CHAPTER 7 ACTIVITY ON 3RD PHASE

7.1 GENRAL CONDITION OF 3RD PHASE

Followed to 1st and 2nd phase, the 3rd phase was started at 13th August 2007 and this is the final phase of the Project.

In the build-up to the April 2007 presidential elections there were renewed outbreaks of violence in February and March, particularly in the city of Same. At this point people that had fled the 2006 violence in Dili were still displaced, living in camps around the country. José Ramos Horta was inaugurated as President on 20th May, following his election win in the second round

In 10th August, a convoy of the UN police that was involved in Peace Keeping Operations was attacked, and as the result one vehicle of the convoy was burnt in Baucau, there was fortunately no injured person. This sort of riots stretched over the country was made quiet by the UN police, the Police of Timor-Leste, the Multinational Security Force (chiefly Australian Army), and the Army of Timor-Leste on 12th August.

Re-organizing of the ministries were carried out in August, however the personnel and bodies of the C/P of the Project remain unchanged.

ADB announced making a support on the infrastructure sector by the technical assistance with budget of 15 million USD; the detail of the support is not yet announced officially.

7.2 PLANNED ACTIVITIES OF 3RD PHASE

7.2.1 Main Activities of 3rd phase

Main activities on 3rd phase are planned as follows;

- Conducting the Workshops for the Material Testing, Pavement Design and Slope Protection (including the Training in Indonesia)
- Preparation of Material Testing Manual/Guideline (Continuation from 2nd phase)
- Preparation of Slope Protection Guideline
- Preparation of Pavement Design Manual
- Supporting on usage of the Material Testing Manual/Guideline at Timor-Leste
- Supporting on usage of the Slope Protection Guideline at Timor-Leste

- Supporting on usage of the Pavement Design Manual at Timor-Leste
- Conducting the Joint Coordination Meeting (JCC) and supporting the Seminar for the Manuals and the Guidelines

7.2.2 Expert Assignment Plan

To accomplish aforementioned activities, the following experts are planned to be assigned both on Timor-Leste and Indonesia at 3rd phase.

Table 7-1 Experts Assignment Plan on 3rd phase

No.	Expert Name	Title	Assignment Schedule
1	Mr. Hisashi MUTO	Team Leader	(1) 02.12.07-21.12.07 (2) 03.02.08-03.03.08
2	Mr. Tetsuro IZAWA	Pavement Design/ Slope Protection Expert/ Project Coordinator 2	(1) 08.09.07-08.10.07 (2) 25.11.07-25.12.07 (3) 15.01.08-04.03.08
3	Mr. Takashi HARA	Material Testing (Soil) Expert	(1) 01.09.07-28.09.07 (2) 25.11.07-21.12.07 (3) 20.01.08-04.03.08.
4.	Mr. Motoki OGAWA	Material Testing (Concrete & Asphalt) Expert 1	(1) 01.09.07- 15.09.07
5	Dr. Tatsumi TOKUNAGA	Material Testing (Concrete & Asphalt) Expert 2	(1) 25.11.07-15.12.07
6.	Mr. Mitsuo HARA	Material Testing (Concrete & Asphalt) Expert 3/ Project Coordinator 1	(1) 31.10.07-18.11.07 (2) 13.01.08-08.03.08

7.2.3 Reporting Milestone

The milestones of the various reports are planned and the summary of the submission and quantity is as follows:

Table 7-2 Reporting Milestones and Schedule of Submission

Reports	Milestones as per TOR	No. of Hard Copies
Progress Report No.2	Beginning of January, 2008	English 35 (25 for C/P) Japanese 15
Project Completion Report	March 2008 (at completion of the Project)	English 50 Japanese 15

Reports	Milestones as per TOR	No. of Hard Copies
Project Completion Report of 3rd phase	March 2008 (at completion of the Project)	Japanese 3

7.3 PREPARATION OF GUIDELINES / MAMUALS

The Guidelines and Manuals to be prepared by the Project are identified as main outputs of the Project, since the commencement of the Project several activities such as site investigation, collection of data, referring of the standards in other countries and discussions with the C/P have been carried out. In the 3rd phase the drafting and finalizing of the Guidelines are carried out reflecting in the activities done.The methodology of the preparation for the Guidelines is specified to be entrusting to the qualified Indonesian institutions and/or consulting firms in consideration of historical background of Timor-Leste and the linking to the Training in Indonesia.

In terms of the Slope Protection and the Pavement Manual a qualified Indonesian consulting firm, PT. VIRAMA KARIYA. (V.K.), was employed in accordance with the JICA's Subletting Guideline, the Agreement between the V.K. and JICA Expert Team was signed on 2nd October 2007 at Jakarta, Indonesia.

For the Material Testing Guidelines, as it is a continuous work from the 2nd phase, RDCRP was employed with method of the direct appointment; it was also in accordance with the JICA's guidelines. The agreement between the RDCRP and JICA Expert Team was signed on 4th October 2007 at Bundung, Indonesia. At same time the agreement to the C/P's training in RDCRP (the Training in Indonesia) was also signed. Pavement Design

The basic policies for the manuals were established at 1st and 2nd phase and the policies are properly understood and approved by the C/P.

As described above, the work for drafting the Manuals is entrusted to the V.K., JICA Expert explained the policies to the V.K. at commencement of the work. In addition, JICA Expert instructed the V.K. to visit Timor-Leste so as to confirm the site conditions and to exchange opinions with the C/P.

Responding to the instruction, the V.K. sent two design engineers headed by Ir. Kamal Tanjung to Timor-Leste from 2nd to 5th December 2007.

Table 7-3 Schedule of Visit in Timor-Leste by the V.K.

Date	Activities	Remark

Date	Activities	Remark
2nd Dec	・ Arrival from Dempasar ・ Site visit at vicinity of Dili City	 Mr. H. GUTERRES, DRD
3rd Dec	・ Site visit at quarries ・ Interview to the local contractor ・ Discussion with C/P ・ Discussion with JICA Experts	 Mr. L. EVANGELISTA, JJ. McDonald Mr. J.PIEDADE, PS, MOI Mr. R. GUTERRES, DTR, DRBFC Mr. H. MUTO, Mr. T. IZAWA, Dr. TOKUNAGA
4th Dec	・ Site visit at Viqueque (ADB Site)	Mr. H. GUTERRES, DRD
5th Dec	・ Discussion with C/P ・ Departure for Dempasar	Mr. J.FREITAS, DC, DRBFC

The drafting the manuals was completed almost 80% at beginning of December, so as to develop and correct it the joint investigation between the JICA Experts, the V.K. and C/P were carried out

(1) Site Visit

The purpose of site visit was to confirm the natural conditions such as topographic and geological features of Timor-Leste, at same time the availability of construction material as well as human resource were also investigated.

1) Quarry Site

Stone quality is very important item for pavement design. In the manual, the standard pavement design catalog will be introduced, reflecting in the established policy “Practical and Useful”

This catalog will be the matrix of summary of the pavement design calculation, resulting at each combination of soil and traffic condition with consideration of some design parameters. The stone (material) quality relates with one of the design parameter which is the layer coefficient. In general AASHTO requires the material quality of subbase and bass course to be 30 and 80 of CBR as the standard value, but at same time AASHTO prepares the layer coefficient considering in case that the quality of the material is less than the standard value, the structure number of the material is decreased in accordance with the layer coefficient complying with actual material quality.

This site visit of quarry aims to collect the material samples for subbase and base course in order them to be tested at DRD laboratory for the confirmation of the quality.

Two (2) places of the quarry were visited where were beside of the Comoro River (1st) and at Liquica.(2nd)

By physical observation the quality of material from 1st quarry looked as if it is less than 80 of CBR and the samples were collected to be tested.

According to Mr. Lope Evangelista, the Material/Laboratory Technician of JJ McDonald & Sons Group which is a local contractor located beside of 1st quarry, the quality of material from 1st quarry is generally not good. The JJ collect the material for concrete from Comoro River and the material is crushed by the crusher before mix with cement, and as for base course the JJ brings the material 100km away from its camp. The quality of material meets 80 of CBR and the abrasion requirement and grading B specified by ADB's Red Book.

The material from 2nd quarry looked to be sufficient with heavy gravity and no organic material contained.

2) Road Condition

The road condition was investigated through the trip to Viqueque via A01 and A06, the pavement conditions are generally not bad and most of the section is passable although there were some points with heavy damage. However it looked that no maintenance work on the pavement is being carried out from the observation of aging, the passable condition is supposed to be due to small traffic.

It was recognized a tendency of pavement damage that some settlement occurs at the embankment part on half cut and fill section, the cause of settlement was supposed that no proper compaction and no bench cut at cut and fill line were provided during the construction

3) Discussion with C/P

The discussions with the C/P were conducted for three (3) times.

The 1st discussion was with Mr. PEDADE, Permanent Secretary Public Works MOI for reporting the work progress and asking his request on the manual. He responded that he just requested on the manuals to be useful and understandable.

The 2nd discussion was with Mr. GUTERRES, Director DRBFC for asking necessary data such as traffic volume, axle loading and metrological data for the designing of pavement. According to the Director, since there is no organization for collection of such data, no data is available. Particularly on metrological data still the Indonesian institution possess more

data than any Timor's organization and some assumption of design parameters from Indonesian case is allowed to apply for the pavement design catalog.

The 3rd discussion was with Mr. FREITAS, Design Chief DRBFC, for asking the comment to the manual. According to him, he needs sometime to study the manual and the comment will be made after the studying.

4) Discussion between JICA Experts and the V.K.

The discussion was made even before the V.K's visit in Timor-Leste, the V.K. submitted the final draft manual to the JICA Expert at beginning of January,2008 as per the agreement.

The manual covers following contents;

CHAPTER 1 INTRODUCTION

1.1. PURPOSE
1.2. SCOPE OF APPLICATION OF THE MANUAL
1.3. REFERENCES
1.4. DEFINITION OF TERM
1.5. DESIGN ASPECTS AND POLICY
1.6. PAVEMENT DESIGN SYSTEM

CHAPTER 2 ENVIRONMENT

2.1. ENVIRONMENT FACTORS
2.2. MOISTURE ENVIRONMENT
2.3. TEMPERATURE ENVIRONMENT

CHAPTER 3 SUBGRADE

3.1. GENERAL
3.2. SPECIFICATION OF SOILS SUBGRADE
3.3. FACTORS TO BE CONSIDERED IN ESTIMATING SUBGRADE SUPPORT
3.4. FIELD DETERMINATION OF SUBGRADE CBR
3.5. ADOPTION OF PRESUMPTIVE CBR VALUES
3.6. SUBGRADE FAILURE CRITERION

CHAPTER 4 PAVEMENT MATERIALS

4.1. GENERAL
4.2. SOILS SUBGRADE
4.3. GRANULAR MATERIALS

Some texts have been prepared n Indonesian language reflecting in the comment by the C/P.

