	13	17	22	52	37	88	55	180	232
Nepal	-	4	-	4	2	3	3	8	12
Others	-	-	-		9	-	18	27	27
n.a									
Total	151	141	126	418	95	124	113	332	750

3.SEX

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Male	120	103	98	321	72	91	74	237	558
Female	31	38	28	97	23	33	39	95	192
n.a									
Total	151	141	126	418	95	124	113	332	750

4.AGE

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
below 7	1	-	-	1	-	-	-		1
8~19	6	14	18	38	8	6	7	21	59
20~29	65	53	39	157	24	49	23	96	253
30~39	39	41	30	110	38	38	29	105	215
40~49	25	20	25	70	12	21	23	56	126
50~59	4	10	11	25	8	10	22	40	65
over 60	4	3	3	10	4		7	11	21
n.a	7			7	1		2	3	10
Total	151	141	126	418	95	124	113	332	750

5.OCCUPATION (PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Professional	40	29	13	82	24	40	38	102	184
Manufacturing	7	3	7	17	11	2	4	17	34
Service/sales	32	32	35	99	24	18	20	62	161
Govemment	14	7	9	30	2	3	5	10	40
Agriculture	5	12	8	25	3	1		4	29
Education	12	10	11	33	7	16	16	39	72
Student	27	27	22	76	5	33	9	47	123
Housewife	5	8	5	18	3	4	6	13	31
Retired	1	3	1	5	1	1	2	4	9
Others	5	10	15	30	5	6	13	24	54
n.a	3			3	10			10	13
Total	151	141	126	418	95	124	113	332	750

6.PURSOSE PF TRAVE (PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Holiday	40	31	28	99	43	63	76	182	281
Business	30	12	16	58	23	19	13	55	113
Convention	1			1	3	12	1	16	17
Official	29	28	25	82	10	9	9	28	110
V.relatives	22	35	29	86	7	4	5	16	102
Others	19	35	28	82	9	17	9	35	117
n.a	10			10					10
Total	151	141	126	418	95	124	113	332	750

7.ACCOMMODATION IN KATHMANDU (PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Private resi.	58	70	60	188	23	28	30	81	269
Hotel	39	25	20	84	63	93	70	226	310
Business	3	6	3	12		3	3	6	18
Others	38	40	43	121	9		10	19	140
n.a	13			13					13
Total	151	141	126	418	95	124	113	332	750

8.LENGTH OF STAY IN KATHMANDU

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
1 day	6	4	1	11	8	7		15	26
2~4 days	19	16	9	44	38	42	37	117	161
5~8 days	22	12	7	41	13	27	28	68	109
9~15 days	18	12	12	42	7	22	10	39	81
16 days~1 mont	7	9	11	27	3	7	9	19	46
1 month	28	88	86	202	26	19	29	74	276
n.a	51			51					51
Total	151	141	126	418	95	124	113	332	750

9.TRANSPORTATION TO AIRPORT

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Private car	27	11	13	51	19	16	18	53	104
Rental/hotel car	16	3	8	27	9	22	27	58	85
Company car	7	3	4	14	16	11	10	37	51
Taxi	74	85	61	220	41	56	42	139	359
Bus	19	29	35	83	7	13	13	33	116
Others	3	10	5	18	3	6	3	12	30
n.a	5			5					5
Total	151	141	126	418	95	124	113	332	750

10.TIME ARRIVAL AT AIRPORT BEFORE DEPARTURE

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
~30 minutes	20	10	15	45	3	5	11	19	
30 min~1 hour	54	25	35	114	19	16	13	48	
1~2 hours	36	39	42	117	61	66	54	181	
2 hours	37	67	34	138	12	37	35	84	
n.a	4			4					
Total	151	141	126	418	95	124	113	332	

11.STATUS OF TRAVEL

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Individual	78	81	74	233	60	71	43	174	407
Group	22	10	9	41	17	33	40	90	131
Family/friends	45	50	43	138	18	20	30	68	206
Others	2			2					2
n.a	4			4					4
Total	151	141	126	418	95	124	113	332	750

12.NUMBER OF WELL WISHERS(PERSONS)

(PERSONS)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Total number	494	334	270	1098	220	193	134	547	1645
per passenger									

13.NUMBER ARTICLES OF BAGGAGE CHECKED IN

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Total number	355	224	182	761	141	186	192	519	1280
per passenger									

14.EXPENDITURE AT TERMINAL SHOP (NEPALESE CURRENCY)

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Total amount	46,015	24,720	16,970	87,705	22,468	19,950	14,590	57,008	144,713
per passenger									

15.EXPENDITURE IN NEPAL

PLACE	Domestic Lobby				International Lobby				Total
DATE	29-Jul	30-Jul	31-Jul	Total	29-Jul	30-Jul	31-Jul	Total	
NUMBER %	151	141	126		95	124	113		
Total amount	220,450	142,600	254,160	617,210	571,900	1,193,850	1,047,665	2,813,415	3,430,625
per passenger									

16.ROUTE OF TRIP

PLACE	Domestic Lobby			Total
DATE	29-Jul	30-Jul	31-Jul	
NUMBER %	151	141	126	
KTM-Eastern Nepal	37	25	57	119
KTM-Central Nepal	74	58	28	160
KTM-Western Nepal		16		16
KTM-Midwest Nepal	40	42	34	116
KTM-Farwest Nepal			7	7
Total	151	141	126	418

PLACE	International Lobby			Total
DATE	29-Jul	30-Jul	31-Jul	
NUMBER %	95	124	113	
KTM-South Asia	94	95	35	224
i.India	70	85	35	190
ii.Pakistan	19			19
iii.Bangladesh		10		10
iv.Buhtan	5			5
KTM-East Asia	1	29	76	106
i.Tibei			36	36
ii.Hong Kong	1			1
iii.Thailand		29	40	69
KTM-Europe			2	2
i.Moscow			2	2
Total	190	248	226	664

AIRPORTS AUTHORITY OF NEPAL

PASSENGER SURVEY FOR TRIBHUVAN INTERNATIONAL AIRPORT

NO. _____ DATE: July.____ ,1993 TIME:____:____ FLIGHT NO. _____ PLACE:_____ (International or Domestic)	SURVEYOR NAME: Signiture:

1. Nationality	01. Nepal	East Asia 11. Japan 12. Korea 13. Taiwan 14. Hong Kong 15. Singapore 16. Malaysia 17. Others ( ) South Asia 21. India 22. Others ( )	Pacific 31. Australia 32. New Zealand 33. Others ( ) The Americas 41. U.S.A. 42. Canada 43. Others ( )	Europe 51. U.K. 52. France 53. Germany 54. Italy 55. Austria 56. Others ( ) 61. Middle East ( ) 71. Africa ( ) 80. Others ( )
2. Original place of departure	Nepal 01. Kathmandu Valley 02. Central Nepal 03. East Nepal 04. West Nepal 05. Others ( )	Foreigner 11. Own country ( ) 12. Nepal ( ) 13. Others ( )		
3. Sex	01. Male	02. Female		
4. Age	01. Below 7 02. 8 ~ 19	03. 20 ~ 29 04. 30 ~ 39	05. 40 ~ 49 06. 50 ~ 59	07. Over 60
5. Occupation	01. Professional 02. Manufacturing 03. Service/Sales 04. Government 05. Agriculture		06. Education 07. Student 08. Housewife 09. Retired 10. Others( )	
6. What is the purpose of your travel?	01. Holiday / Vacation 02. Business 03. Convention 04. Officials	05. Visiting friends/relatives 06. Others( )		
7. What is your accommodation in Kathumandu?	01. Private residence 02. Hotel( ) 03. Place of business 04. Others( )			

8. Length of stay in Kathumandu	01. 1 day 02. 2 - 4 days 03. 5 - 8 days	04. 9 - 15 days 05. 16 days - 1 month 06. more than 1 month
9. Transportation to this airport	01. Private car 02. Rental/Hotel car 03. Company car	04. Taxi 05. Bus 06. Others( )
10. Time arrival at the airport before departure	01. less than 30 minutes before 02. 30 minutes ~ 1 hour before 03. 1 hour ~ 2 hours before 04. more than 2 hours before	
11. Status of travel	01. Individual 02. Group (____ persons)	03. Family/Friends 04. Others( )
12. Number of well-wishers:	_____ persons	
13. Number of articles of baggage checked in:	_____	
14. Expenditure at terminal shop:	Rupee _____ or US _____	
15. Expenditure in Nepal: (Visitors only)	Rupee _____ or US _____	

16. Route your trip, nights spent, and transportation

( )nights ( )nights ( )nights

1) Air 2) Road 3) Rail 4) Sea

( )nights ( )nights ( )nights

1) Air 2) Road 3) Rail 4) Sea

17. Suggestions for airport facility if any: (1)Excellent, (2)Good, (3)Fair, (4)Need to develop

01. Check-in lobby	: (1) (2) (3) (4)
02. Duty free shop	: (1) (2) (3) (4)
03. Coffee shop and restaurant	: (1) (2) (3) (4)
04. Immigration	: (1) (2) (3) (4)
05. Security check	: (1) (2) (3) (4)
06. Baggage claim and customs(arrival)	: (1) (2) (3) (4)
07. Public facilities/services	
Telephone	: (1) (2) (3) (4)
Flight information	: (1) (2) (3) (4)
Information counter/Hotel, taxi, etc.	: (1) (2) (3) (4)
Maney exchange	: (1) (2) (3) (4)
Portor	: (1) (2) (3) (4)
Toilet	: (1) (2) (3) (4)
Others	: (1) (2) (3) (4)
08. Landscaping	: (1) (2) (3) (4)
09. Others	: (1) (2) (3) (4)

18. Other comments

नेपाल विमानस्थलको उडान प्रमाण
अन्तरराष्ट्रिय त्रिभुवन, काठमाण्डु विमानस्थलको यात्रु निरीक्षण

मो: अगष्ट ___१९८२ समय ______________ निरीक्षकको नाम :-
उडान नं ______________ ठाउँ ______________ हस्ताक्षर :-
(विदेशी वा स्वदेशी)

१. राष्ट्रियता [ ] ०.१ नेपाल

पूर्व एशिया
११. जापान
१२. कोरिया
१३. ताइवान
१४. हङ्कङ
१५. सिङ्गापुर
१६. मलेशिया
१७. अरु कुनै ( )

दक्षिण एशिया
२१. भारत
२२. अरु कुनै ( )

प्रशान्त क्षेत्र
३१. अष्ट्रेलिया
३२. न्युजिल्याण्ड
३३. अरु कुनै ( )

अमेरिका
४१. यु.एस.ए.
४२. क्यानाडा
४३. अरु कुनै ( )

५१. यु.के.
५२. फ्रान्स
५३. जर्मन
५४. इटाली
५५. अष्ट्रिया
५६. अरु कुनै ( )

६१. मध्य पूर्व ( )

७१. अफ्रिका ( )

८०. अरु कुनै ( )

२. प्रस्थानको स्थायी ठाउँ [ ]

नेपाल
०१. काठमाण्डु उपत्यका
०२. नेपालको केन्द्रिय भाग
०३. पूर्व नेपाल
०४. पश्चिम नेपाल
०५. अरु कुनै ( )

विदेश
११. आफ्नै देश ( )
१२. नेपाल ( )
१३. अरु कुनै ( )

३. लिङ्ग [ ] ०.१ पुलिङ्ग ०.२ स्त्रीलिङ्ग

४. उमेर [ ] ०.१ कम ७ ०.३ २० - २९ ०.५ ४० - ४९ ०७. बढी ६०
०.२ ८ - १९ ०.४ ३० - ३९ ०.६ ५० - ५९

५. पेशा [ ]
०.१ व्यवसायिक
०.२ उत्पादन
०.३ नोकरी । बिक्रय
०.४ सरकारी
०.५ कृषि
०६. शिक्षा
०७. विद्यार्थी
०८. गृहस्वामी
०९. अवकाश प्राप्त
१०. अरु कुनै ( )

६. तपाईं कुन किसिमले यात्रा गर्नु भएको ? [ ]
०.१ विदा । छाँटो
०.२ व्यवसाय
०.३ प्रतिनिधि सभा
०.४ अतिथि
०.५ साथी । आफन्तहरूलाई भेट्न
०.६ अरु कुनै ( )

७. तपाईं काठमाण्डुमा कहाँ बास लिनु हुन्छ ?
०.१ निजी निवास
०.२ होटेल ( )
०.३ व्यवसाय कुनै ठाउँ
०.४ अरु कुनै

८. कति समय सम्म काठमाण्डु बस्नु हुन्छ ?
०.१ एक दिन
०.२ २ - ४ दिन
०.३ ५ - ८ दिन
०.४ ९ - १५ दिन
०.५ १६ दिन देखि १ महिना सम्म
०.६ १ महिना भन्दा बढी