Photographs of the Site Investigation for the Pavement Manual

Discussion between C/P and V.K. and JICA Experts

Quarry Investigation
(Comoro River Quarry)

Quarry Investigation
(Comoro River Quarry)

Sample Collection
(Comoro River Quarry)

Local Contractor Camp Visit
(JJ McDonald)

Local Contractor Camp Visit
(JJ McDonald)

Quarry Investigation
(Liquica Quarry)

Quarry Investigation
(Liquica Quarry)

7.3.2 Slope Protection

The basic policy of the Slope Protection Guideline has also been established during 1st and 2nd phase, and the policy is resulted from overall consideration applying to all the guidelines which is "Practical and Useful". Japan is one of advanced country in terms of the slope protection engineering works. There are so many techniques adjusting to every sort of natural and man-made conditions and however those are all extremely expensive. If the guideline introduces such high techniques, it opposes the policy and has no reality in consideration of present economical and physical condition in Timor-Leste. Therefore the guideline focuses on development of existing slope protection techniques and others which are considered to be applicable and possible in the country.

In guideline, it shall include the check sheet format for existing slope in order to evaluate existing condition and this check sheet is expected to function of putting preliminary emergency ranking as to be reference for the road maintenance work.

(1) Site Investigation

Some investigation of the existing condition has been carried out during 1st and 2nd phase; in addition the joint investigation by the C/P and JICA Expert together with the V.K was carried out at same time on the pavement investigation in this 3rd phase.

Figure 7-1 Survey Route

1) Tendency of Existing Slope Failure

It is observed there is an effort of which the creation of man made slope is being minimized although the geometrical requirement is sacrificed. Therefore there was limited large scale man-made both of cut and fill slopes along the surveyed roads.

Some settlements are observed on the pavement and the slopes, which are located beside of the settled pavement, are also slid slightly. Those two phenomenons look being created by same cause and the cause is supposed to be weakening of soil strength due to rising up of under ground water. The installing horizontal drainage system such as the PVC pipe into the soil is considered to be one of the measures.

2) Assessment of Existing Slope Protection Works

This assessment will be important reference to the guideline and from this survey the following information is expected to obtain;

- Availability of materials for slop protection
- Possible work items for slope protection (Capability for kinds of construction item)
- Effectiveness by each protection work

There were some protection works such as gabion and masonry wall, some of them looks to function effectively, but applying of the protection work dose not look to be standardized.

From the example works on the surveyed road, it is recognized that existing slope protection is a sort of the work which does not require machinery; low techniques such as work by manual labours is applied, and in terms of material the local materials such as boulder is mainly used. The content of the guideline is as follows;

CHAPTER 1 INTRODUCTION

1.1. PURPOSE
1.2. SCOPE OF GUIDE - LINE
1.3. DEFINITION
1.4. REFERENCES

CHAPTER 2 GENERAL INFORMATION

2.1. PURPOSE
2.2. SCOPE
2.3. REVIEW OF ROAD NETWORK CONDITION

Photographs of the Site Investigation for the Slope Protection Guideline

Wooden Fence for Rock Fall
A09

Step Drainage along Vertical Line
A01

Large Scale Cutting Slope
A09 Viqueque

Gully on Cutting Slope
A09 Viqueque

Masonry Wall
A09 Viqueque

Collapse on Gabion
A09 Viqueque

River Protection (Filling) by Gabion
A09 Viqueque

Overview of Large Scale Cutting Slope
A09 Viqueque

7.3.3 Material Test

The preparation of the Material Test Guidelines/Manuals is continuous work from 2nd phase. So no particular discussion is made between the RDCRP and JICA Experts, however, followed to 2nd phase there was an opportunity of discussion with the C/P and the RDCRP and JICA Expert during the Training in Indonesia. In the discussion, the C/P requested the RDCRP and JICA Expert that the guidelines are prepared basing on the SNI which is being familiar to DRD members.

As the results of the Project, the Material Test Guideline/ Manuals are prepared; their contents are as follows;

(1) Soil Material Guideline

CHAPTER 1 SOIL SAMPLING

1.1 PLANNING
SOURCE OF SOIL SAMPLE DISTURBANCES
CLASSIFICATION OF SOIL SAMPLE QUALITY
QUALITY EVALUATION ON THE FIELD
1.2 METHOD OF SOIL SAMPLING
UNDISTURBED BLOCK SOIL SAMPLING
UNDISTURBED TUBE SOIL SAMPLING
DISTURBED SOIL SAMPLING
1.3 HANDLING OF SOIL SAMPLING
SOIL SAMPLE SEALING
SOIL SAMPLE TRANSPORT TO THE LABORATORY

CHAPTER 2 EARTH FILL

2.1 PLANNING OF EARTH FILL TESTING
2.2 TESTING OF FILL MATERIAL
2.3 TESTING OF EARTH FILL WITH EXTRA MEASURES
(1) EARTH FILL ON SLOPED SURFACE
(2) EXISTENCE OF SOFT SOIL AS FOUNDATION
(3) EARTH FILL IN SLIDING AREA
(4) EARTH FILL SUSCEPTIBILITY TO EARTHQUAKE

CHAPTER 3 WEAK SOIL

3.1 PLANNING OF CONSTRUCTION MATERIAL TESTING

3.2 SOIL TESTING FOR THE ANALYSIS AND SUBSIDENCE AND STABILITY

(1) DEEP SOUNDING

(2) WEAK SAMPLING

(3) DIRECT IN-SITU SOIL TESTING

(4) WEAK TESTING

(5) PRESENTATION OF INVESTIGATION RESULTS

CHAPTER 4 RETAINING WALLS AND CULVERTS

4.1 PLANNING

(1) SURVEYS FOR TOPOGRAPHY, GEOLOGY AND GEO-HYDROLOGY

(2) SOIL PROPERTIES INVESTIGATION

4.2 OBJECTIVES AND PURPOSES OF INVESTIGATION

4.2.1 RETAINING WALLS

4.2.2 CULVERTS

CHAPTER 5 SOIL INVESTIGATION

5.1 METHOD OF TESTING AND RELEVANT STANDARDS OF SOIL INVESTIGATION

5.2 INTERPRETATION AND THE USE OF THE RESULTS

(1) GEOPHYSICAL EXPLORATION

(2) DEEP SOUNDING

(3) LOADING TESTING

(4) FIELD COMPACTION TEST

(5) FIELD GAUGING

(6) SOIL TEST

CHAPTER 6 CLASSIFICATION OF ROCKS AND SOILS

(1) ROCK CLASSIFICATION

(2) SOIL CLASSIFICATION

(2) Soil Material Test Manual

PART I PREPARATION

PA – 0101 – 07 PREPARING SOIL SAMPLING

PA – 0102 – 07 GENERAL DETERMINATION OF CALIBRATION APPARATUS

PA – 0103 – 07 TESTING APPARATUS/ MATERIAL PREPARATION

PART II PHYSICAL SOIL TEST

PA – 0201 – 07 NATURAL WATER CONTENT TEST
PA – 0202 – 07 SPECIFIC GRAVITY OF SOIL
PA – 0203 – 07 LIQUID LIMIT OF SOIL TEST
PA – 0204 – 07 PLASTIC LIMIT OF SOIL TEST
PA – 0205 – 07 PARTICLE SIZE ANALYSIS OF SOIL TEST
PA – 0206 – 07 REDUCTION LIMIT TEST

PART III CHEMICAL SOIL TEST

PA – 0301 – 07 PH OF SOIL TEST
PA – 0302 – 07 DUST DEGREE TEST

PART IV MECHANICAL SOIL TEST

PA – 0401 – 07 COMPACTION STANDARD TEST
PA – 0402 – 07 MODIFIED COMPACTION TEST
PA – 0403 – 07 LABORATORY CBR TEST
PA – 0404 – 07 ONE DIMENSION CONSOLIDATION TEST
PA – 0405 – 07 DIRECT SHEAR TEST
PA – 0406 – 07 UCS TEST
PA – 0407 – 07 TRIAXIAL TEST (UU)
PA – 0408 – 07 TRIAXIAL TEST (CU)
PA – 0409 – 07 PERMEABILITY SOIL TEST

(3) Pavement Material Guideline

INTRODUCTION

CHAPTER 1 ROAD PAVEMENT STRUCTURE

1.1 GENERAL
1.2 TYPES OF PAVEMENT CONSTRUCTION
1.3 FLEXIBLE PAVEMENT CONSTRUCTION
1.3.1 CRITERIA OF FLEXIBLE PAVEMENT
1.3.2 STRUCTURE OF FLEXIBLE PAVEMENT
1.4 RIGID PAVEMENT CONSTRUCTION
1.4.1 PRINCIPLE OF RIGID PAVEMENT
1.4.2 TYPES OF RIGID PAVEMENT
1.4.3 STRUCTURE OF RIGID PAVEMENT
1.4.4 OVERLAY AC ON CONCRETE PAVEMENT

(4) Pavement Material Test Manual

PC – 0102 – 07 ASPHALT SOFTENING POINT
PC – 0103 – 07 ASPHALT DUCTILITY
PC – 0104 – 07 ASPHALT FIRE POINT
PC – 0105 – 07 ASPHALT SPECIFIC GRAVITY
PC – 0106 – 07 ASPHALT SOLUBILITY
PC – 0107 – 07 ASPHALT VISCOSITY
PC – 0108 – 07 WEIGHT REDUCTION BY THIN FILM OVEN TEST

PART II ASPHALT MIXTURE TESTING

PC – 0201 – 07 ASPHALT MIXTURE TEST BY MARSHALL APPARATUS

PART III IN-SITU TESTING

PC – 0301 – 07 CBR TEST BY DYNAMIC CONE PENETROMETER (DCP) APPARATUS
PC – 0302 – 07 CBR IN-SITU TEST
PC – 0303 – 07 PAVEMENT DEFLECTION BY BENKELMAN BEAM APPARATUS

(5) Concrete Material Guideline

CHAPTER 1 PORTLAND CEMENT

1.1 INTRODUCTION
1.2 MANUFACTURE OF PORTLAND CEMENT
1.3 CHEMICAL COMPOSITION
1.4 HYDRATION OF CEMENT
1.5 TYPES OF PORTLAND CEMENT
1.6 PHYSICAL PROPERTIES
1.7 REQUIREMENTS OF PORTLAND CEMENT
1.8 PORTLAND – POZZOLAN CEMENT
1.9 STORAGE OF CEMENT
1.10 USE OF CEMENT IN CONCRETE MIXER

CHAPTER 2 AGGREGATE

2.1 INTRODUCTION
2.2 CLASSIFICATION OF AGGREGATE
2.3 SAMPLING
2.4 MECHANICAL PROPERTIES
2.5 PHYSICAL PROPERTIES
2.6 CHEMICAL RESISTANCE