९. यो विमानस्थलबाट यातायात
०.१ निजी मोटर
०.२ किराया । होटेलको मोटर
०.३ कम्पनीको मोटर
०.४ ट्याक्सी
०.५ बस

१०. प्रस्थान हुन कति कुन समयमा विमानस्थल पुग्नु हुन्छ ?
०.१ ३० मिनेट अगाडि
०.२ ३० मिनेट देखि १ घण्टा अगाडि
०.३ एक घण्टादेखि २ घण्टा अगाडि
०.४ २ घण्टा भन्दा अगाडि

११. यातायातको ढाँट
०.१ एक्लै
०.२ फर्म (______ मान्छे)
०.३ परिवार । साथी
०.४ अरु कोहि ( )

१२. कुल विदाईको संख्या
-------- मान्छे

१३. वस्तु परीक्षणको अवस्था जाँच गर्यो ____________

१४. विमान चढ्न खर्च लागेको -
रु. __________ अथवा यु.एस. ____________

१५. काठमाण्डुमा खर्च लाग्ने
रु. ________ अथवा यु.एस. ____________
(पेटेकोलाई मात्र)

१६. तपाईंको मार्ग क्रम, यात्रा पूर्व र यातायात

[ ]	( ) रातो	( ) रातो	( ) रातो
१. हवाईजहाज २. सडक ३. रेल ४. समुद्र		१. हवाईजहाज २. सडक ३. रेल ४. समुद्र	१. हवाईजहाज २. सडक ३. रेल ४. समुद्र
( ) रातो	( ) रातो	( ) रातो	( ) रातो
१. हवाईजहाज २. सडक ३. रेल ४. समुद्र		१. हवाईजहाज २. सडक ३. रेल ४. समुद्र	१. हवाईजहाज २. सडक ३. रेल ४. समुद्र

१७. विमानस्थलको कुनै सुझाव दिनु पर्ने :- (१) एकदम राम्रो (२) राम्रो (३) ठिक (४) सुधार गर्नु पर्ने

		(१)	(२)	(३)	(४)
०.१	प्रवेश कोण्टा जाँच	१	२	३	४
०.२	निःशुल्क पसल	१	२	३	४
०.३	खाना पसल र रेष्टुरेण्ट	१	२	३	४
०.४	पर्खने बास	१	२	३	४
०.५	सुरक्षाले जाँच	१	२	३	४
०.६	फर्केर माग गर्नु र वस्तु	१	२	३	४
०.७	सार्वजनिक सुविधा । सेवा टेलिफोन	१	२	३	४
	उडान सूचना	१	२	३	४
	सूचना काउण्टर । होटेल, ट्याक्सी आदि	१	२	३	४
	पैसा साट्ने	१	२	३	४
	ट्वाइलेट	१	२	३	४
	बत्ती	१	२	३	४
	अरु केहि	१	२	३	४
०.८	भन्सार	१	२	३	४
०.९	अरु केही	१	२	३	४

१८. अरु केहि आलोचना भए

AIRPORTS AUTHORITY OF NEPAL

PASSENGER SURVEY FOR TRIBHUVAN INTERNATIONAL AIRPORT

NO. _____ DATE: Aug. _____,1993 TIME: _____ : _____ FLIGHT NO. _____ PLACE: _____ (International or Domestic)		SURVEYOR NAME: SIGNITURE:

1. 国籍

01. ネパール

東南アジア
11. 日本
12. 韓国
13. 台湾
14. 香港
15. シンガポール
16. マレーシア
17. その他 (　　)

南アジア
21. インド
22. その他 (　　)

太平洋
31. オーストラリア
32. ニュージーランド
33. その他 (　　)

アメリカ大陸
41. U.S.A.
42. カナダ
43. その他 (　　)

ヨーロッパ
51. イギリス
52. フランス
53. ドイツ
54. イタリー
55. オーストリア
56. その他 (　　)

61. 中東 (　　)

71. アフリカ (　　)

80. その他 (　　)

2. 現在の住居

ネパール
01. カトマンズ バレイ
02. 中央ネパール
03. 東ネパール
04. 西ネパール
05. その他 (　　)

外国人
11. 自国 (　　)
12. ネパール (　　)
13. その他 (　　)

3. 性別

01. 男　02. 女

4. 年令

01. 7才以下
02. 8~19 才
03. 20~29 才
04. 30~39 才
05. 40~49 才
06. 50~59 才
07. 60才以上

5. 職業

01. 専門家
02. 製造業
03. サービス／商業
04. 役人
05. 農業
06. 教職
07. 学生
08. 主婦
09. 退職者
10. その他 (　　)

6. 旅行目的

01. 休暇
02. ビジネス
03. コンベンション
04. 公務
05. 知人／友人訪問
06. その他 (　　)

7. カトマンズでの宿泊

01. 個人宅
02. ホテル (　　)
03. 社宅
04. その他 (　　)

8. カトマンズでの宿泊日数

01. 1日
02. 2～4日
03. 5～8日
04. 9～15日
05. 16日～1ケ月
06. 1ケ月以上

9. カトマンズ空港までの交通手段

01. 自家用車
02. レンタカー／ホテルカー
03. 会社の車
04. タクシー
05. バス
06. その他 (　　)

10. 出発の何分前に空港に着きましたか

01. 30分前以下
02. 30分～1時間前
03. 1時間～2時間前
04. 2時間以上前

11. 個人旅行かグループ旅行か

01. 個人
02. グループ
03. 家族／友人
04. その他 (　　)

12. 見送りの人数は？

_____人

13. チェックイン荷物の数は？

_____個

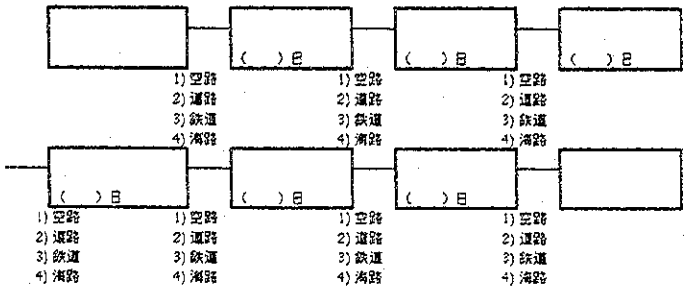
14. カトマンズ空港ターミナルでいくら使いましたか？

_____ルピー　または、　US$ _____

15. ネパールでいくら使いましたか？

_____ルピー　または、　US$ _____

16. 今回の旅行のルート、その間の交通手段及び宿泊数



17. 空港施設に関するご意見がありましたらお聞かせ下さい。(1)大変良い (2)良い (3)普通 (4)改善が必要

01. チェックインロビー	(1)	(2)	(3)	(4)
02. デューティフリーショップ	(1)	(2)	(3)	(4)
03. レストラン／コーヒーショップ	(1)	(2)	(3)	(4)
04. 出入国管理	(1)	(2)	(3)	(4)
05. セキュリティチェック	(1)	(2)	(3)	(4)
06. 手荷物受取／通関（到着）	(1)	(2)	(3)	(4)
07. 公共施設及びサービス				
電話	(1)	(2)	(3)	(4)
フライトインフォメーション	(1)	(2)	(3)	(4)
インフォメーションカウンター／ホテル、タクシー等	(1)	(2)	(3)	(4)
外貨交換	(1)	(2)	(3)	(4)
ポーター	(1)	(2)	(3)	(4)
トイレ	(1)	(2)	(3)	(4)
その他	(1)	(2)	(3)	(4)
08. 案内	(1)	(2)	(3)	(4)
09. その他	(1)	(2)	(3)	(4)

18. その他ご意見があれば

2 Landside Vehicle Traffic Survey

A landside vehicle traffic survey was carried out at Tribhuvan International Airport according to the following procedures.

2.1 Survey Items

Survey item for landside vehicles is number of incoming, outgoing and parking vehicles by type around the international and the domestic passenger terminals.

2.2 Period of the Survey

The survey was carried out during the following period.

(1) Date : July 29 (Thu.), 30 (Fri.), 31(Sat.), 1993
(2) Time : 9:00 - 18:00
(3) Place : International and Domestic terminal at Tribhuvan International Airport

2.3 Method of Survey

The survey was carried out by counting number of vehicle on roads from/to the international and the domestic passenger terminal building and at carparks for the international and the domestic passenger terminal.

2.4 Result of Survey

The preliminary result of the survey is shown in the following tables.

Domestic

Time	Pax	Number of Vehicles																							
		Incoming								Outgoing								Parking							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1993/6/29																									
11:50	65	22	1		22	9		17	2	17			13	4		7	3	21	11	1	14	5	2	21	10
12:00	82	11	1		5	1		1		14	1		3	3	3	4	3	33	12	1	11	4	2	22	10
12:10	108	13			16	2	4	7	1	8			4			8		31	13	1	17	4	2	18	11
12:20	54	10			13	1	1	5	1	10			7	1		3	1	36	11	1	16	3	4	19	9
12:30	43	14	1		10	3		5	1	22	4	2	12	1	2	4	1	28	14		17	3	4	20	16
12:40	42	7			4	6	1	7	1	14			7	4	1	7	2	27	9		14	5	2	15	19
Total	394	77	3	0	70	22	6	42	6	85	5	2	46	13	6	33	10	176	70	4	89	24	16	115	75
1993/6/30																									
15:50	145	9	6	1	9	1	1	6		12	4		5	2		1		56	14	3	1		2	5	2
16:00		16	3	2	3	4		3		10	2		1		1	4		54	12	3	1		2	5	2
16:10		10	5	3	5	5	1	3	4	9			1			2	1	52	11	3	1		2	5	2
16:20	76	12	6	2	4		1	2	3	6	7	1	3	3	1			50	9	2	1		2	5	2
16:30	164	9	4	1	11	3	2	8	4	3	4		1			3		41	8	2	1		2	4	2
16:40	171	10	4	2	5	2	1	7	2	4	3		1	2		1	2	40	8	2	1		2	4	2
Total	556	66	28	11	37	15	6	29	13	44	20	1	12	7	2	11	3	293	62	15	6	0	12	28	12
1993.6.31																									
13:10	107	14		3	11	2	1	15	5	7	1		3	2		1	1	81	31	2	3	1	2	16	1
13:20	34	19	1	4	16	4	3	5	7	12	3	1	6	2	1	1		78	26	2	2	1	2	15	1
13:30	54	30	6	1	20	1	3	5	4	37	9		14			7	2	64	23	1	3	1	2	14	1
13:40	32	24	4	2	12	9	1	5	1	33	5	5	14	4		6	1	56	25		4		2	15	1
13:50	196	13	1		5	3	3	8	2	17	6		5	3		2		29	17		1			11	1
14:00	111	17		1	14	7	1	5	3	11	3	1	6	3		1	1	24	14		1			9	1
Total	534	117	12	11	78	26	12	43	22	117	27	7	48	14	1	18	5	332	136	5	14	3	8	80	6

International

Time	Pax	Number of Vehicles																													
		Incoming								Outgoing								Parking								Parking							
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1993/6/29																																	
12:20	105	22	1	2	12	2	2	14	4	5			5	2		2		13	2	2		1		2								44	21
12:30		33	3	5	14	3	2	16	1	5	1	1	6	1	1	4	1	20	2	4	4	1					1		1			43	19
12:40		31	4	3	9	5	2	9	3	4		1	6	2	1	3	3	18	2	4		1	1	1		1						46	22
12:50		31	1	1	8	8	3	8	4	5		1	2	2	1	3	1	20	1	2		1										49	14
13:00	91	22	1	1	15	5	2	11	3	7			4	2		2	1	22	1	4		1	1	2		2						40	16
13:10		28	1	1	10	3	1	8	3	7			3	3		1	2	20	1	3				3		2						38	14
13:20	184	23	1	2	12	3	2	10	6	7	1	1	7		2	3	1	24	1	2				2		2						35	14
Total	380	190	12	15	80	29	14	76	24	40	2	4	33	12	5	18	9	137	10	21	4	5	2	10	0	7	1	0	1	0	0	295	120
1993/6/30																																	
15:40	22	3	5	2	4	2	1	13		11	2			3		1		62	16	3	3		2	2	2	3						43	20
15:50	145	9	6	1	9	1	1	6		12	4		5	2		1		56	14	3	1		2	5	2	4						39	14
16:00		16	3	2	3	4		3		10	2		1		1	4		54	12	3	1		2	5	2	5						36	13
16:10		10	5	3	5	5	1	3	4	9			1			2	1	52	11	3	1		2	5	2	4			2			35	13
16:20	76	12	6	2	4		1	2	3	6	7	1	3	3	1			50	9	2	1		2	5	2	5			2			32	12
16:30	164	9	4	1	11	3	2	8	4	3	4		1			3		41	8	2	1		2	4	2	4			3			29	11
16:35	171																																
16:40		10	4	2	5	2	1	7	2	4	3		1	2		1	2	40	8	2	1		2	4	2	4			3			37	10
Total	556	66	28	11	37	15	6	29	13	44	20	1	12	7	2	11	3	293	62	15	6	0	12	28	12	26	0	0	10	0	0	208	73
1993.6.31																																	
13:30	54	30	6	1	20	1	3	5	4	37	9		14			7	2	64	23	1	3	1	2	14	1	2		1	1			49	21
13:40	32	24	4	2	12	9	1	5	1	33	5	5	14	4		6	1	56	25		4		2	15	1	2	1		1			49	21
13:50	196	13	1		5	3	3	8	2	17	6		5	3		2		29	17		1			11	1	2	1		1			42	20
14:00	111	17		1	14	7	1	5	3	11	3	1	6	3		1	1	24	14		1			9	1	2	1		1			44	19
14:10	89	22	6	1	10	4	2	8		14	8		10	5	2	5		24	14		1			9	1	2			2			38	18
14:20	24	32	3	2	17	9	9	15	3	13	7	2	10	2	1	2		22	20		1		2	13	1	3			2			39	16
14:30	184	19	1	1	13	2	1	8	4	11	6		8	3	2	4		26	21		1		1	9	1	3			3			38	17
Total	690	157	21	8	91	35	20	54	17	136	44	8	67	20	5	27	4	245	134	1	12	1	7	80	7	16	3	1	11	0	0	299	132

Note : 1 = Private Car 2 = Minibus 3 = Taxi, Tuk Tuk 4 = Bus (Large)
5 = Truck (Cargo) 6 = Motorcycle 7 = Others

Result of Soil Investigation

SUMMARY & CONCLUSIONS

The main purpose of soil and foundation investigations carried out at Tribhuvan International Airport Modernization Project is to obtain the geological profile, its compactness and the safe bearing capacity of soils within the permissible limit of foundation settlements as well as CBR value for pavement design.

The foundation investigations which have been carried out, comprised of drilling 4 numbers of holes up to 12 m depth, along with standard penetration test and extraction of disturbed and undisturbed soil samples. Standard penetration tests (SPT value- N) were carried out at each 2.0 m depth interval along the entire depth of the borehole. All the disturbed samples were collected from split spoon barrel of SPT and undisturbed samples with the aid of open tube samplers. The representative open pit soil samples were also collected from four different locations for laboratory Moisture. Density relation and CBR tests.

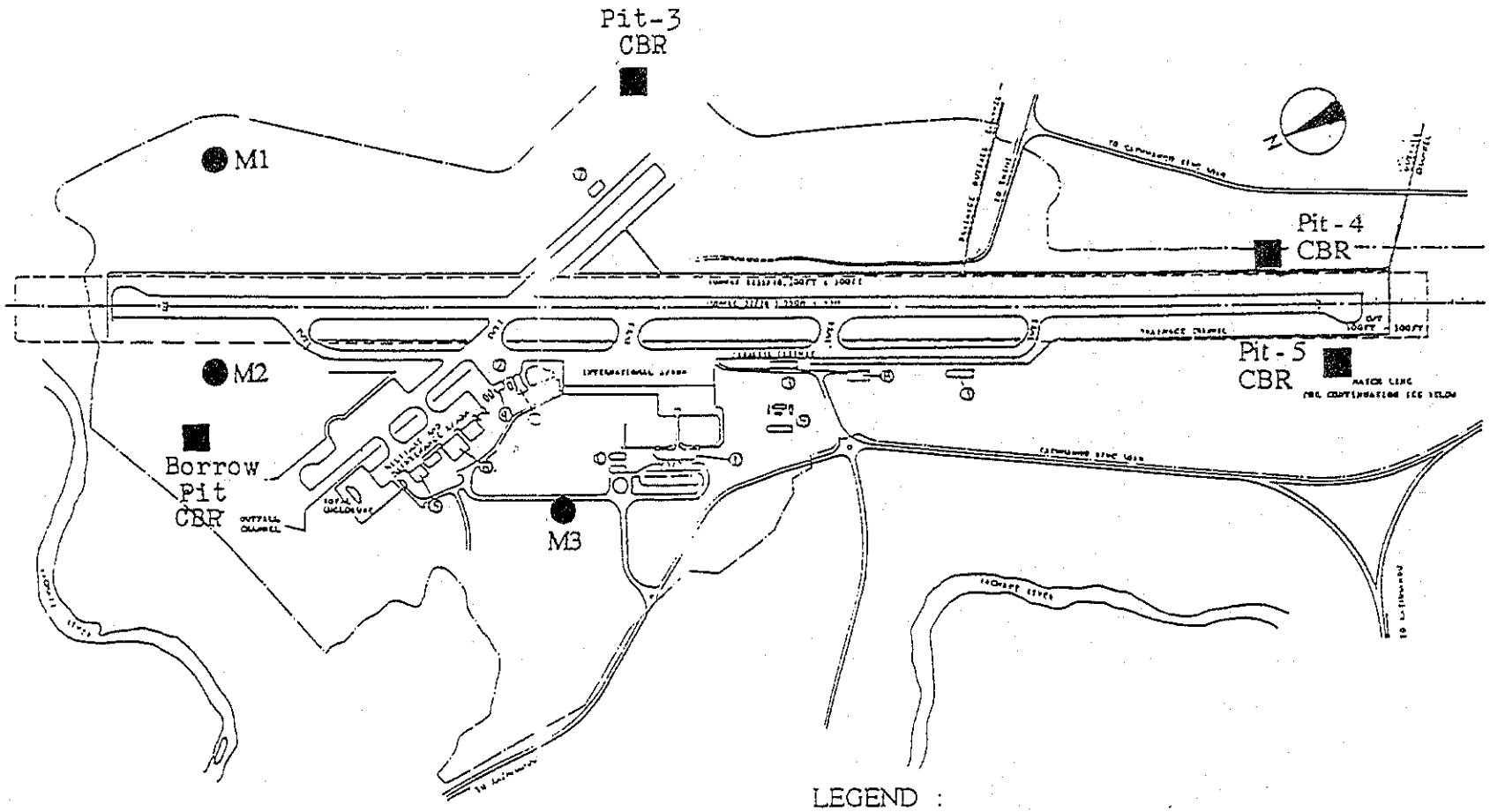
The field investigations were carried out at the exact location as shown in fig-1 as well as fig-1c. The geological soil profiles and ground water level were properly recorded and are shown in Appendix: A.

Alternate layers of micaceous fine SILTY SAND, plastic CLAYEY SILT are the main geological formations available at the boreholes M1, M2 and M3. A number of layers of medium to high plastic clayey silts (Kalimati) are sandwiched between the sandy soils. But in borehole - M4 at Training Center (Sanothimi), clayey SILT and fine sandy SILT are the main type of soils available at the site.

The natural ground water level is not encountered at all the boreholes up to 12.0 m depth. The local accumulated seepage water encountered during drilling time due to rainy season is shown in log of boring sheet of Appendix : A.

The optimum moisture content (OMC), maximum dry density (γ d) and CBR values from 4 numbers of open pit soil samples are given in table - 3.

The complete design parameters needed for foundation and pavement design could be obtained from tables - 1 to 3.



LEGEND :

Mi : Mechanical Boring (10m deep)

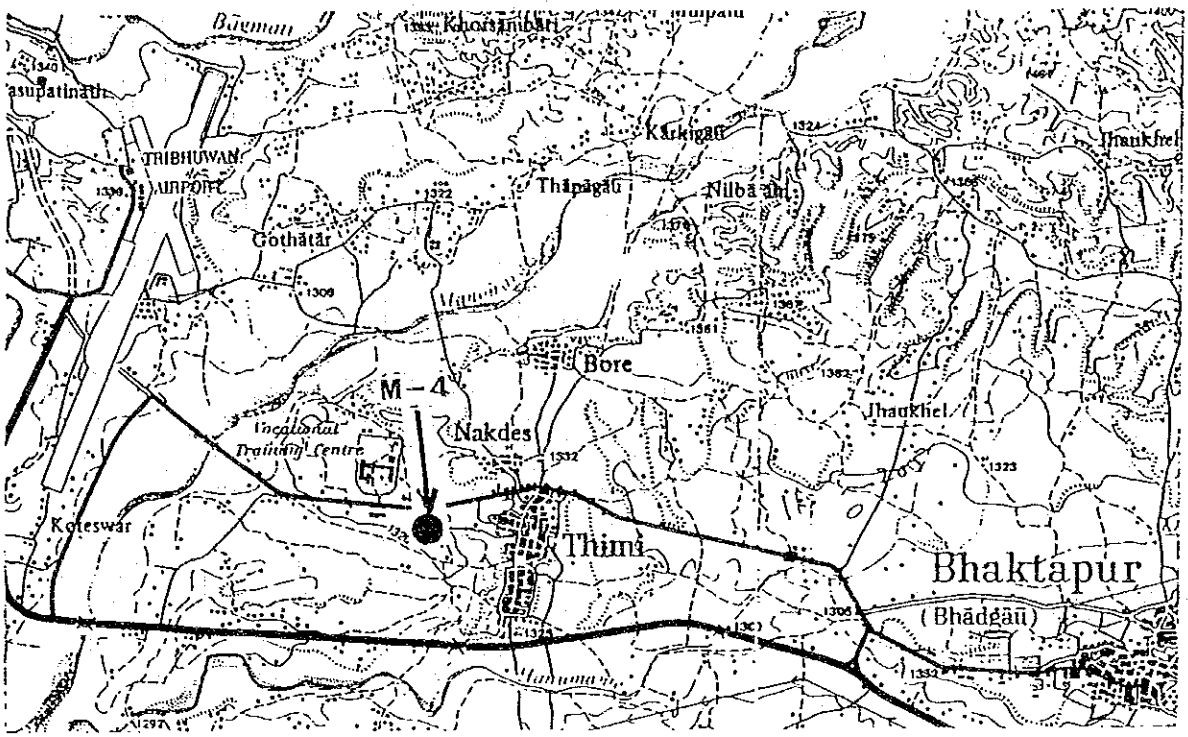
CBR : Laboratory CBR Test Sampling (3 - locations)

Note: 1) One Laboratory CBR Test is to be performed using soil sample taken from a suggested borrow-pit by Department of Civil Aviation.

2) One Mechanical Boring (M4) is to be performed at New Civil Aviation Training Center.