6.2 STRENGTH OF CONCRETE
6.3 TYPES OF STRENGTH OF CONCRETE
6.4 DURABILITY OF CONCRETE
6.5 DEFECTS OF CONCRETE

CHAPTER 7 MIX DESIGN OF CONCRETE

7.1 INTRODUCTION
7.2 FACTORS AFFECTING MIX PROPORTION
7.3 VARIABILITY
7.4 METHODS AND DESIGN PROCESS

CHAPTER 8 QUALITY CONTROL OF CONCRETE WORKS

8.1 INTRODUCTION
8.2 INITIAL WORKS
8.3 MATERIALS
8.4 MIX PROPORTION
8.5 BATCHING UNIT
8.6 MIXING UNIT
8.7 CONCRETING
8.8 AFTER CONCRETING
8.9 CONCRETE TESTS

(6) Concrete Material Test Manual

PART I CEMENT TESTING

PB – 0101 – 07 FINENESS OF HYDRAULIC CEMENT (SNI 2530 – 1991, ASTM-C14-94, AASHTO-T12-97)
PB – 0102 – 07 SPECIFIC GRAVITY OF HYDRAULIC CEMENT (SNI 2531 – 1991, ASTM- C188, AASHTO-T133, JIS-A5005)
PB – 0103 – 07 NORMAL CONSISTENCY OF HYDRAULIC CEMENT (SNI 03-6826-2002, ASTM-C187-86, AASHTO-T55, JIS-A1125)
PB – 0104 – 07 SETTING TIME OF HYDRAULIC CEMENT (SNI 03-6827-2002, ASTM-C191-92, AASHTO-T131-93)
PB – 0105 – 07 COMPRESSIVE STRENGTH OF HYDRAULIC CEMENT MORTAR(SNI 03-6825-2002, ASTM-C109-92, AASHTO-T106-93, JIS-R5201)

PART II AGGREGATE TESTING

PB – 0201 – 07 TEST FOR SIEVE ANALYSIS OF AGGREGATES (SNI

03-1968-1990, ASTM-C136-01, AASHTO-T27, JIS-A1102)

PB – 0202 – 07 UNIT WEIGHT AND VOIDS IN AGGREGATES (SNI 03-4804-1998, ASTM-C29-91, AASHTO-T19, JIS-A1104)

PB – 0203 – 07 TEST FOR SPECIFIC GRAVITY AND ABSORPTION OF COARSE AGGREGATE (SNI 03-1969-1990, ASTM-C127-01, AASHTO-T85-74, JIS-A1110)

PB – 0204 – 07 TEST FOR SPECIFIC GRAVITY AND ABSORPTION OF FINE AGGREGATE (SNI 03-1970-1990, ASTM-C128-93, AASHTO-T84, JIS-A5005)

PB – 0205 – 07 TEST OF MOISTURE CONTENT OF AGGREGATE BY DRYING (SNI 03-1971-1990, ASTM-C566-89, AASHTO-T255-00, JIS-A1125)

PB – 0206 – 07 TEST FOR RESISTANCE TO DEGRADATION OF COARSE AGGREGATE BY ABRASION IN THE LOS ANGELES MACHINE (SNI 03-2417-1991, ASTM-C131-01, AASHTO-T96-02, JIS-A1121)

PB – 0207 – 07 TEST FOR ORGANIC PARTICLES IN FINENESS AGGREGATE (SNI 03-2816-1992, ASTM-C40-92, AASHTO-T21, JSFE)

PB – 0208 – 07 TEST FOR CLAY LUMPS AND FRIABLE PARTICLES IN AGGREGATE (SNI 03-4141-1996, ASTM-C142-90)

PB – 0209 – 07 TEST FOR RESISTANCE TO CRUSHING OF AGGREGATE (SNI 03-1757-1990, ASTM-C131-01, AASHTO-T96-02, BS-812, JIS-A1121)

PB – 02010 – 07 TEST FOR MATERIALS FINER THAN NO. 200 SIEVE IN MINERAL AGGREGATE BY WASHING (SNI 03-41421-1996, ASTM-C117-95)

PB – 02011– 07 TEST FOR FLAT AND ELONGATED PARTICLES IN COARSE AGGREGATE (SNI 03-1765-1990)

PART III FRESH CONCRETE TESTING

PB – 0301 – 07 TEST FOR SLUMP OF HYDRAULIC CEMENT CONCRETE (SNI 03-1972-1990, ASTM-C143, AASHTO-T119, JIS-A1101)

PB – 0302 – 07 TEST FOR SPECIFIC GRAVITY OF HYDRAULIC CEMENT (SNI 03-1973-1990, ASTM-C138921, AASHTO-T121, JIS-A1116)

PB – 0303 – 07 TEST FOR AIR CONTENT OF FRESHLY MIXED CONCRETE (SNI 03-3418-1994, ASTM-C231, AASHTO-T152-01, JIS-A1128)

PB – 0304 – 07 MAKING AND CURING CONCRETE TEST SPECIMENS IN THE LABORATORY (SNI 03-2493-1991, ASTM-C192-90)

PART IV HARDENED CONCRETE TESTING

PB – 0401 – 07 CAPPING CYLINDRICAL CONCRETE SPECIMENS (SNI 03-6429-2000, ASTM-C617-94)

PB – 0402 – 07 TEST FOR COMPRESSIVE STRENGTH OF CONCRETE SPECIMENS (SNI 03-1974-1990, ASTM-C39, AASHTO-T97, JIS-A1108)

PB – 0403 – 07 TEST FOR SPLITTING TENSILE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS (SNI 03-2491-2002, ASTM-C496-90, AASHTO-T198, JIS-A1113)

PB – 0404 – 07 TEST FOR FLEXURAL STRENGTH OF CONCRETE USING SIMPLE BEAM WITH TWO POINT LOADING(SNI 03-4431-1997, ASTM-C78-94, AASHTO-T158, JIS-A1106)

PB – 0405 – 07 TEST FOR STRENGTH OF CONCRETE USING SIMPLE BEAM WITH CENTER – POINT LOADING (SNI 03-4154-1996, ASTM-C293-94, AASHTO-T158, JIS-A1106)

PB – 0406 – 07 TEST FOR COMPRESSIVE STRENGTH OF DRILLED – CORES OF CONCRETE (SNI 03-3403-1994, ASTM-C42-90)

PB – 0407 – 07 TEST FOR ELEMENT OF CONCRETE STRUCTURE USING CONCRETE HAMMER TYPE N AND TYPE NR (SNI 03-4430-1997, ASTM-C805-02, BS-4408, JSCE G-504)

7.4 WORKSHOP AND OJT

7.4.1 Soil Material Test

The items of test in the Manual to be prepared by the Project are identified as necessary for road construction and maintenance. However there are some test items which are considered to be not ready in execution because of current circumstance in Timor-Leste. On such items, even if the technical training by JICA Expert is given to DRD, the quality of test is not able to be maintained unless DRD will be in the condition of having opportunity of carrying out the tests regularly.

In addition, there is some test items which are never carried out by DRD although the testing equipments have been possessed; the equipments are not in good condition for the testing due to lack of proper maintenance and calibration.

Hence, the OJT in the Project focus on the improvement of tests being familiar to DRD through daily work by some advice and suggestion by JICA Expert.

Evaluation and discussion about the test results have been made in the Workshop with participation of all staff of soil material test group in DRD.

(1) On the Job Training (OJT) in 3rd phase

Followed to 1st and 2nd phase, the OJT has been carried out in order DRD staff to develop their capacity.

In general, the JICA Expert has been giving some advices and lectures on the works which are entrusted by DRD's client, and also some instruction and practice to the new tests which have never been experienced.

The items of test conducted in 3rd phase are shown in the Table 7-4.

Table 7-4Conducted Tests in 3rd phase Project

Soil Material Test	Type of the Work	Work Experience
Liquid Limit Test	Daily Work	Yes
Plastic Limit Test	Daily Work	Yes
Compaction / CBR Test	Daily Work	Yes
Consolidation Test	Training (Practice)	No
Unconfined Compressive Strength Test	Training (Practice)	Yes
Specific Gravity Test	Training (Practice)	No
Sieve Analysis Test	Daily Work	Yes
Hydrometer Analysis Test	Training (Practice)	No
Shrinkage Limit Test	Training (Practice)	Yes
Permeability Test	Training (Practice)	No

Some improvements and achievements have been observed on the tests result and operation which were consulted by JICA Expert on 1st and 2nd phase, and however there are still some test items to be improved ; some test results were not with required accuracy because of lack of proper workman ship.

Including the above, the followings suggestion and consultation are made by JICA Expert on the OJT at 3rd phase.

1) General

DRD members are suggested to have a daily practice of referring testing manuals when

they are conducting tests even if the tests are being familiar to DRD members; it is because of the observation that DRD members tend to carry out the tests without referring the manuals.

The behavior of above can be identified a sort of tendency; it comes from too much self-confident on the test operations; the members are not making any efforts on improvement of test result accuracy once the members remember the testing procedure. .

In case of calculating of the test results, as the process of calculations are being computed by pre-programmed formula, the members never have doubt on the result from the computation even if the result shows abnormal value causing due to miss-inputting data and formula. To be sure, the results shall be once checked by their manual calculation.

2) Liquid Limit Test

- In accordance with the suggestion made by the JICA Experts at phase 2, the members use the manual machine on testing instead of the electrical machine which is considered to be difficult in the calibration
- Because of without knowing mechanism of stopping for blowing the cup, the results of the test are not stable, and also due to this un-stable, the results are not liner on the graph when they are plotted, therefore it is difficult obtain test results with required accuracy.

3) Plastic Limit Test

- As being pointed out by the JICA Expert on the OJT, due to with out preparation of standard specimen with 3.2mm in thickness for comparative purpose, the samples are not being checked for adjustment to required size.
- Test results are likely to be unstable because of difference of individual workman ship, so it is suggested that all members shall have more practice on the testing so as the members to have required skill for making proper judgment on the test results.

4) Compaction Test

- Due to lack of proper adjustment of water contents in good manner, the Compaction test is not being carried out as planned.
- The sample should not be pressed by knife directly after compaction by the rammer, otherwise the result would be affected by it

- The Zero Air Void Curve shall be plotted on the graph of the compaction test in order to be sure on the test result.

5) CBR Test

- Since the data recording sheet for the penetration value is prepared in both inch and centimeter unit, it is instructed to avoid confusion on recording data while the dial gauge of DRD's equipment is shown in centimeter unit only.
- The testing equipment shall be maintained properly.
- The members shall have proper understanding on the objective of the test, and the soak test shall be conducted before CBR test, if necessary.
- There was a fact that the dry density value from the CBR test was higher than the MDD (Maximum Dry Density) value from the compaction test, it suggested that there were some problems on the compaction process at the determination of the MDD.

6) Consolidation Test

- It was recognized that proper test result is difficult to obtain by the members alone because the DRD has not enough experience on the test
- It was also difficult on the recording value of the dial gauge at 6, 15, 30 and 60 second after the loading, so it is recommended to have more practice on the recording at specified time.

7) Unconfined Compressive Strength Test

- It was judged that the members have obtained proper understanding and operation on the test.
- As the preparation of undisturbed specimen affect on the test result, it is suggested to have enough experience on the preparation, top and bottom of the specimen needs to be finished in even and parallel, particularly.