Figure - 1 LOCATION MAP OF SOIL INVESTIGATIONS

LOCATION MAP OF PROPOSED TRAINING CENTRE



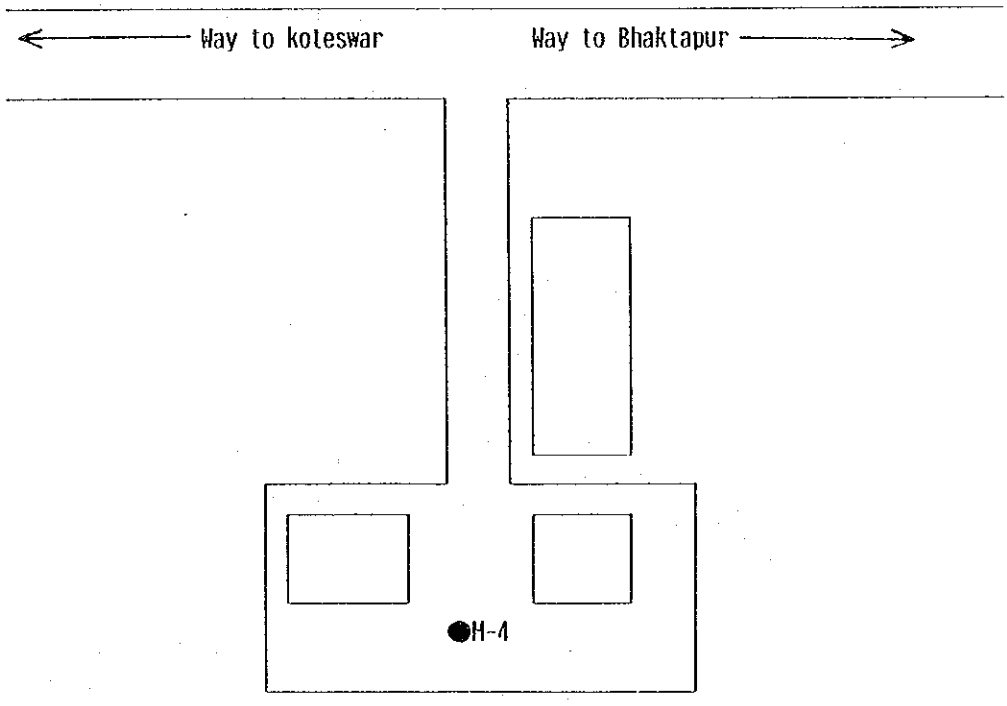


Fig. - 1e Location plan of borehole M4 at proposed Training Center, Sanothimi

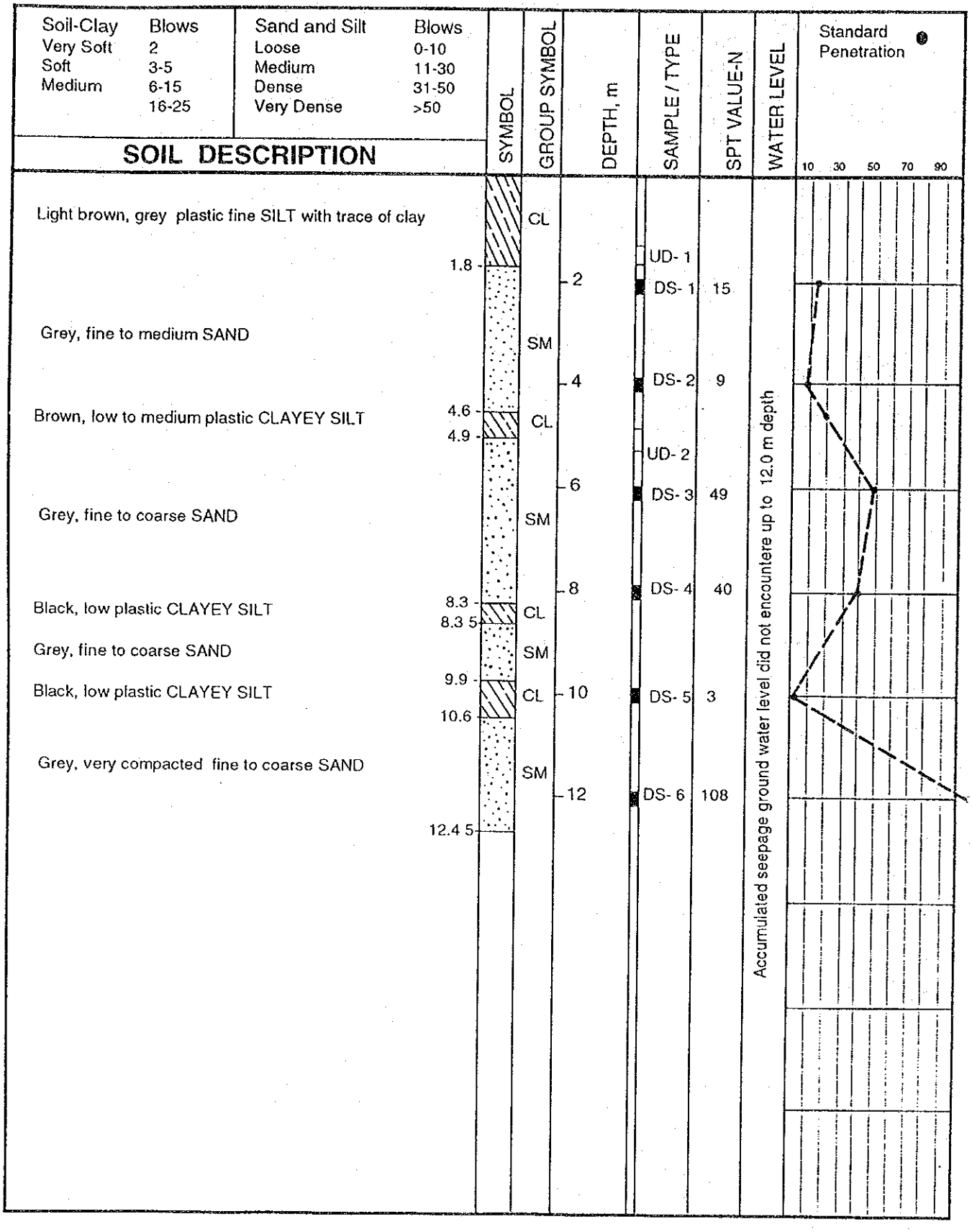
LOG OF BORING-M1

Elevation : 1365 m

PROJECT: Tribhuvan International Airport Modernization Project

DATE: 30 / 7 /1993

Soil-Clay	Blows	Sand and Silt	Blows
Very Soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very Dense	>50



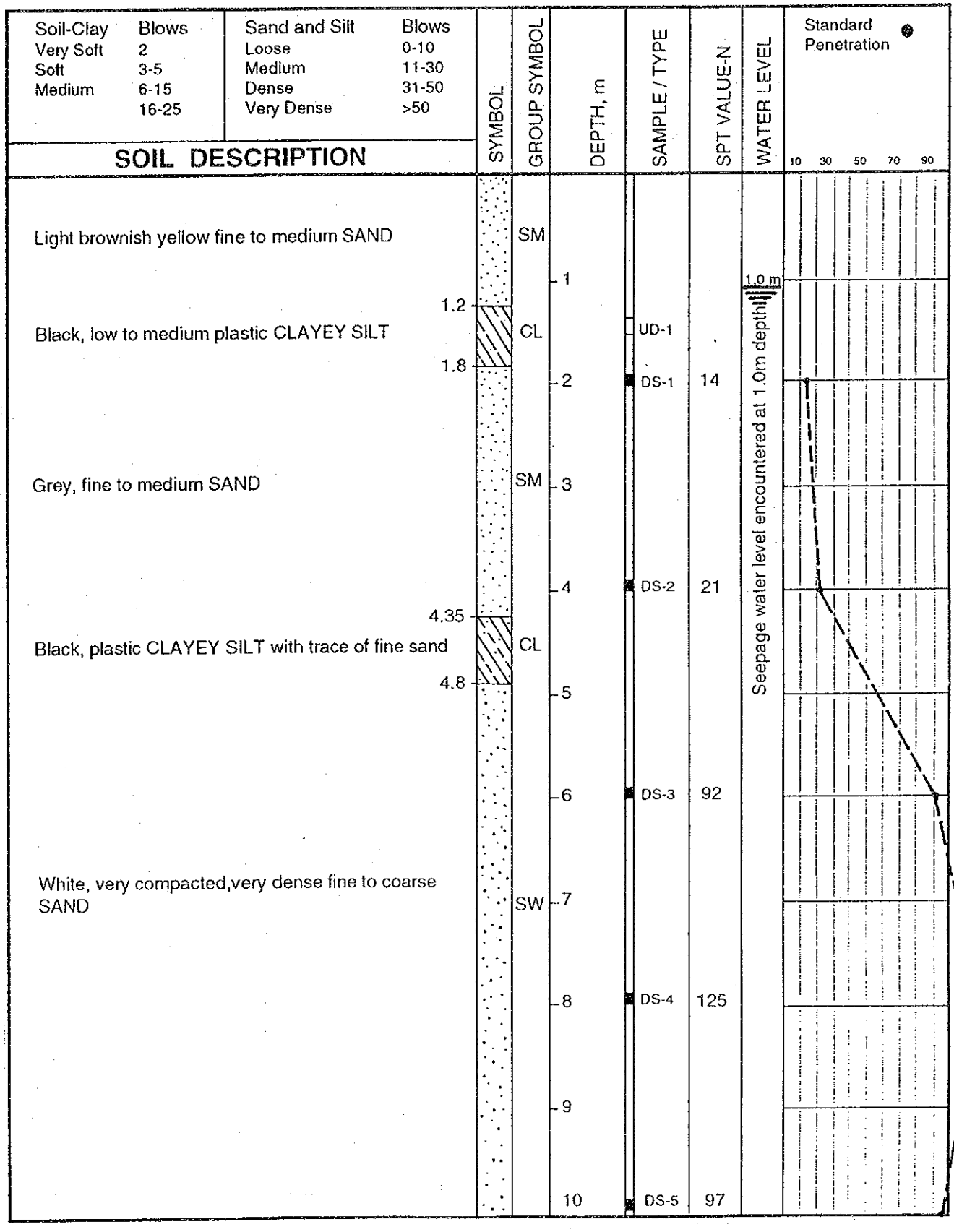
LOG OF BORING- M 2

Elevation : 1350 m

PROJECT: Tribhuvan International Airport Modernization Project

DATE: 28 / 7 /1993

Soil-Clay	Blows	Sand and Silt	Blows
Very Soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very Dense	>50



LOG OF BORING- M 3

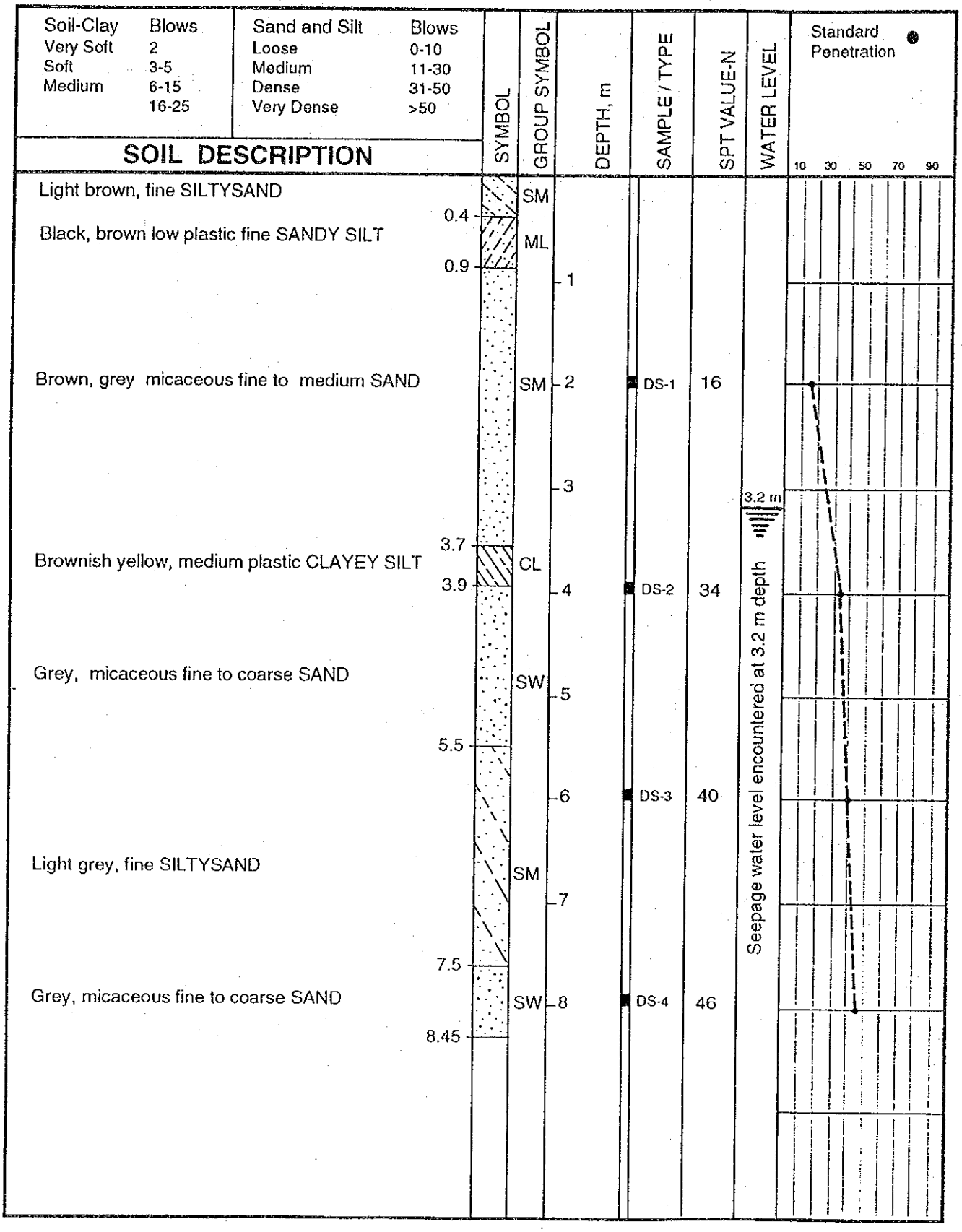
Elevation : 1360 m

PROJECT: Tribhuvan International Airport Modernization Project

DATE: 31 / 7 /1993

Soil-Clay	Blows
Very Soft	2
Soft	3-5
Medium	6-15
	16-25

Sand and Silt	Blows
Loose	0-10
Medium	11-30
Dense	31-50
Very Dense	>50



LOG OF BORING- M 4

Elevation : 1320 m

PROJECT: Tribhuvan International Airport Modernization Project (Sanothimi)