8) **S**pecific Gravity Test

- Temperature control is important during the testing.
- It is necessary to remove the bubble from specimen by boiling, carefully after mixing with water.

9) Sieve Analysis Test

- According to the Main Book of Material Testing prepared by the Kupang University in Indonesia, the sieve analysis is categorized as an item of concrete test and however not categorized as an item of the soil test; the testing procedure for soil test differs from the concrete test.

- It is important to mix materials of the specimen uniformly and separate them sufficiently before the analysis. If the materials are not mixed uniformly, there is a possibility that the result of the analysis does not represent its characteristic due to different mix proportion from original specimen.

10) Hydrometer Analysis Test

- As there is a difficulty on recording value of the hydrometer in the short time (ex 1 and 2 minutes) just after mixing of the specimen at the mess cylinder, the members is suggested to have more practice on the reading.

- It is important to the members to have an achievement which the members carry out sieving, hydrometer analysis, making graphs and identify the material characteristic, alone.

11) Shrinkage Limit Test

- It is important to remove air from the container before putting the soil and also remove air from the soil as much as possible.

- As the mercury which is identified to be poisonous article is used in execution of the test, maximum attention shall be paid on handling it, the evaporated mercy will have bad effect on health.

12) Permeability Test

- It is important to remove air from the specimen, otherwise .the proper test result is difficult to obtain.

- In case of conducting of the Constant Head Permeability test, water shall be poured in the funnel without putting the air and keep the water head, always.

13) Standard Penetration Test

- Usually, this test is carried out together with drilling survey. It will be difficult to do the test in case at deep underground level without using motive power of drilling machine.

- The test result shall be prepared with geotechnical Engineer to check the penetrated sample taken by the test. The DRD shall consider involving a geologist for the test.

14) Tri-axial Compression Test

- The machine is not available to use properly since no maintenance and calibration were given. Therefore, water and air leaking are found out at joint parts of tubes on the control panel. It is difficult to keep the continuous pressure to specimen in the present situation.
- The saturated cohesive soil shall be applied for the test. It will be difficult to take the soil sample in the situation of DRD since they do not have the equipments to take a saturated and undisturbed soil sample

(2) Workshop

The Workshop was carried out regarding the results of test carried out in 3rd phase.

Detailed subjects are as follows;

- Unstable results from the Liquid Limit and Plastic Limit Test
- Proper operations on the Optimum Moisture Contents and Maximum Dry Density
- Difference on Maximum Dry Density between by the Compaction Test and by the CBR Test
- Test results on the Unconfined Compressive Test
- Theory, result and analysis on the Consolidation Test

Speaker: Mr. Takashi HARA (JICA Expert)

Venue: DRD meeting room

Date& Time: 24th September, 2007, 15:00hrs

Participants: Mr. Saturnino Gomes, Mr. Hermenegildo Gutteres,
Ms. Juliana Pereira, Mr. Adylson da Costa, Mr. Orlando da Costa Rosalos, Mr. Fabio da Chuna, Ms. Calmelita Alves, Mr. Gregolio dos Rois, Mr. Mariano Monteiro, Mr. Floriano de Almeida, Ms. Isabel M. F. M.F. Alves, Mr. Janastacio Freitas da Costa, Mr Amaro Monteiro

(JICA) Mr. T. Kamijo, Mr. T. Izawa

The contents of each subject were summarized respectively as follows;

1) Unstable results from the Liquid Limit and Plastic Limit Test

The result is easily affected by the difference of individual experience and workmanship. The results obtained from the OJT at 3rd phase were unstable in general, and it could be identified that there was some problem on operation of the testing.

To improve testing results, the members shall understand testing methodology properly and have more experience.

2) Proper operations on the Optimum Moisture Contents and the Maximum Dry Density

There are many experiences on the testing of the Moisture Contents and Maximum Dry Density at DRD.

However, there was no circumstance of plotting the Zero Air Void Curve s on the graph after the testing and therefore the checking of accuracy on the test results could not be done. Through the OJT, the plotting has been possible and the checking of accuracy on the test results has also been possible by the members.

Hence it is expected that accuracy of test results will be improved comparing before.

3) Difference on Maximum Dry Density between by the Compaction Test and by the CBR Test

The moisture content of CBR value is applied from the optimum moisture contents (OMC) by the result of compaction test together with the maximum dry density (MDD) in general. So the moisture contents by CBR test should be same of the OMC by the Compaction test, logically and however, in reality, the moisture contents by the CBR test differed from the OMC by the Compaction test, significantly.

The result of above suggested that the moisture content by the Compaction test was not controlled sufficiently and/or that the specimen was not formed properly after the compaction.

By learning the logic of the relationship between the two tests, the proper test result is possible to obtain.

4) Test results on the Unconfined Compressive Test

The members have achieved acceptable level on the Unconfined Compressive Test. It is

recommended that the specimen shall be formed more carefully, so that it result an improvement of the accuracy of the test.

5) Theory, result and analysis on the Consolidation Test

This was the first time of conducting the Consolidation test to the members; therefore the result of the test was not successful due to lack of proper maintenance and calibration of the testing equipment. In addition, it was observed that there were some mistakes on the recording the test result.

By this OJT and the Workshop, the members, at least, have learned the theory and procedure of the testing and it is expected that members make some effort to be familiar with the testing by the practice.

In the Workshop, the phenomenon of the consolidation was also explained to the members.

(3) Capacity Assessment

The Capacity Assessment (Test) was carried out in order to confirm the achievement of proper understanding on soil tests, the tested members were in charge person on soil tests as follows;

Mr. Adylson da Costa, Mr. Amaro Monteiro, Mr. Floriano de Almeida, Ms. Calmelita Alves, Mr. Jose Manuel, Mr. Alfredo Neves

The question on the test was 44 consisting of multiple selections and filling answers, and the number of the testing was three (3) times for comparison purpose, which were before and after the Training in Indonesia for 26th September and 30th November, 2007 and 25th January .2008

The following table shows the result of the tests.

Table 7-5 Results of Capacity Assessments (Soil)

No.	Subject of Question	Ratio of Correct Answer			Type of Question
		1st Exam.	2nd Exam.	3rd Exam.	
1	Reading of Vernier calipers	0	0	67	Descriptive
2	Reading of Hydrometer	50	17	83	Selective
3	Name of Test Equipment 1	100	83	67	Descriptive
4	Name of Test Equipment 2	100	83	67	Descriptive
5	Name of Test Equipment 3	83	0	67	Descriptive
6	Specific Characteristic of Soil 1	17	17	83	Selective
7	Specific Characteristic of Soil 2	33	17	100	Selective
8	Specific Characteristic of Soil 3	17	17	100	Selective
9	Number of Layer for Standard Proctor Test	67	67	100	Descriptive
10	Result of Unconfined Compressive Strength Test	67	100	67	Descriptive
11	Particle Size of Soil 1	0	0	83	Descriptive
12	Particle Size of Soil 2	17	0	83	Descriptive
13	Particle Size of Soil 3	17	33	83	Descriptive
14	Meaning of the Zero Air Avoids Curve	33	33	33	Descriptive
15	Evaluation of result of Grading of Soil 1	50	100	50	Selective
16	Evaluation of result of Grading of Soil 2	33	83	83	Selective
17	Evaluation of result of Grading of Soil 3	17	0	83	Selective
18	Condition of the Triaxial Test	0	33	83	Descriptive
19	Parameter obtained from the Direct Shear Test	0	17	50	Descriptive
20	Energy of compaction for Standard CBR Test	67	33	50	Selective
21	Suitable Test depending on the Purpose	83	67	100	Selective
22	Evaluation of result of Compaction Test	100	83	100	Selective
23	Definition of Terminology 1	0	17	42	Descriptive
24	Definition of Terminology 2	0	17	50	Descriptive
25	Parameter obtained from the Consolidation	0	17	67	Descriptive
26	Parameter obtained from the Triaxial Test	0	17	58	Descriptive
27	Aim of Soaked CBR Test	0	33	75	Descriptive
28	Sampling 1	0	33	50	True-False
29	Sampling 2	83	67	100	True-False
30	Formula for Calculation of Ratio of Void	50	100	17	True-False
31	Formula for Calculation of Moisture Content	33	0	67	True-False
32	Character of Moisture Content	50	17	50	True-False
33	Definition of Terminology 3	67	67	33	True-False
34	Definition of Terminology 4	0	17	100	True-False
35	Formula for Calculation for Plastic Index	50	83	33	True-False
36	Formula for Calculation for Consistency Index	83	67	50	True-False
37	Meaning of Plastic Index	100	83	50	True-False
38	Meaning of Consistency Index	17	33	67	True-False
39	Definition of Consolidation	50	50	50	True-False
40	Application of the Unconfined Compressive Strength Test	50	17	67	True-False
41	Meaning of Sensitivity	83	100	100	True-False
42	Method of the Compaction Test	100	50	50	True-False
43	Calculation of the Moisture Content	67	100	67	Practice
44	Decision of Liquid Limit	0	33	67	Descriptive

As shown in above, the average score on first and second examinations were 42 points and 44 points; there was 2 points in average of improvement after the Training in Indonesia. The average score on third exam was improved to 69 points.

When the individual exam results are analyzed, there were 3 members with score

improvement of 10-20 points after the Training of Indonesia. For the questions by filling answers, the average score were raised after the Training. Thus it is recognized the benefit of the Training. In the third exam, there were 5 members with score improvement of more than 30 points.

On the other hand, there were some questions with decrease of score after the Training, which were with minor modifications to the previous exam. Regarding question for the physical tests which are basic items in the soil test, ratio of correct answer was raised in the third exam. Additionally, ration of correct answer for questions about term definitions also were raised. These results are considered that through the OJT in DRD, they acquired the knowledge obtained in the training in Indonesia. According the result of the last exam, 5 members which are 80% of the soil material test staff obtained 70 points of correct answer.