DATE: 26 / 7 /1993

Soil-Clay	Blows	Sand and Silt	Blows
Very Soft	2	Loose	0-10
Soft	3-5	Medium	11-30
Medium	6-15	Dense	31-50
	16-25	Very Dense	>50

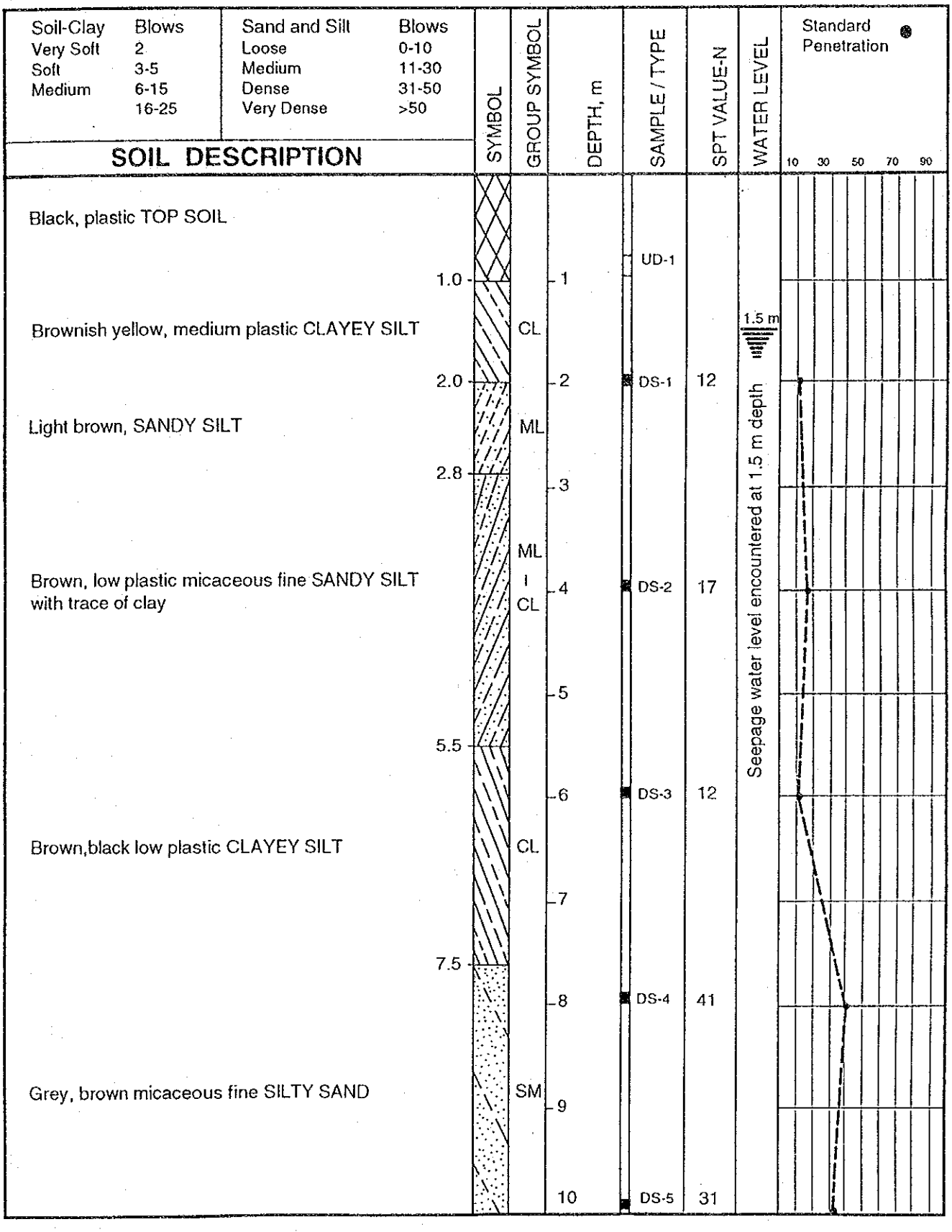


Table - 1 Bearing capacity of foundation - soils from standard penetraton tests

Depth, m	Field SPT value-N	Corrected SPT value-N	Allowable bearing capacity tons/m²
Borehole -M1			
2.0 - 2.45	15	15	13.5
4.5 - 4.45	9	9	80
6.0 - 6.45	49	32	28.0
8.0 - 8.45	40	27	22.5
10.0 - 10.45	3	3	-
12.0 - 12.45	108	61	50.0
Borehole -M2			
Depth, m	Field SPT value-N	Corrected SPT value-N	Allowable bearing capacity tons/m²
2.0 - 2.45	14	14	13.0
4.0 - 4.45	21	18	16.0
6.0 - 6.45	92	53	50.0
8.0 - 8.45	125	70	50.0
10.0 - 10.45	97	58	50.0
Borehole -M3			
Depth, m	Field SPT value-N	Corrected SPT value-N	Allowable bearing capacity tons/m²
2.0 - 2.45	16	15	13.5
4.5 - 4.45	34	24	21.0
6.0 - 6.45	40	27	22.5
8.0 - 8.45	46	30	27.0
Borehole -M4			
Depth, m	Field SPT value-N	Corrected SPT value-N	Allowable bearing capacity tons/m²
2.0 - 2.45	12	12	11.0
4.5 - 4.45	17	16	14.0
6.0 - 6.45	12	12	11.0
8.0 - 8.45	41	28	24.0
10.0 - 10.45	31	23	20.5

Table - 2 Grain size analysis test results

Borehole	Depth, m	Samples		Percent passing through IS - sieves						
		DS	UD	4.75 mm	2.36 mm	1.18 mm	600 mtr	300 mtr	150 mtr	75 mtr
M -1	4.0 - 4.45	2		95.0	78.6	40.3	20.6	4.9	2.6	0.9
M -2	6.0 - 6.45	3		92.8	86.7	68.8	53.5	22.3	12.5	5.0
M - 3	8.0 - 8.45	4		100	94.5	73.6	51.0	15.0	7.1	2.0
M - 4	2.0 - 2.45	1		100	100	97.3	90.9	78.0	64.7	21.9

Table - 3 Summary of geotechnical properties of foundation soils from laboratory tests

Borehole	Depth, m	Samples		Gradation			MDR Test		Atterberg Limits			Unconfined Compressive Strength, Kg/cm²	Compression Index C_c	Natural Moisture Content %	Specific Gravity	CBR Value at 2.5 mm
		DS	UD	Gravel %	Sand %	Silt & Clay %	OMC %	Max. γ_d, gm/cm³	LL	PL	PI					
M1	1.50 - 1.80		1						60	36	24	0.535	0.23	27.7		
	4.00 - 4.45	2		5	94	1									2.56	
	4.65 - 4.95		2						40	29	11	0.457	0.145	31.7		
M2	1.40 - 1.70		1						60	33	27	0.811	0.55	33.2		
	6.00 - 6.45	3		7	88	5									2.58	
M3	8.00 - 8.45	4		0	98	2									2.60	
M4	0.60 - 0.90		1						27	21	6	0.406	0.245	28.7		
	2.00 - 2.45	1		0	78	22									2.60	
Borrow pit	1.0						18.6	1.620								2.052
Pit - 3	1.0						12.5	1.798								5.420
CBR - 4	1.0						10.0	1.897								3.150
CBR - 5	1.5						12.7	1.825								2.052

Note :

DS = disturbed sample UD = undisturbed sample OMC = Optimum moisture content γ_d = Maximum dry density
LL = liquid limit PL = plastic limit PI = plasticity index C_c = Compression index MDR = Moisture density relation

APPENDIX TO CHAPTER 4

Appendix - 4.2.3 Forecast of International Passenger

Table 4.1 Forecast of International Passengers

(1) Foreigners

Y = 0.007 X1 + 0.137 X2 - 156.59

Where, Y : Number of International Passengers (Foreiners)
X1: OECD Members GDP (at Constant 1987 Price)
X2: India GDP (at Constant 1987 Price)

Year	Passengers				GDP			
	(a) Actual (1,000)		(b) Forecast (1,000)		(a) OECD (Bil. US$ in Constant 1987 Price)		(b) India (Bil. Rp. in Constant 1987 Price)	
1983	305		285		8,769		2,776	
1984	300	-1.6%	300	5.3%	8,946	2.0%	2,879	3.7%
1985	304	1.3%	323	7.7%	9,148	2.3%	3,034	5.4%
1986	365	20.1%	354	9.6%	10,951	19.7%	3,171	4.5%
1987	411	12.6%	386	9.0%	12,347	12.7%	3,326	4.9%
1988	470	14.4%	437	13.2%	13,394	8.5%	3,651	9.8%
1989	416	-11.5%	466	6.6%	13,926	4.0%	3,834	5.0%
1990	453	8.9%	493	5.8%	14,318	2.8%	4,013	4.7%
1991	536	18.3%	524	6.3%	14,747	3.0%	4,214	5.0%
1992	601	12.1%	556	6.1%	15,190	3.0%	4,424	5.0%
1995			660		16,598		5,122	
2000			870		19,242		6,537	
2003			1,000		21,026		7,353	
2005			1,090		22,307		7,953	
2010			1,350		25,860		9,676	
Annual %								
1992-1995		3.2%		5.9%		3.0%		5.0%
1995-2000				5.7%		3.0%		5.0%
2000-2003				4.8%		3.0%		4.0%
2003-2005				4.4%		3.0%		4.0%
2005-2010				4.4%		3.0%		4.0%

Table 4.1 Forecast of International Passengers (Continued)

	(2) Nepalese						
	Y = 8.745 X1 - 64.56 - 63.721 D Where, Y : Number of International Passengers (Nepalese) X1: Nepal GDP (at Constant 1974/75 Price) D : Dummy						
Year	Passengers				GDP		Dummy
	(a) Actual (1,000)		(b) Forecast (1,000)		(a) Nepal (Bil. Rs. in Constant 1974/75 Price)		
1983	110		130		22.3		0
1984	165	50.0%	142	9.2%	23.6	5.8%	0
1985	179	8.5%	151	6.3%	24.6	4.2%	0
1986	158	-11.7%	159	5.3%	25.6	4.1%	0
1987	163	3.2%	176	10.7%	27.5	7.4%	0
1988	158	-3.1%	186	5.7%	28.7	4.4%	0
1989	198	25.3%	207	11.3%	31.0	8.0%	0
1990	146	-26.3%	155	-25.1%	32.4	4.5%	1
1991	245	67.8%	225	45.2%	33.1	2.2%	0
1992	179	-26.9%	170	-24.4%	34.1	3.0%	1
1995			280		39.6		0
2000			380		50.8		0
2003			430		57.1		0
2005			480		61.8		0
2010			590		75.1		0
Annual %							
1992-1995		16.1%		18.1%		5.1%	
1995-2000				6.3%		5.1%	
2000-2003				4.2%		4.0%	
2003-2005				5.7%		4.0%	
2005-2010				4.2%		4.0%	

Note: The V-shape decline of the actual traffic movement of the international passengers traffic (Nepalese) in 1990 is mainly due to the impact of fuel crisis in Nepal caused by the delay of renewal of the Trade and Transit Treaty with India.
Accordingly, the 1990 value of international passengers (Nepalese) is assumed to be a kind of an extraordinary value. Then, the dummy variable is set up as an independent variable in addition, and a dummy value is given to 1990. Also for 1992, a dummy value is given.
For forecasting future numbers of passengers, dummy values are set up to be zero in the application of the regression model.
In the description of regression formula in the main text, the part of dummy variable is omitted.

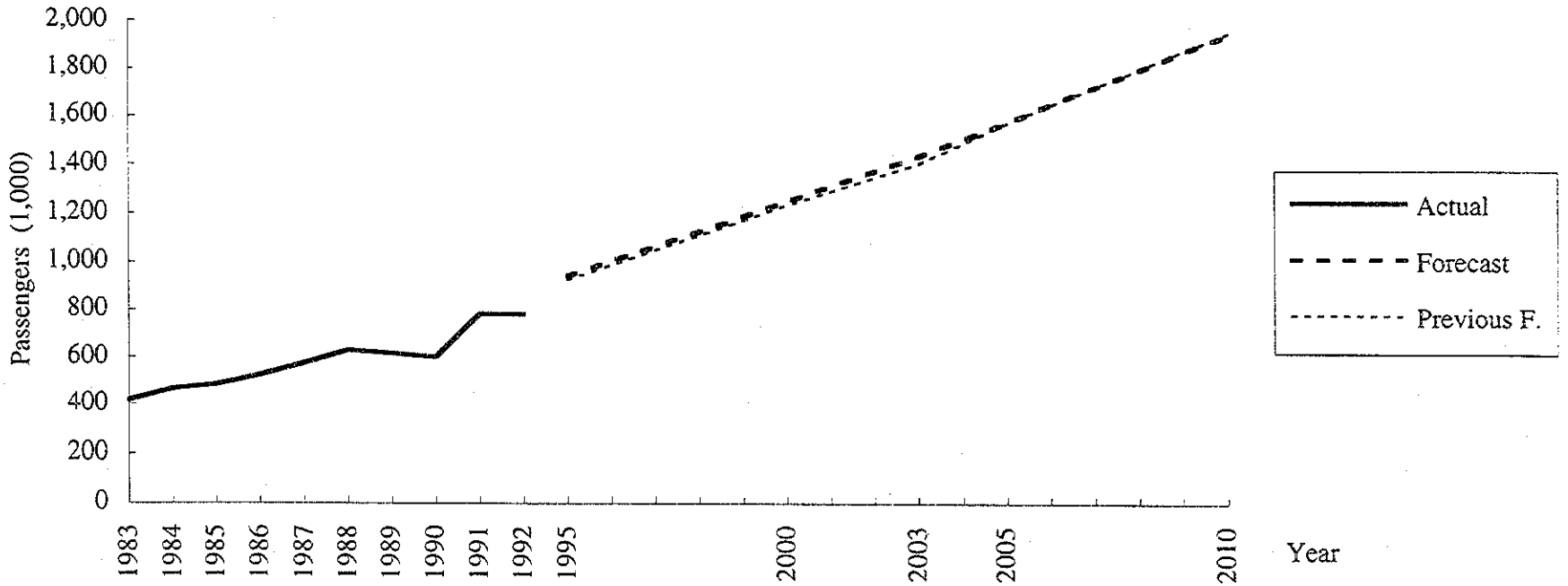


Fig. 4.1 International Passengers Traffic Forecast

Appendix - 4.3.3 Forecast of Domestic Passenger

Table 4.2 Forecast of Domestic Passengers

Y = 7.168 X1 + 10.026

Where, Y : Number of Domestic Passengers
X1: Nepal GDP (at Constant 1974/75 Price)

Year	Passengers (a) Actual (1,000)		Passengers (b) Forecast (1,000)		GDP (a) Nepal (Bil. Rs. in Constant 1974/75 Price)	
1983	153		170		22.3	
1984	173	13.1%	179	5.3%	23.6	5.8%
1985	187	8.1%	186	3.9%	24.6	4.2%
1986	203	8.6%	194	4.3%	25.6	4.1%
1987	219	7.9%	207	6.7%	27.5	7.4%
1988	264	20.5%	216	4.3%	28.7	4.4%
1989	204	-22.7%	232	7.4%	31.0	8.0%
1990	217	6.4%	242	4.3%	32.4	4.5%
1991	216	-0.5%	247	2.1%	33.1	2.2%
1992	292	35.2%	254	2.8%	34.1	3.0%
1995			290		39.6	
2000			370		50.8	
2003			420		57.1	
2005			450		61.8	
2010			550		75.1	
Annual %						
1992-1995		-0.2%		4.5%		5.1%
1995-2000				5.0%		5.1%
2000-2003				4.3%		4.0%
2003-2005				3.5%		4.0%
2005-2010				4.1%		4.0%

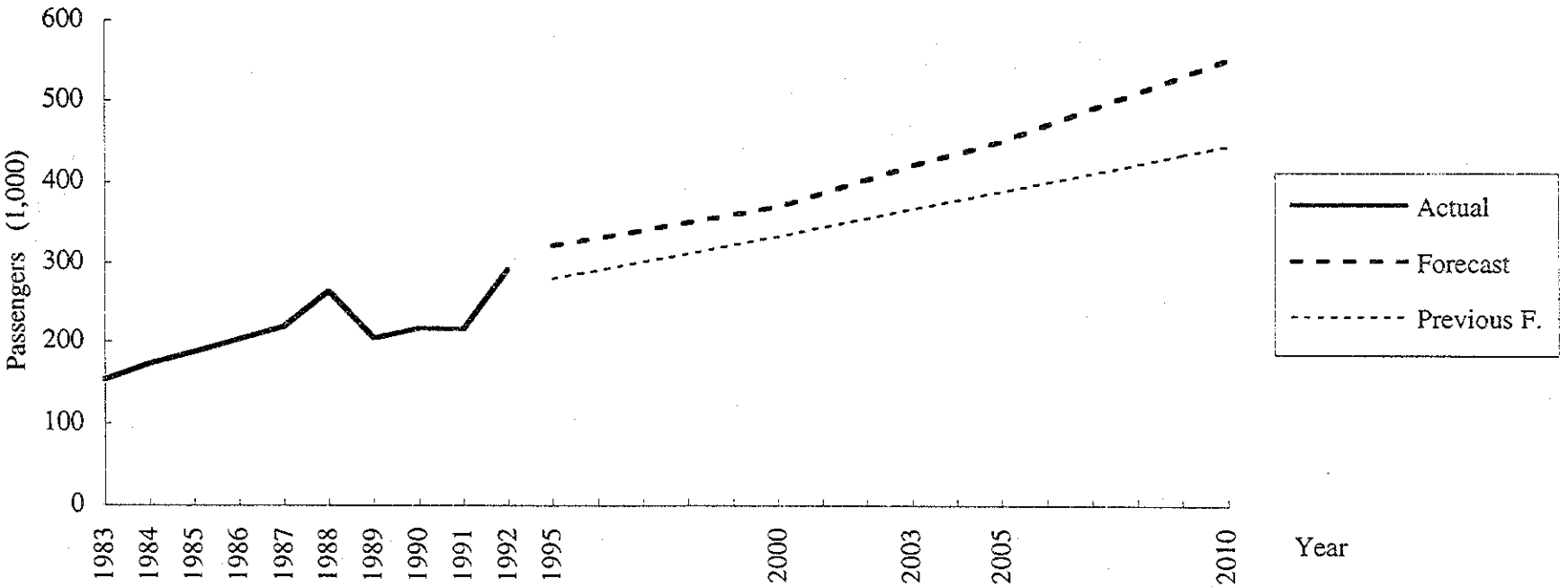


Fig. 4.2 Domestic Passengers Traffic Forecast

Appendix - 4.4.3 Forecast of International Cargo

Table 4.3 Forecast of International Cargo

(1) Loaded

Y = 0.367 X1 + 3.063 X2 - 9334.014

Where, Y : Volume of International Cargo (Loaded)
X1: OECD Members GDP (at Constant 1987 Price)
X2: India GDP (at Constant 1987 Price)

Year	Cargo (Loaded)				GDP			
	(a) Actual (ton)		(b) Forecast (ton)		(a) OECD (Bil. US$ in Constant 1987 Price)		(b) India (Bil. Rp. in Constant 1987 Price)	
1983	1,673		2,387		8,769		2,776	
1984	2,400	43.5%	2,768	16.0%	8,946	2.0%	2,879	3.7%
1985	4,172	73.8%	3,316	19.8%	9,148	2.3%	3,034	5.4%
1986	4,450	6.7%	4,398	32.6%	10,951	19.7%	3,171	4.5%
1987	5,917	33.0%	5,385	22.4%	12,347	12.7%	3,326	4.9%
1988	7,664	29.5%	6,765	25.6%	13,394	8.5%	3,651	9.8%
1989	8,811	15.0%	7,520	11.2%	13,926	4.0%	3,834	5.0%
1990	5,218	-40.8%	8,213	9.2%	14,318	2.8%	4,013	4.7%
1991	7,389	41.6%	8,986	9.4%	14,747	3.0%	4,214	5.0%
1992	11,815	59.9%	9,791	9.0%	15,190	3.0%	4,424	5.0%
1995			12,450		16,598		5,122	
2000			17,750		19,242		6,537	
2003			20,900		21,026		7,353	
2005			23,210		22,307		7,953	
2010			29,790		25,860		9,676	
Annual %								
1992-1995		1.8%		8.3%		3.0%		5.0%
1995-2000				7.4%		3.0%		5.0%
2000-2003				5.6%		3.0%		4.0%
2003-2005				5.4%		3.0%		4.0%
2005-2010				5.1%		3.0%		4.0%

Table 4.3 Forecast of International Cargo (Continued)

(2) International Cargo (Unloaded)						
Y = 348.91 X1 - 4411.558 Where, Y : Volume of International Cargo (Unloaded) X1: Nepal GDP (at Constant 1974/75 Price)						
Year	Cargo (Unloaded)				GDP	
	(a) Actual (ton)		(b) Forecast (ton)		(a) Nepal (Bil. Rs. in Constant 1974/75 Price)	
1983	2,346		3,369		22.3	
1984	2,860	21.9%	3,823	13.5%	23.6	5.8%
1985	3,795	32.7%	4,172	9.1%	24.6	4.2%
1986	4,289	13.0%	4,521	8.4%	25.6	4.1%
1987	6,486	51.2%	5,183	14.6%	27.5	7.4%
1988	7,782	20.0%	5,602	8.1%	28.7	4.4%
1989	8,400	7.9%	6,405	14.3%	31.0	8.0%
1990	7,735	-7.9%	6,893	7.6%	32.4	4.5%
1991	6,880	-11.1%	7,137	3.5%	33.1	2.2%
1992	4,018	-41.6%	7,486	4.9%	34.1	3.0%
1995			9,400		39.6	
2000			13,300		50.8	
2003			15,510		57.1	
2005			17,140		61.8	
2010			21,810		75.1	
Annual %						
1992-1995		32.8%		7.9%		5.1%
1995-2000				7.2%		5.1%
2000-2003				5.3%		4.0%
2003-2005				5.1%		4.0%
2005-2010				4.9%		4.0%

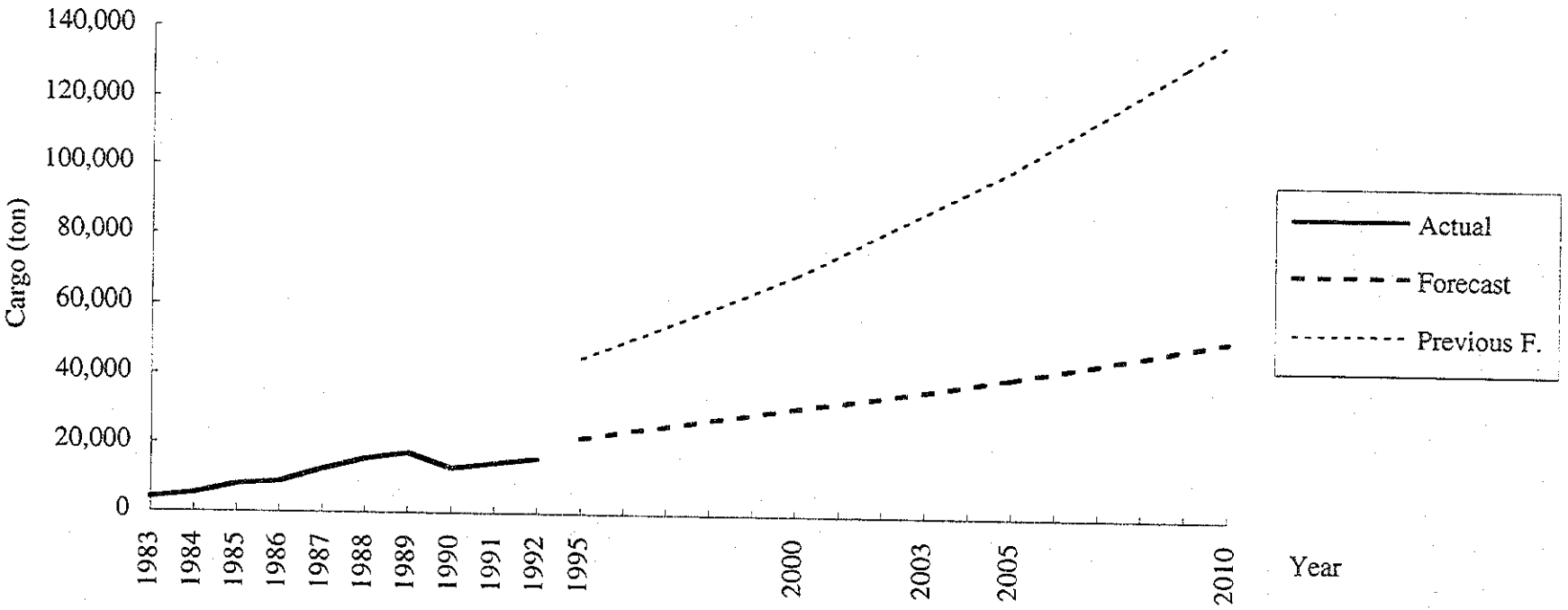


Fig. 4.3 International Cargo Traffic Forecast

Appendix - 4.4.3 Forecast of Domestic Cargo

Table 4.4 Forecast of Domestic Cargo

Y = 22.755 X1 - 171.249 - 255.947 D

Where, Y : Volume of Domestic Cargo
X1: Nepal GDP (at Constant 1974/75 Price)
D : Dummy