Photographs of the OJT on Soil Tests

Sieve Analysis
(Sample brought by the DRD's Client)

Sieve Analysis
(Manual Sieve Shaker)

Sieve Analysis
(Measuring Mass of Retained Samples)

Hydrometer Analysis
(Disturb a Soil Fragment)

Hydrometer Analysis
(Sample mix with Water)

Hydrometer Analysis
(Measuring Density of Soil Water)

Specific Gravity Test
(Boiling Sample with Water)

Specific Gravity Test
(Measuring Mass of Sample)

Photographs of the OJT on Soil Tests

Standard Penetration Test
(Preparing Tripod)

Standard Penetration Test
(Blowing)

Standard Penetration Test
(Collecting Sampler)

Standard Penetration Test
(Checking Sample)

Tri-axial Compression Test
(Setting up Specimen)

Tri-axial Compression Test
(Setting Sample in Pressure Cell)

Tri-axial Compression Test
(Consolidation of Specimen)

Tri-axial Compression Test
(Shearing of Specimen)

7.4.2 Concrete Material Test

The concrete tests to be considered as necessary to DRD were carried out in 2nd phase. In this phase the reviewing of those tests was done in the Training in Indonesia and it was confirmed that the methodologies and the operations were properly understood by the members. In order to confirm the skill of the Concrete Material Test, the final workshop was carried out with an intention of wrap-up of entire concrete material testing programme

Day：13th February, 2008 14:00-16:00
Venue：DRD Meeting Room
Participants：Juliana P. Neves, Isabel Maria F. Alves, Orlando C. Rosales
Mariano Monteiro, Anastacio F. Costa /M. Hara

(1) OJT Subjects

1) Objectives of Concrete Material Tests

- Concrete tests are conducted in two phases as fresh concrete and hardened concrete accordingly from its natures.
  Tests for fresh concrete are slump test, air content test, bleeding tests, etc. for the purpose of judging the material whether it is workable with proper consistency.
  Tests for hardened concrete are typically strength tests (compressive, splitting tensile, flexural), static elasticity test and non-destructive hammer test for the purpose of checking strength of hardened material.

- Cement tests are conducted to know the quantitative characteristics of cement material by physical and chemical tests.

- Aggregate tests are for mixture design and quality control with the tests of sieve tests, unit weight tests, absorption tests, wearing test, etc. for coarse & fine aggregates.

2) Review of OJT and Daily Practice

Concrete material tests which were previously practiced or explained were reviewed in this OJT.

Table 7-6 Practiced Concrete Material Test Items

No	Concrete Material Tests	Reference	Remarks
1	Making and Curing Concrete Test Specimens in Laboratory	SNI 03-2493	OJT

2	Capping of Cylindrical Concrete Specimens	SNI 03-6429 ASTM C 617	OJT
3	Compressive Strength of Concrete Specimens	SNI 03-1974 ASTM C 39	OJT
4	Compressive Strength of Hydraulic Cement Mortar	SNI 03-6825 ASTM C 109-1	OJT
5	Slump of Hydraulic Cement Concrete	SNI 03-1972 ASTM C 143	OJT
6	Unit Weight of Freshly Mixed Concrete	SNI 03-1973 ASTM C 29	OJT
7	Air Content of Freshly Mixed Concrete	SNI 03-3418 AASHTO T-152	OJT
8	Sieve Analysis of Fine and Coarse Aggregate	SNI 1968 ASTM C 136	OJT
9	Specific Gravity and Absorption of Coarse Aggregate	SNI 1969 ASTM C 127	OJT
10	Specific Gravity and Absorption of Fine Aggregate	SNI 1970 ASTM C 128	OJT
11	Specific Gravity of Hydraulic Cement	SNI 6825	OJT
12	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion in Los Angeles Machine	SNI 2417 ASTM C 131	OJT
13	Splitting Tensile Strength of Cylindrical Concrete Specimens	SNI 2491	Explanation
14	Flexural Strength of Concrete using Simple Beam	SNI 03-4431	Explanation
15	Concrete Hammer Test	SNI 4430	Introduction

Hand Out： Concrete Testing Manual (extract)
Related SNI Standards

(2) Concrete Material Assessment Test

Day：18th February, 2008 9:00 – 10:00
Venue：DRD Meeting Room

Participants：Juliana P. Neves, Isabel Maria F. Alves, Orlando C. Rosales
Mariano Monteiro, Anastacio F. Costa, Saturunino Gomes

In order to collect the progress of C/P skills, assessment tests have been conducted twice, and the third test was tried this time with six participants.

1) Contents of Capacity Assessment

- Merits of Concrete
- Defects of Concrete
- Objectives of Concrete Tests
- Tests for Fresh Concrete（Slump Test, making of Compressive Test Specimens）
- Tests for Hardened Concrete (Procedure of Compressive Test, Calculation of Compressive Strength)

2) Results of the Assessment

Table 7-7 Results of Capacity Assessment (Concrete)

Names(Initial)	Test #1 (‘07/ 9/26)	Test #2 (‘07/11/30)	Test #3 (‘08/2/18)
1.G.B.	62	65	80
2. J.P.	74	78	86
3. I.M.	57	62	77
4. O.C.	56	64	72
5. M.M.	38	45	58
6. A.F.	41	-	70
Average	54.7	62.8	73.8(80%70pt.up)

From the above results, it can be stated that skills and knowledge have been progressed gradually after training in Indonesia and through daily practice. But
it is strongly recommended to review and develop the material test skills continuously in order to improve capacity development.

Photographs of the Concrete Test Workshop


7.4.3 Asphalt Material Test

Since there is some difficulties for obtaining samples to be tested and therefore a few OJT have been carried out in Timor-Leste. In this phase, the real trainings by using instruments were conducted in the Training in Indonesia. The reviewing of tests conducted in the Training in Indonesia was carried out end of January to beginning of February 2008.

(1) Schedule and Programme

Table 7-8 Schedule of Asphalt OJT

Date	Training Programme		Reference
28.01 (Mon)	9:00	Preparatory Meeting of Programme and Materials	
	14:00	General Explanation on Asphalt Tests	
	16:00	Preparation of Test Materials and Equipments	
29.01 (Tue)	9:00	Marshall Stability Test (Asphalt Mixture using Marshall Apparatus)	RSNI M-01; AASHTO T245 ASTM
30.01 (Wed)	8:30	Marshall Stability Test	RSNI M-01; AASHTO T245
	15:30	Quantitative Extraction & Recovery of Asphalt Binder from Asphalt Mixture	SNI 03-3640; AASHTO T319
31.01 (Thu)	8:30	Softening Point of Asphalt and Tar	SNI 06-2434; AASHTO T53
		Penetration of Asphalt Materials	SNI 06-2456; AASHTO T-49
		Ductility of Asphalt materials	SNI 06-2432; AASHTO T51
		Specific Gravity of Semi Solid Asphalt	SNI 06-2441; AASHTO T228
		Flash and Fire Point by Cleveland Cup	SNI 06-2433; AASHTO T48
01.02 (Fri)	9:00	Review & Summary of Asphalt Tests	
	14:00	Benkelman Beam Test on Road (Pavement Deflection Measurement)	SNI03-2416; AASHTO T256
02.02 (Sat)	9:00	Analysis & Evaluation of Test Results	
	14:00	Loss on Heating of Oil and Asphaltic Compounds	SNI 06-2440; AASHTO T47

(2) Lecturer & Instructors:

Mr. Mitsuo Hara (JICA Expert), Mr. Apriyanto (PT VIRAMA KARYA, Indonesia)

(3) Participants:

Mr. Saturnino Gomes, Mr. Hermenegildo Guterres, Mr. Nazario Freitas,

Mr. Jeremias da Costa, Mr. Fabiao da Cunha, Mr. Alfredo das Neves,
Ms. Juliana das Neves, Ms. Isabel M.F.Alves, Ms. Camelita A.Guterres,
Mr. Gregorio dos Reis, Mr. Eustaquio Ximenes, Mr. Orlando D.C.Rosales,
Mr. Floriano de Almeida, Mr. Amaro Monteiro, Mr. Mariano Monteiro,
Mr. Jose Sarmento

(4) Objective of the Workshop

To learn and review basic knowledge of typical asphalt tests through lecture and laboratory practice.

(5) Lecture

- Basic material test equipments and maintenance
- Typical tests apparatus and procedure
- Work sheets for typical laboratory tests
- Preparation of reports on typical laboratory tests
- Evaluation method of test results

(6) Practice of typical tests in laboratory

- Marshall Test
  To test asphalt mixture using Marshall apparatus to be conducted to measure stability to plastic flow of asphalt-aggregate mixture to assess its performance
- Bitumen Penetration
  To determine penetration of hard or soft bitumen and level of asphalt hardness by thrusting a particular size penetration needle with certain load during specified time interval
- Specific Gravity
  To determine specific gravity of hard bitumen using pycnometer in order to know the composition of asphalt to be used in road pavement
- Softening Point
  To determine softening point of asphalt material using balls and ring
- Loss on Heating
  To find out loss of oil and asphalt mass by heating
- Extraction
  To calculate asphalt percentage in the mixture
- Ductility
  To determine elasticity/hardness of asphalt by measuring elongation length of asphalt

specimen

- Flash and Fire Point by Cleveland Cup
- Benkelman Beam Test

  To determine static rebound by measuring with Benkelman beam at points on flexible road

(7) Reference Martial

- Resistance to plastic flow of bituminous mixture using Marshall apparatus (PSNI M 01-2003; AASHTO T245-97)
- Penetration of bituminous materials (SNI 06-2456-1991; AASHTO T49-03; ASTM D5)
- Ductility of bituminous materials (SNI 06-2432-1991; AASHTO T51-00)
- Softening point of bitumen (SNI 06-2434-1991; AASHTO T53-96)
- Specific gravity of semi solid bituminous materials (SNI 06-2441-1991; AASHTO T228-04)
- Seybolt viscosity (SNI 03-6721-2002; AASHTO T72-97; ASTM D88-94)
- Flash and fire point by Cleveland oven cup (SNI 06-2433-1991; AASHTO T48-04)
- Loss on heating of oil and asphaltic compounds (SNI 06-2440-1991; AASHTO T47-98)
- Quantitative extraction and recovery of asphalt binder from asphalt mixtures (SNI 03-3640-1994; AADSHTO T319-03)
- Pavement deflection measurement, non continuous static loading device (Benkelman Beam) (SNI 03-2416-1991; AASHTO T256-01)
- Job Mix Formula
- Hot Asphalt Mixing Design
- Aggregate Module
- Asphalt Tests (SNI)
- Asphalt Materials (Table of Standards)

(8) Achievement

As for the main goal of capacity building of the DRD as well as individual staffs of DRD to conduct material test related asphalt materials as demands for improving quality assurance, the initial purpose of the OJT was achieved according to the result of assessment test conducted right after the OJT.

1) Test Contents

- Objective of Marshall Stability Test
- Objective of Penetration Test
- Softening Point Test and Test Equipments

- Ductility Test and Test Equipments
- Meaning of Asphalt Stability
- Meaning of Flow Value
- Test Equipments for Measurement of Stability
- Test Equipments for Measurement of Flow Value
- Advantages of Asphalt Concrete

2) Capacity Assessment Results

Table 7-9 Results of Capacity Assessment (Asphalt)

Names (Initial)	#1 (‘07/11/30)	#2 (‘08/ 2/ 1)	Remarks
1. H.G.	67	84	
2. J.C.	47	72	
3. N.F.	43	70	
4. A.N.	41	54	
5. F.A.	54	70	
6. J.N.	-	88	
7. I.A.	-	73	
8. G.R.	56	74	
Average	48.0	73.1	* 87.5% 70pt.over

Comparing to two test results, progress can be seen in the second test, which was conducted right after OJT with the advantage of having got used to asphalt tests.

It is strongly recommended to review and develop the material test skills continuously in order to improve capacity development.

Photographs of the Asphalt Test Workshop

7.4.4 Pavement Design

(1) Workshop

The workshop for the pavement design was carried out on 24th September with participation of following members;

Mr. Saturnino Gomes, Mr. Hermenegildo Gutteres,
Ms. Juliana Pereira, Mr. Adylson da Costa, Mr. Orlando da Costa Rosalos,
Mr. Fabio da Chuna, Ms. Calmelita Alves, Mr. Gregolio dos Rois, Mr. Mariano Monteiro,
Mr. Floriano de Almeida, Ms. Isabel M. F. M.F. Alves,
Mr. Janastacio Freitas da Costa, Mr Amaro Monteiro

The objective of the workshop was;

1. To understand typical composition of pavement structures
2. To understand necessary conditions, information and materials for pavement design
3. To understand treatment of problematic soil for pavement design
4. To understand worldwide trend for pavement design
5. To understand general methodology and process for pavement designAnd its contents were as follows;

1. Cross Section
2. Pavement Composition
3. Design Period
4. Axle Load
5. Treatment for Problem Soil
6. Design Methodology
7. Pavement Design Catalog to be introduced
8. Discussion

Handout documents were prepared in both of English and Indonesian language.

In the workshop, the following subjects were highlighted;

The specific features of pavement types in several views such as durability, cost, and easiness of maintenance to each type of pavement were also explained and this was because of a consideration that understanding the features helps to select the pavement type during the design works. In addition, meaning and criteria of the design period were also explained.

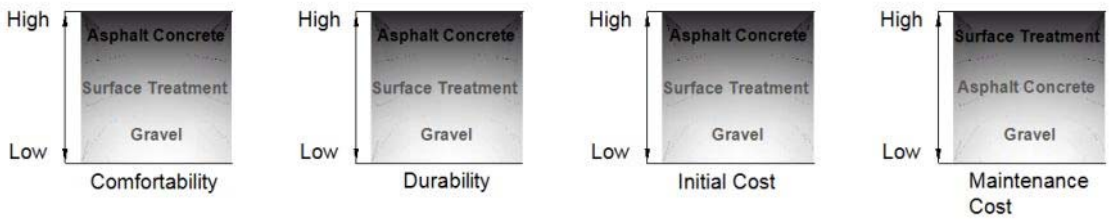

Figure 7-2 Comparison of Pavement Types by Aspects

Table 7-10 Criteria for Design Period of Pavement Design

Design data reliability	Importance/Level of Service	
	Low	High
Low	10-15 Years	15 Years
High	10-20 Years	15-20 Years

Since there is no reliable data in terms of traffic and information of the social background in Timor-Leste, JICA Expert recommend adopting 10 years for the design period in normal case .

In the end of the explanation, the general procedure for pavement design and some considerations for the pavement design catalog to be introduced in the Pavement Design Manual were mentioned.

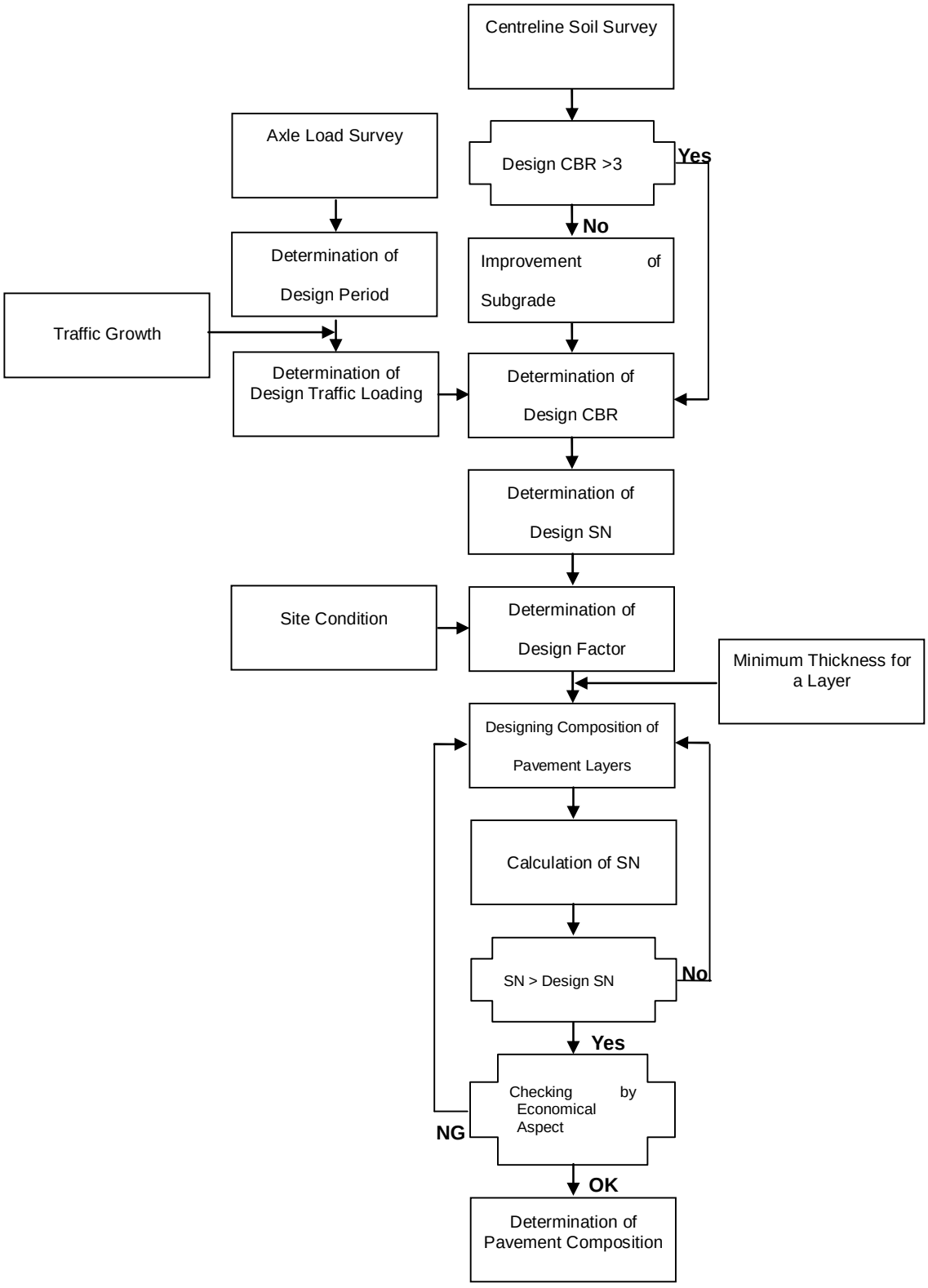

Figure 7-3 General Procedure for Pavement Design

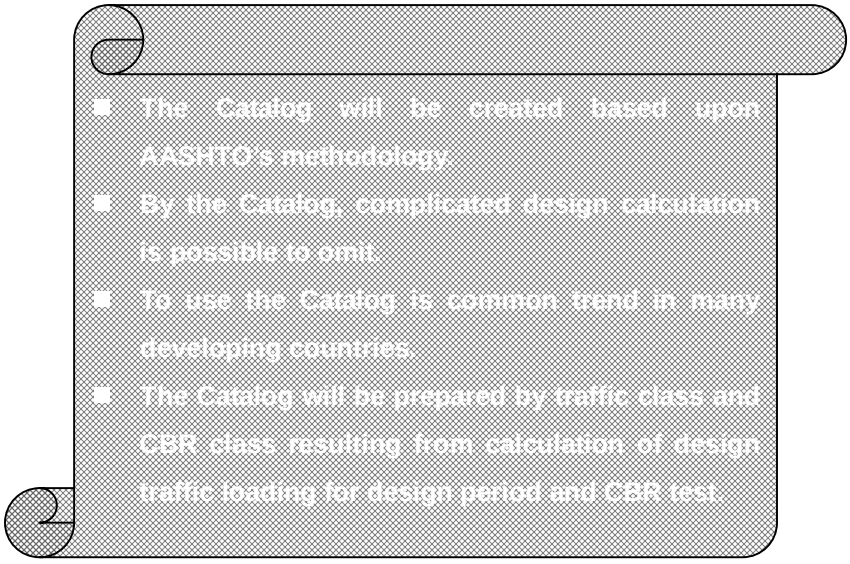

Figure 7-4 Consideration to the Pavement Design Catalog

After the explanation of JICA Expert, the discussion was made.

Since the contents were not being familiar with the C/P, there was no remarkable issue on the discussion. However, the following issues were raised as related matter of the road administration.

- There is no approved typical cross section of the National Road
- The cross sections are being introduced depending on design policy of the financer/donor
- The applied width of the cross section is varied from 5.5m to 7.5m
- The necessary idea of the ROW (Right of Way) shall be introduced for future reservation of road widening and to avoid unnecessary conflict of compensation for property relocation

(2) Capacity Assessment

The final capacity assessment was carried out on 18th February 2008 in order to confirm the achievement level of the C/P and its manner and question was same as that of 1st phase.

Table 7-11 Results of Capacity Assessment (Pavement Design)

No.	Question	Answers		Remarks
		C/P(1)	C/P(2)	
1	Material Test/Specific Gravity	C	C	
2	Material Test/Abrasion Test	C	C	
3	Material Test/Sieve Analysis	C	C	
4	Material Test/Density by Sand Replacement Method	C	C	
5	Material Test/Marshall Stability	C	C	
6	Material Test/Penetration Test	I	C	
7	Material Test/Unconfined Compressive Test	C	C	
8	Material Test/Liquid Limit Test	C	I	
9	Material Test/Plastic Limit Test	C	I	
10	Material Test/Soaked CBR Test	C	C	
11	Design/Design Traffic Volume	C	C	
12	Design/Pavement Design Period	C	C	
13	Design/Equivalent Standard Axle Load	I	C	
14	Design/Design CBR	C	C	
15	Design/Serviceability Index	C	I	
16	Design/Pavement Layers	C	I	
17	Design/Structure Number Method	C	C	
18	Design/Layer Coefficient	I	C	
19	Design/Design Depth for Subgrade	C	I	
20	Maintenance/International Roughness Index	I	I	
	Score	80	70	

C: Correct Answer I: Incorrect Answer, C/P (1): Mr. J.AUGUST, C/P (2): Mr. MONTRIRO, DRBFC

As table above shows that both results of the scores are more than 70, it is more than the Project's targeted point.

Photographs of the Pavement Design Work Shop


7.4.5 Slope Protection

There was a proposal from the CBRM that the Project takes a part of investigation of the CBRM's case study that is emergency repair work caused by land slide on A01. This was also good opportunity of the workshop in terms of checking and monitoring skill on dangerous slopes, and this experience and result are expected to help to draft the Slope Protection Guideline as well.