Year	Cargo (a) Actual (ton)		Cargo (b) Forecast (ton)		GDP (a) Nepal (Bil. Rs. in Constant 1974/75 Price)		Dummy
1983	352		336		22.3		0
1984	372	5.7%	366	8.9%	23.6	5.8%	0
1985	335	-9.9%	389	6.3%	24.6	4.2%	0
1986	369	10.1%	411	5.7%	25.6	4.1%	0
1987	555	50.4%	455	10.7%	27.5	7.4%	0
1988	530	-4.5%	482	5.9%	28.7	4.4%	0
1989	497	-6.2%	534	10.8%	31.0	8.0%	0
1990	453	-8.9%	566	6.0%	32.4	4.5%	0
1991	326	-28.0%	326	-42.4%	33.1	2.2%	1
1992	680	108.6%	605	85.6%	34.1	3.0%	0
1995			730		39.6		0
2000			980		50.8		0
2003			1,130		57.1		0
2005			1,230		61.8		0
2010			1,540		75.1		0
Annual %							
1992-1995		2.4%		6.5%		5.1%	
1995-2000				6.1%		5.1%	
2000-2003				4.9%		4.0%	
2003-2005				4.3%		4.0%	
2005-2010				4.6%		4.0%	

Note: The V-shape decline of the actual traffic movement of the domestic cargo traffic in 1991 is mainly due to the impact of fuel crisis in Nepal caused by the delay of renewal of the Trade and Transit Treaty with India.
Accordingly, the 1991 value of domestic cargo is assumed to be a kind of an extraordinary value. Then, the dummy variable is set up as an independent variable in addition, and a dummy value is given to 1991.
For forecasting future volumes of cargo, dummy values are set up to be zero in the application of the regression model.
In the description of regression formula in the main text, the part of dummy variable is omitted.

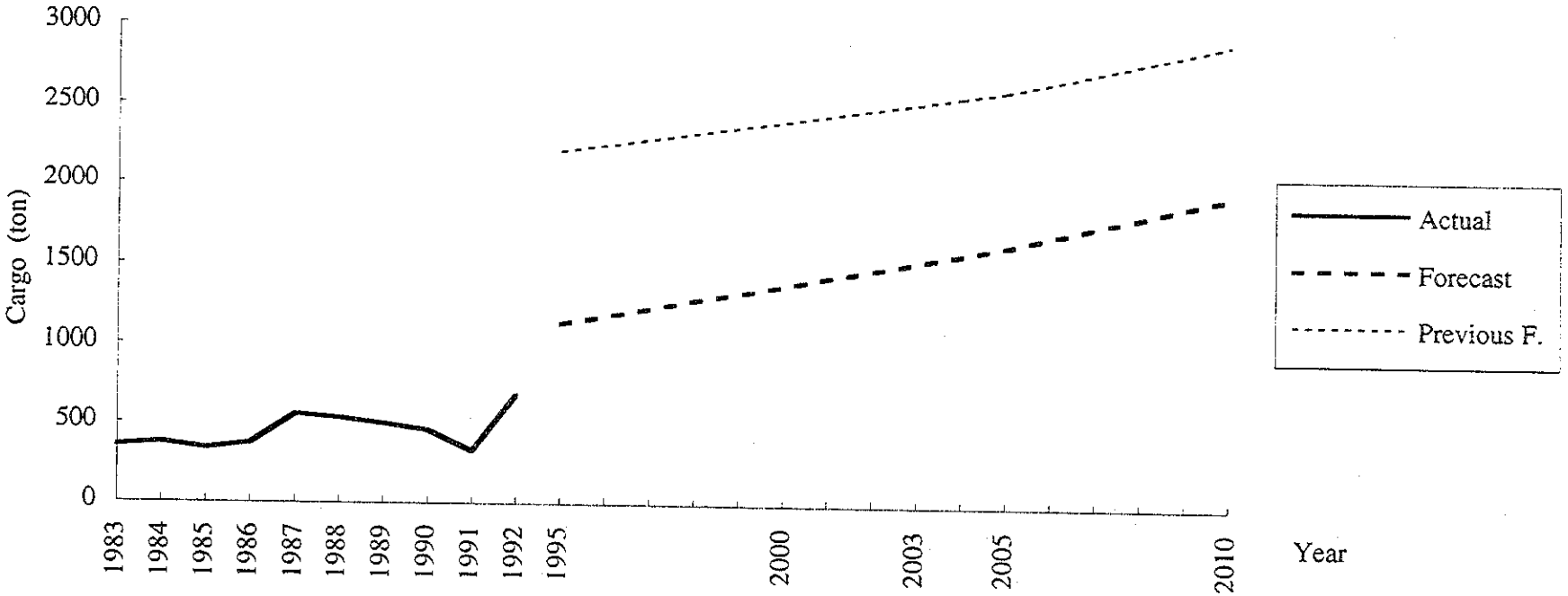


Fig. 4.4 Domestic Cargo Traffic Forecast

APPENDIX TO CHAPTER 5

Appendix - 5.4.1 Major Facility Requirements for Passenger Terminal Building

MAJOR FACILITY REQUIREMENTS FOR PASSENGER TERMINAL BUILDING

The major facility requirements for both an international and a domestic passenger terminal building were calculated by using the calculation formulas of IATA and the passenger processing time survey data (Refer to Appendix 5.2.1).

The requirements are summarized as follows, and a detail calculation is discussed in this section.

Table A5.1.1 Summary ; International Passenger Terminal Building

	International	Short-term Development 2003	Long-term Development 2010
	Peak-hour PAX (One-way)	600 Pax	800 Pax
1.	Departure Curb	44 m	59 m
2.	Departures Concourse	1,350 sq.m	1,800 sq.m
3.	Security Check before Check-in	2 units	3 units
4.	Customs Inspection -Departure	9 positions	12 positions
5.	Check-in Counter	22units (44 m long)	30units (60 m long)
6.	Queuing Area Check-in	165 sq.m	220 sq.m
7.	Passport Control -Departure	14 positions	18 positions
8.	Security Check Before Departure Lounge	2 units	3 units
9.	Departure Lounge	1,100 sq.m	1,450 sq.m
10.	Arrivals Health Control	3 positions	3 positions
11.	Passport Control -Arrival	22 positions	30 positions
12.	Queuing Area Passport Control -Arrival	300 sq.m	400 sq.m
13.	Baggage Claim Area	600 sq.m	720 sq.m
14.	No. of Baggage Claim Devices	2 devices Wide-body 1 Narrow-body 1	3 devices Wide-body 1 Narrow-body 2
15.	Customs Inspection -Arrival	9 positions	12 positions
16.	Queuing Area Arrival Customs	66 sq.m	88 sq.m
17.	Arrival Concourse	1,250 sq.m	1,650 sq.m
18.	Arrival Curb Length	44 m	59 m
19.	Restaurant Seating Capacity	308 seats 310 sq.m DC-10	550 seats 550 sq.m B747

Table A5.1.2 Summary ; Domestic Passenger Terminal Building

	Domestic	Short-term Development 2003	Long-term Development 2010
	Peak-hour PAX (One-way)	180 Pax	240 Pax
1.	Departure Curb	19 m	25 m
2.	Departures Concourse	405 sq.m	540 sq.m
3.	Security Check before Check-in	1 unit	1 unit
4.	Check-in Counter	7units (14 m long)	9units (18 m long)
5.	Queuing Area Check-in	50 sq.m	60 sq.m
6.	Security Check Before Departure Lounge	2 units	3 units
7.	Departure Lounge	330 sq.m	440 sq.m
8.	Baggage Claim Area	180 sq.m	240 sq.m
9.	No. of Baggage Claim Devices	1 device Narrow-body 1	1 device Narrow-body 1
10.	Arrival Concourse	380sq.m	500sq.m
11.	Arrival Curb Length	19m	25 m
12.	Restaurant Seating Capacity	210 seats 210 sq.m	210 seats 210 sq.m

Table A5.1.3 Major Facilities Requirement for International, Short-term Development -2003

	Item	Formula	Require-ment
1.	Departures Curb	L = 0.095ap (+10%)	43.9
2.	Departure Concourse	A = 0.75[a (1+o)+b]	1,350
3.	Security Check before Check-in - Centralized	N = (a+b)/300	2.0
4.	Customs Inspection - Departure	N = eft+4/30 (+10%)	8.8
5.	Check-in Counter (Centralized, Common Check-in)	N = (a+b)t_1/60 (+10%)	22.0
6.	Queueing Area - Check-in	A = 0.25(a+b) (+10%)	165.0
7.	Passport Control - Departure	N = (a+b)/t_2/60 (+10%)	13.2
8.	Security Check before Departure Lounge - Centralized	N = (a+b)/300	2.0
9.	Departure Lounge (excluding concessions and bar/snack)	A = c(ui+vk)/30 (+10%)	1,100
10.	Arrivals Health Check (where required)	N = 450/30t_5	2.6
11.	Passport Control - Arrival	N = (d+b)t_3/30 (+10%)	22.0
12.	Queueing Area - Passport Control - Arrival	A = 0.50(d+b)	300.0
13.	Baggage Claim Area (excluding claim devices)	A = 0.9e (+10%)	594
14.	Number of Baggage Claim Devices Wide-body aircraft Narrow-body aircraft	 N = eq/425 N = er/300	 1.0 0.6
15.	Customs Inspection - Arrival	N = eft$_4$/30 (+10%)	8.8
16.	Queueing Area - Arrival Customs	A = 0.50ef (+10%)	66.0
17.	Arrivals Concourse Waiting Area (excluding concessions)	A = 0.375(d+b+2do) (+10%)	1,237.5
18.	Arrivals Curb	L = 0.095dp (+10%)	43.9
19.	Restaurant Seating Capacity to Meet Irregularities	N = m (+10%)	308.0

Table A5.1.4 Value Used in the Calculation at 2003

Item	factor
Peak hour number of Originating passengers	a = 600
Peak hour number of Departing passengers	c = 600
Peak hour number of Terminating passengers	d = 600
Peak hour number of Transfer passengers	b = 0
Peak hour number of Terminating and International/Domestic Transfer passengers	e = 600
Portion of passengers using car/taxi : a) Originating b) Terminating	 p = 0.7 p = 0.7
Portion of Long-haul Departing passengers during peak hour	i = 0.6
Portion of Short-haul Departing passengers during peak hour	k = 0.4
Portion of Terminating passengers arriving by Wide-body aircraft during peak hour	q = 0.7
Portion of Terminating passengers arriving by Narrow-body aircraft during peak hour	r = 0.3
Time of Arrival of first passenger at gate hold room	g = 50
Number of Visitors : a) Originating passenger b) Terminating passenger	 o = 2 o = 2
Maximum number of seats on largest aircraft	m = 280
Average occupancy time of departure lounge per Departing : a) Long-haul passenger b) Short-haul passenger	 u = 50 v = 50
Portion of passengers to be customs checked	f = 0.2
Average processing time per passenger at : a) Departure check-in counter b) Passport control -Departure c) Passport control - Arrival and Departure d) Customs - Arrival e) Arrival Health Check	 t_1 = 2 t_2 = 1.2 t_3 = 1.0 t_4 = 2.0 t_5 = 0.17

Table A5.1.5 Major Facilities Requirement for International, Long-term Development -2010

	Item	Formula	Require-ment
1.	Departures Curb	L = 0.095ap (+10%)	58.6
2.	Departure Concourse	A = 0.75[a (1+o)+b]	1,800
3.	Security Check before Check-in - Centralized	N = (a+b)/300	2.7
4.	Customs Inspection - Departure	N = cft+4/30 (+10%)	11.7
5.	Check-in Counter (Centralized, Common Check-in)	N = (a+b)t_1/60 (+10%)	29.3
6.	Queueing Area - Check-in	A = 0.25(a+b) (+10%)	220
7.	Passport Control - Departure	N = (a+b)/t_2/60 (+10%)	17.6
8.	Security Check before Departure Lounge - Centralized	N = (a+b)/300	2.7
9.	Departure Lounge (excluding concessions and bar/snack)	A = c(ui+vk)/30 (+10%)	1,447
10.	Arrivals Health Check (where required)	N = 450/30t_5	2.6
11.	Passport Control - Arrival	N = (d+b)t_3/30 (+10%)	29.3
12.	Queueing Area - Passport Control - Arrival	A = 0.50(d+b)	400
13.	Baggage Claim Area (excluding claim devices)	A = 0.9e (+10%)	720
14.	Number of Baggage Claim Devices Wide-body aircraft Narrow-body aircraft	 N = eq/425 N = er/300	 1.0 1.2
15.	Customs Inspection - Arrival	N = eft$_4$/30 (+10%)	11.7
16.	Queueing Area - Arrival Customs	A = 0.50ef (+10%)	88.0
17.	Arrivals Concourse Waiting Area (excluding concessions)	A = 0.375(d+b+2do) (+10%)	1,650
18.	Arrivals Curb	L = 0.095dp (+10%)	58.6
19.	Restaurant Seating Capacity to Meet Irregularities	N = m (+10%)	550.0

Table A5.1.6 Value Used in the Calculation at 2010

Item	factor
Peak hour number of Originating passengers	a = 800
Peak hour number of Departing passengers	c = 800
Peak hour number of Terminating passengers	d = 800
Peak hour number of Transfer passengers	b = 0
Peak hour number of Terminating and International/Domestic Transfer passengers	e = 800
Portion of passengers using car/taxi :	
a) Originating	p = 0.7
b) Terminating	p = 0.7
Portion of Long-haul Departing passengers during peak hour	i = 0.6
Portion of Short-haul Departing passengers during peak hour	k = 0.4
Portion of Terminating passengers arriving by Wide-body aircraft during peak hour	q = 0.55
Portion of Terminating passengers arriving by Narrow-body aircraft during peak hour	r = 0.45
Time of Arrival of first passenger at gate hold room	g = 50
Number of Visitors :	
a) Originating passenger	o = 2
b) Terminating passenger	o = 2
Maximum number of seats on largest aircraft	m = 500
Average occupancy time of departure lounge per Departing :	
a) Long-haul passenger	u = 50
b) Short-haul passenger	v = 50
Portion of passengers to be customs checked	f = 0.2
Average processing time per passenger at :	
a) Departure check-in counter	t_1 = 2
b) Passport control -Departure	t_2 = 1.2
c) Passport control - Arrival and Departure	t_3 = 1.0
d) Customs - Arrival	t_4 = 2.0
e) Arrival Health Check	t_5 = 0.17

Table A5.1.7 Major Facilities Requirement for Domestic, Short-term Development -2003

	Item	Formula	Require-ment
1.	Departures Curb	L = 0.095ap (+10%)	18.8
2.	Departure Concourse	A = 0.75[a (1+o)+b]	405
3.	Security Check Check-in - Centralized	N = (a+b)/300	0.6
4.	Check-in Counter (Centralized, Common Check-in)	N = (a+b)t_1/60 (+10%)	7.0
5.	Queueing Area - Check-in	A = 0.25(a+b) (+10%)	50
6.	Security Check before Departure Lounge - Centralized	N = (a+b)/300	0.6
7.	Departure Lounge (excluding concessions and bar/snack)	A = c(ui+vk)/30 (+10%)	330
8.	Baggage Claim Area (excluding claim devices)	A = 0.9e (+10%)	179
9.	Number of Baggage Claim Devices Wide-body aircraft Narrow-body aircraft	 N = eq/425 N = er/300	 0 0.6
10.	Arrivals Concourse Waiting Area (excluding concessions)	A = 0.375(d+b+2do) (+10%)	372
11.	Arrivals Curb	L = 0.095dp (+10%)	18.8
12.	Restaurant Seating Capacity to Meet Irregularities	N = m (+10%)	209

Table A5.1.8 Value Used in the Calculation at 2003

Item	factor
Peak hour number of Originating passengers	a = 180
Peak hour number of Departing passengers	c = 180
Peak hour number of Terminating passengers	d = 180
Peak hour number of Transfer passengers	b = 0
Peak hour number of Terminating and International/Domestic Transfer passengers	e = 180
Portion of passengers using car/taxi : a) Originating b) Terminating	 p = 0.7 p = 0.7
Portion of Long-haul Departing passengers during peak hour	i = 0
Portion of Short-haul Departing passengers during peak hour	k = 1
Portion of Terminating passengers arriving by Wide-body aircraft during peak hour	q = 0
Portion of Terminating passengers arriving by Narrow-body aircraft during peak hour	r = 1
Time of Arrival of first passenger at gate hold room	g = 50
Number of Visitors : a) Originating passenger b) Terminating passenger	 o = 2.0 o = 2.0
Maximum number of seats on largest aircraft	m = 190
Average occupancy time of departure lounge per Departing : a) Long-haul passenger b) Short-haul passenger	 u = 50 v = 50
Average processing time per passenger at Departure check-in counter	t_1 = 2

Table A5.1.9 Major Facilities Requirement for Domestic, Long-term Development -2010

	Item	Formula	Require-ment
1.	Departures Curb	L = 0.095ap (+10%)	25
2.	Departure Concourse	A = 0.75[a (1+o)+b]	540
3.	Security Check Check-in - Centralized	N = (a+b)/300	0.8
4.	Check-in Counter (Centralized, Common Check-in)	N = (a+b)t_1/60 (+10%)	9.0
5.	Queucing Area - Check-in	A = 0.25(a+b) (+10%)	60
6.	Security Check before Departure Lounge - Centralized	N = (a+b)/300	0.8
7.	Departure Lounge (excluding concessions and bar/snack)	A = c(ui+vk)/30 (+10%)	440
8.	Baggage Claim Area (excluding claim devices)	A = 0.9e (+10%)	238
9.	Number of Baggage Claim Devices Wide-body aircraft Narrow-body aircraft	 N = eq/425 N = er/300	 0 0.8
10.	Arrivals Concourse Waiting Area (excluding concessions)	A = 0.375(d+b+2do) (+10%)	495
11.	Arrivals Curb	L = 0.095dp (+10%)	25
12.	Restaurant Seating Capacity to Meet Irregularities	N = m (+10%)	209

Table A5.1.8 Value Used in the Calculation at 2003

Item	factor
Peak hour number of Originating passengers	a = 240
Peak hour number of Departing passengers	c = 240
Peak hour number of Terminating passengers	d = 240
Peak hour number of Transfer passengers	b = 0
Peak hour number of Terminating and International/Domestic Transfer passengers	e = 240
Portion of passengers using car/taxi : a) Originating b) Terminating	 p = 0.7 p = 0.7
Portion of Long-haul Departing passengers during peak hour	i = 0
Portion of Short-haul Departing passengers during peak hour	k = 1
Portion of Terminating passengers arriving by Wide-body aircraft during peak hour	q = 0
Portion of Terminating passengers arriving by Narrow-body aircraft during peak hour	r = 1
Time of Arrival of first passenger at gate hold room	g = 50
Number of Visitors : a) Originating passenger b) Terminating passenger	 o = 2.0 o = 2.0
Maximum number of seats on largest aircraft	m = 190
Average occupancy time of departure lounge per Departing : a) Long-haul passenger b) Short-haul passenger	 u = 50 v = 50
Average processing time per passenger at Departure check-in counter	t_1 = 2

APPENDIX TO CHAPTER 6

Appendix - 6.2.3 Calculation of Runway Capacity for TIA at the Year 2010

Calculation of Runway Capacity for TIA at the Year 2010

1. Conditions of the calculations are as follows.

1) Runway Usage Proportion by Aircraft Types

Large, Medium and Small Jet	(B747, DC-10, B-767, A-300, A-320, B-757, B-727) :	43%	12,680
HS-748	:	27%	7,880
DHC-6	:	32%	8,750

Large Jet : Medium & Small Jet = 23% : 77% (2,950 : 9,730)
(DC-10, B-767) (B-757~B-727)

The above proportion are based on the forecast annual aircraft movements in the year 2010.

2) Aircraft Speed

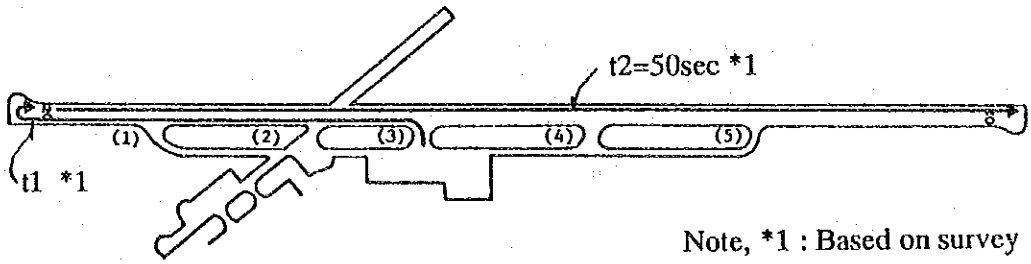
	Landing	Take-off	Climb over VOR/DME	Climb in TMA
Jet	150 kt	170 kt	210 kt	250 kt
HS-748	120 kt	150 kt	175 kt	200 kt
DHC-6	70 kt	85 kt	93 kt	101 kt

Case-1 Full length of the existing parallel taxiway is available to all types of aircraft

1) Runway Occupancy Time

a. Take-off followed by Take-off

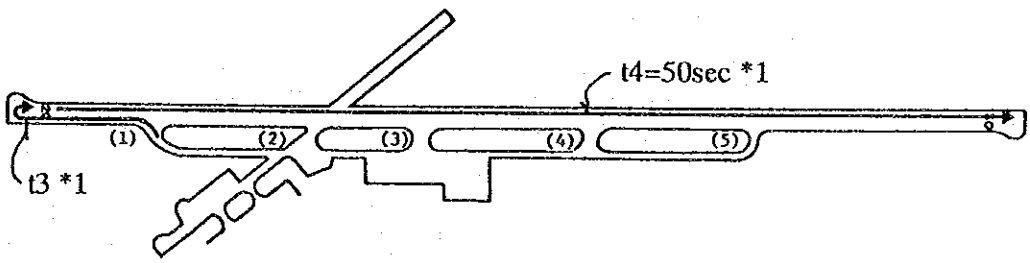
Jet



Note, *1 : Based on survey

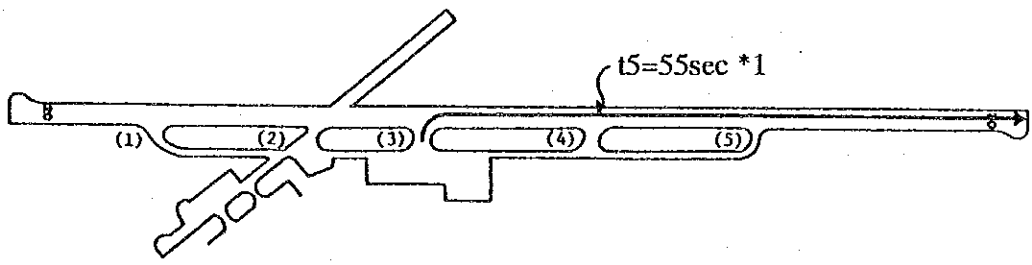
t1 = (0.5 km ÷ 30 km/hr) + 10 sec (turning) = 70 sec
t2 = 50 sec
T1 = t1 + t2 = 120 sec

HS 748



t3 = (0.5 km ÷ 30 km/hr) + 5 sec = 65 sec
t4 = 50 sec
T2 = t3 + t4 = 115 sec

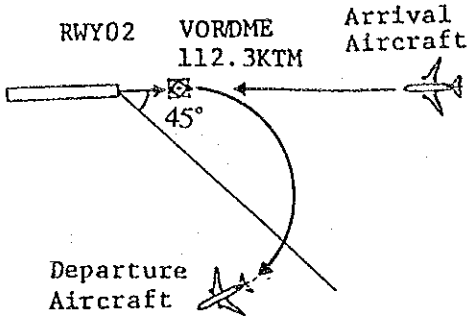
DHC-6



t5 = 55 sec
T3 = t5 = 55 ≒ 60sec

Although an actual runway occupancy time is 55 seconds, minimum flight separation of 60 seconds is required under visual meteorological condition (VMC).

b. Take-off followed by Landing



In this case, separation minima is defined as follows:

The departing aircraft takes off so that it is established on a course diverging by at least 45 degrees from the reciprocal of the final approach course before the arriving aircraft leaves a fix inbound not less than 4 nm from the airport.

Distance from Runway threshold 02 to the point is 4.74 nm.

Jet

Take-off t1 = T1 = 120 sec

Circling t2 = 4.74 nm / 210 kt = 82 sec, Approaching t3 = 2.0 / 150 = 48 sec

T4 = t1 + t2 = 250 sec

HS 748

Take-off t4 = T2 = 115 sec

Circling t5 = 4.74 nm / 175 kt = 98 sec, Approaching t6 = 2.0 / 120 = 60 sec

T5 = t4 + t5 + t6 = 273 sec

DHC-6

Take-off t7 = T3 = 55 sec

Circling t8 = 4.74 nm / 93 kt = 184 sec, Approaching t6 = 2.0 / 70 = 103 sec

T5 = t4 + t5 + t6 = 342 sec