There is a part with huge scale of settlement on pavement at A01, and this settlement becomes a disturbance of smooth traffic flow. Hence the Road Maintenance Office of the MOI decided to repair this part with consultation and supervision of Experts of the CBRM, however there is information by local authority that the settlement is still in progress together with land slide. In order the repair work to be more effective and good example for similar cases, the initial investigation and monitoring for land slide were thus proposed.

Figure 7-5 Location Map for Slope Protection Workshop Site

Figure 7-6 Plan View for Slope Protection Workshop Site

According to the local authorities there was huge scale land slide in the past, after the land slide some repair works was provided

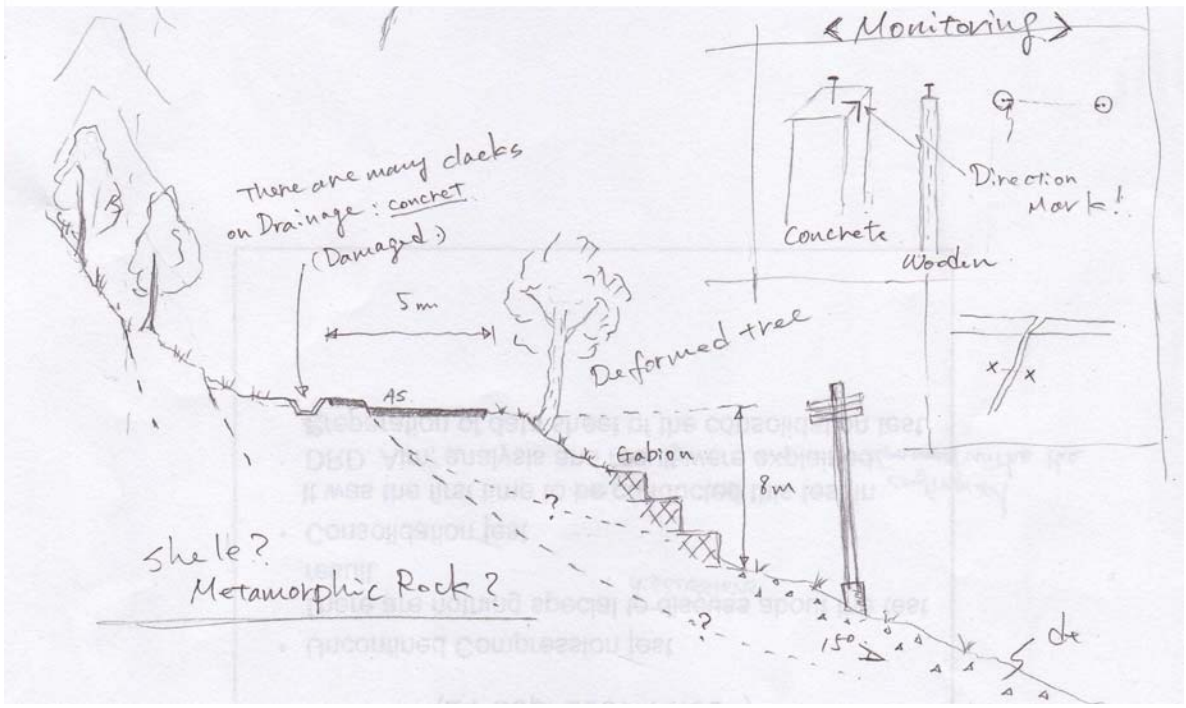

Figure 7-7 Cross View for Slope Protection Workshop Site

JICA Experts identified the current situation by his physical observation that the landslide looks to be still in progress that is in accordance with the opinion of local authority. JICA Expert proposed the monitoring in order to clarify the movement by data. So the monitoring plan for landslide movement has been established by JICA Expert, its summary is as follows:

1. "Nukiita" method with some modifications is adopted in consideration of financial and time constraint.

2. Frequencies of the monitoring are proposed for each term respectively which is (1) Every week on before repair (2) Every day on during repair and (3) Every month on after repair.

(1) Workshop for Slope Movement Monitoring

By abovementioned methodology, the workshop for the slope movement monitoring is carried out; the summary of it as follows;

2) Date

19th December 2008, 22ndand 26th January, 2nd February 2008

3) Participants

Mr. A. CRUZ,	DRBFC, Supervisor,	Dili Regional Office
Mr. M.TILMAN	DRBFC, Ass. Supervisor,	Dili Regional Office

Mr. IZAWA JICA Expert
Mr. T. HARA JICA Expert
Mr. M. HARA JICA Expert

4) Venue

Site at A01, Dili Region

In the workshop, the point of view for the selection of monitoring points and the monitoring methodology were lectured.

The monitoring was carried out with the supports by the JICA Experts; the result of the monitoring is as follows;

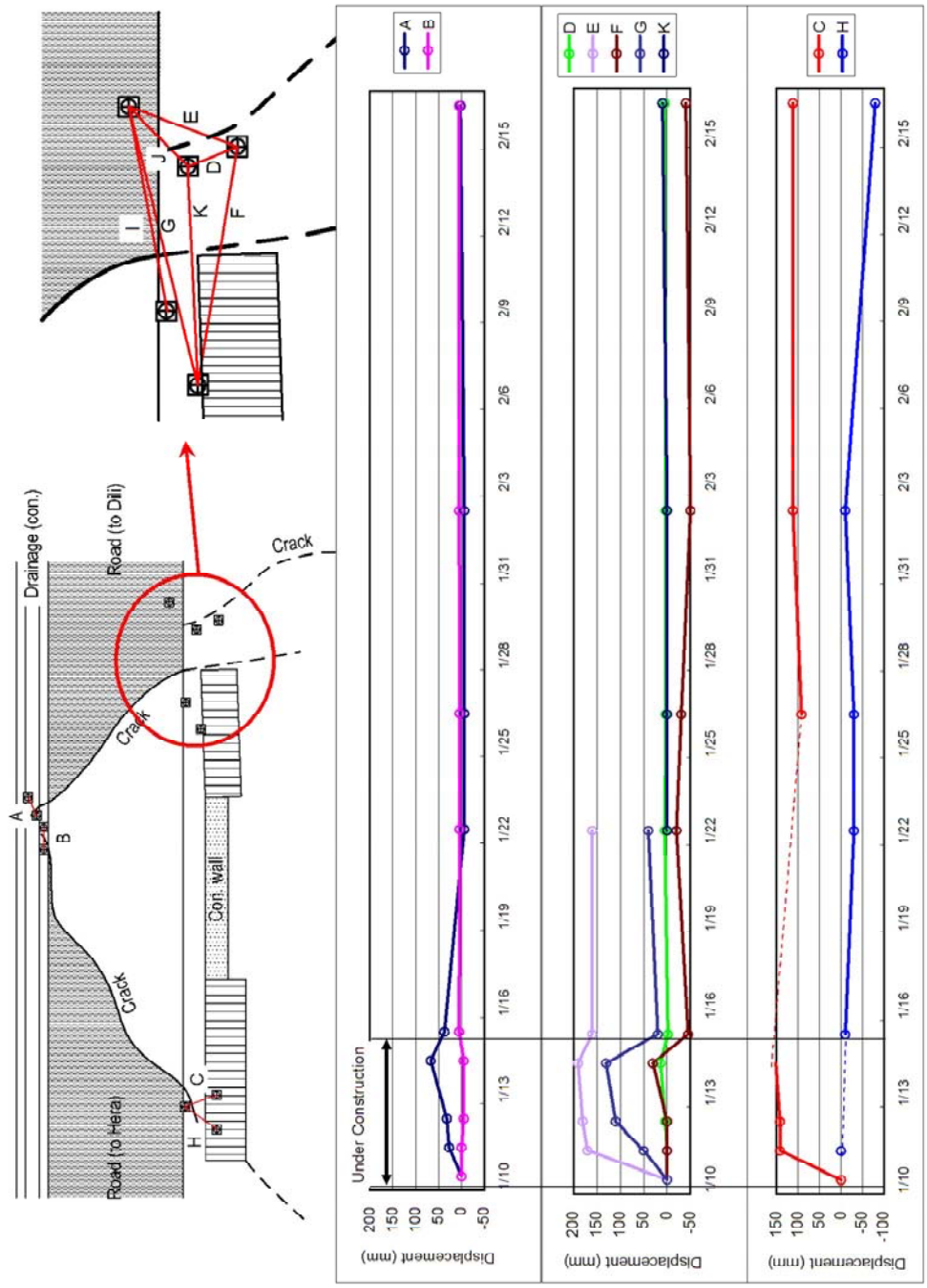

Figure 7-8 Results of the Monitoring

Some changes were given to monitoring points because of finding out of another new cracking on road surface. As above figure shows, there are some movements even in short monitoring period. When they are checked by the criteria shown in below, the slope movement is categorized on “Study of Slope Protection”, which indicates that it is in the condition of that specific counter measurement is considered.

Table 7-12 Measurement Criteria for Slope Movement

Under construction of Slope Protection		
Action	**Mechanical**	**Manual**
Enhanced Monitoring	>5mm/10day	>10mm/7day
Study of Slope Protection	5-10mm/5day	N/A
Caution/Temporary measure	10-100mm/day	N/A
Stop construction/Evacuation	>100mm/day	N/A
Maintenance		
Enhanced Monitoring	>10mm/30day	>20mm/30day
Study of Slope Protection	5–50mm/5day	N/A
Caution/Temporary measure	10-100mm/day	N/A
Closure/Evacuation	>100mm/day	N/A

However, JICA Expert instructed the C/P to monitor the movements much longer terms because the monitoring period is too short to make proper judgment and the results of the measurement is supposed to be with some error.

(2) Capacity Assessment

The final capacity assessment was carried out on 18th February 2008 in order to confirm the achievement level of the C/P and its manner and question was same as that of 1st phase.

Table 7-13 Results of Capacity Assessment (Slope Protection)

No.	Question	Answers		Remarks
		C/P(1)	C/P(2)	
1	Typical Type of Slope Failures	C	C	
2	Purpose of Slope Protection	C	I	
3	Typical Type of Slope Monitoring Method	C	C	
4	Typical Type of Site Investigation	C	C	
5	Measure for Slope Collapse	C	C	
6	Measure for Road Collapse	C	C	
7	Measure for Rock Fall	I	C	
8	Measure for Mass Movement	I	I	
	Score	75	75	

C: Correct Answer, I: Incorrect Answer C/P, (1): Mr. J.AUGUST, C/P (2): Mr. MONTRIRO, DRBFC

As table above shows that the results of the scores are same for 75 point, it is more than the Project's targeted point.

However, they are identified themselves being in progress of mastering basic methodology of slope protection.

Photographs of the Slope Protection Work Shop




7.5 TRAINING IN INDONESIA

7.5.1 Introduction

As one of the main activities of the Project, a practical training of material testing in Indonesia has been planned and coordinated from the very beginning of the Project.

Through deep consideration and discussion on the present state of DRD material testing personnel and test equipments, it was concluded to be better to carry out the material test training in the Research and Development Center for Roads and Bridges (RDCRB), Agency for Research and Development, Ministry of Public Works in Bandung, Indonesia

The reasons of this conclusion are as follows:

1) RDCRB has plenty experiences of conducting trainings with a variety of subjects concerning roads, bridges and materials.

2) They possess necessary sets of material test equipments and tools under enough maintenance in regard to soil, concrete and asphalt.

3) They have lecturers with wide experience and skilful instructors in the fields mentioned above.

4) Material test standards are fundamentally based on SNI (Indonesian National Standards) with reference to ASTM and AASHTO standards, which are also being familiar for engineers and technicians of Timor-Leste.

5) The language used in lecture and laboratory practice is Indonesian Language which is also most commonly understandable for engineers and technicians of Timor-Leste.

6) Traveling from Timor-Leste to Bandung via Jakarta is an easy and short way, and reasonable hotels and public transportation are available around RDCRB.

7) Information exchange on standards of material testing and of design is very easy to access for DRD because of short distance and common language.

This will work efficiently in future to promote good relationship between two organizations.

The area of the material training course programme were to cover a number of laboratory testing to assist the method and procedure of road material testing for soil, concrete and asphalt.

7.5.2 Objectives of Training

The objectives of the training programme in road material testing are as follows:

1) To learn quality assurance of laboratory testing in regard to such road and bridge materials as soil, concrete and asphalt through lecture and practice and to develop knowledge of road and bridge work.

2) To develop capacity for engineers and technicians of the DRD and the DRBFC in the field of material testing.

3) To improve skills in road construction and maintenance technologies especially in laboratory testing concerning roads.

4) To upgrade understanding of material test standards and background knowledge with practical experience of road works.

7.5.3 Training Schedule

Training schedule is shown on Table 7-14

Table 7-14 Schedule of Training in Indonesia

	Date (Nov.2007)		Schedule	Remarks
1	3	(Sat)	11:00 All trainees at Airport 13:35 Dep. Dili > 14:30 Arr. Denpasar	MZ 8490 Stay at Santika Beach Hotel
2	4	(Sun)	14:20 Dep. Denpasar > 14:55 Arr. Jakarta Travel to Bandung, PM: Arrival. At Hotel Preparation for Training	Bandung, Stay at Mitra Hotel
3	5	(Mon)	AM: Opening & Orientation at RDCRB PM Start for Training	
4	6	(Tue)	Training at RDCRB	
5	7	(Wed)	Training at RDCRB	
6	8	(Thru)	Training at RDCRB	
7	9	(Fri)	Training at RDCRB	
8	10	(Sat)	Self Learning, Report Making	
9	11	(Sun)	Holiday	

	Date (Nov.2007)		Schedule	Remarks
10	12	(Mon)	Training at RDCRB	
11	13	(Tue)	Training at RDCRB	
12	14	(Wed)	Training at RDCRB	
13	15	(Thru)	AM: Evaluation of Training &Reporting PM: Closing Training	
14	16	(Fri)	AM-PM Site Study Tour (Bandung-Jakarta Highway) Stay at Jakarta	Hotel: Ciputra Hotel(BB)
15	17	(Sat)	06:10 Dep. Jakarata > 08:50 Arr. Denpasar Stay at Denpasar	MZ644 Stay at Santika Beach Hotel
16	18	(Sun)	10:05 Dep. Denpasar >12:55 Arr. Dili	MZ 8480

7.5.4 Training Place

Research and Development Centre for Roads and Bridges (RDCRB), Agency for Research and Development, Ministry of Public Works in Bandung, Indonesia

Jl.A.H. Nasution No.264 Bandung 40294, Indonesia
TEL: +62-22-7802251

7.5.5 Trainees

For the purpose that all trainees have an opportunity to be trained due to their major field, 22 members from DRD and DRBFC* has been divided into 3 courses as follows for effective learning and teaching process. However, some participants were dispatched to a different course from their minor field in DRD due to the total balance of each course.

Table 7-15 Trainees Grouping

Soil Class	Concrete Class	Asphalt Class
1. Adylson H.M.da Costa	1. Saturnino Gomes	1. Hermengildo Guterres
2. Amaro Monteiro	2. Isabel M.F. Alves	2. Jeremias M. Da Costa
3. Floriano de Almeida	3. Anastacio F. Da Costa	3. Nazario de J. Freitas
4. Jose M. Sarmento	4. Orlando D.C. Rosales	4. Fabiao da Cunha
5. Mario do Rego*	5. Juliana P. Das Neves	5. Domingos de J. Barreto*
6. Carmerita A. Guterres	6. Gregorio dos Reis	6. Alfredo O.S. das Neves
7. Alfredo O.S. das Neves	7. Mariano Monteiro	7. Marcelino G. Godinho
	8. Devi E. De Sousa	

7.5.6 Methodology of Training

(1) Preparation

Training contents and schedule were determined through preliminary visit by RDCRB representing members with close discussion of DRD and JICA Experts Team in February, 2007, in Dili.

Handout documents of training were prepared in advance for lectures and practices to explain material testing procedures and recording forms with the purpose of future use.

(2) Lectures and Practices

The lectures and laboratory practice in this training program were conducted by 18 lecturers (technical skill) and assisted by 16 instructors (testing practice in laboratory) from three divisions in RDCRB during the training period in order to adjust the necessity of material testing.

They were teaching based on their expertise and experience within their competence, names of lecturers and instructors are stated as follows in each course.

Table 7-16 List of Lecturer and Instructor of RDCRB

Asphalt Class	Concrete Class	Soil Class	Field (Site Visit) and Laboratory Management
Lecturer			
1. Ir. Kurniadji, MSC. 2. Ir. Tjitjik W. 3. Ir. Leksminingsih 4. Ir. Ketut Darsana, MT. 5. Ir. M. Tranggono, MSc. 6. Ir. Iriansyah. 7. Y. Ronnie, ST. 8. Alfi, ST.	1. Ir. Roestaman, MSc. 2. N. Retno Setiati, ST., MT. 3. Hadi Gunawan, S.Si.	1. DR. Ir. M. Eddie Sunaryo, M.Sc. 2. Drs. M. Suherman. 3. Ir. GJW. Fernandez 4. Ir. Rudy Febrijanto, MT. 5. Ir. Adyawati Tanzil, M.Sc.	1. DR. Djoko Widajat, MSc. 2. DR. Ir. Anwar Yamin, MSc. 3. Ir. M. Tranggono, Msc. 4. Haliena Alien, ST.
Instructor			
1. Ms. Wienne 2. Ms. Tuti 3. Mr. Tommy 4. Mr. Alfi 5. Mr. Yosep 6. Mr. Bambang 7. Mr. Iyus 8. Mr. Alpin	1. Mr. Rubby Mastra. 2. Mr. Budi Subrata. 3. Mr. Ivan Sofyan. 4. Mr. Supardi.	1. Ir. Deny Hidayat 2. Mr. Djaenudin. 3. Ms. Yayah R. 4. Mr. Rizal P.	-

(3) Study Tour to RDCRB Project

The Study Tour was also included in the training programme so as to lean actual utilization of the technique at the site.

The Study Tour was conducted on 10th November 2007 (Saturday), the selected site was Cirebon, 150 km from Bandung, for visiting of an asphalt plant making use of recycled materials and construction and rehabilitation sites of trunk roads carried out by RDCRB in Plimmanan.

Those projects are experimentally using recycle formed bitumen and also modified asphalt with rubber materials. These new technologies are expected for improving the pavement performance.

The study tour were led by Ms. Ati Dwiyanti, Ms. Norida Saraswati and lecturers on site were Dr. Djoko Widajat and Dr. Ir. Anwar Yamin from RDCRB who were supervising the

pilot project of recycle material pavement project in the construction and rehabilitation site.

7.5.7 Training Programme

In general, the material test training was successfully executed in RDCRB from 5th to 16th November, 2007, in Bandung.

The trainings were provided for the engineers and technicians not only for learning basic methods of using various testing equipments but also for recognizing the importance of testing for the quality assurance of road construction materials.

Each engineer and technician is expected to develop knowledge of material testing in each major field (soil, concrete and asphalt) as well as of quality assurance in laboratory testing and background of road and bridge works.

(1) Soil Class

Table 7-17 Time Table for Soil Class

	Schedule and Training Contents
11/5 (Mon)	8:30 Registration 9:00 Opening Ceremony 10:00 General Explanation 11:00 Laboratory Visit 13:00 Lecture (Purpose of Training)
11/ 6 (Tue)	8:30 Lecture (Basic Equipments to be used for Material and Maintenance)
11/ 7 (Wed)	8:30 Lecture (Arrangement of Samples, Water Content, Purpose of Tests)
11/ 8 (Thu)	8:30 Lecture (Purpose of CBR and Direct Shear, Consolidation), Laboratory
11/ 9 (Fri)	8:30 Laboratory (Arrangement of samples and testing for CBR test)
11/ 10 (Sat)	7:30 Study Tour to an Asphalt Mixing Plant and Road Construction Sites
11/ 11 (Sun)	Self Learning
11/12 (Mon)	8:30 Laboratory (Arrangement of samples and testing for Trial Test)
11/ 13 (Tue)	8:30 Laboratory (Unconfined Compression Test) 13:00 Lecture* (Roads in Indonesia) 14:30 Lecture (Quality Control and management of laboratory)
11/14 (Wed)	8:30 Compilation and Evaluation of Testing Results
11/ 15 (Thu)	8:30 Report Making 10:00 Closing Ceremony (Certificate of Achievement)
11/ 16 (Fri)	Report Making

Remarks *by Director of Road, MPW

1) Curriculum of Training Program

1. Theory in Lecture

- Sampling and handling soil samples
- Making of soil specimens
- Expalanations on soil laboratory testinig

2. Practice in Laboratory

Index testing

- Water/ moisture content
- Specific gravity
- Limit consistency
- Particle size analysis for determining particle size distribution
- pH and organic content
- Shear strength testing
- Direct shear
- Triaxial

(2) Concrete Class

Table 7-18 Time Table for Concrete Class

	Schedule and Training Contents
11/5 (Mon)	8:30 Registration 9:00 Opening Ceremony 10:00 General Explanation 11:00 Laboratory Visit 13:00 Lecture (Purpose of Training)
11/ 6 (Tue)	8:30 Introduction of Testing Material Procedures, Sampling of Aggregates
11/ 7 (Wed)	8:30 Sieve Analysis of Fine and Coarse Aggregates, Unit Weight Test
11/ 8 (Thu)	8:30 Fineness of Hydraulic Cement, Compressive Strength Tests
11/ 9 (Fri)	8:30 Mixing Preparation, Slump Test, Unit Weight Test of Fresh Concrete
11/ 10 (Sat)	7:30 Study Tour to an Asphalt Mixing Plant and Road Construction Sites
11/ 11 (Sun)	Self Learning
11/12 (Mon)	8:30 Compressive Test of Concrete, Flexural Strength of Concrete
11/ 13 (Tue)	8:30 Evaluation Method of Test Results 13:00 Lecture* (Roads in Indonesia) 14:30 Lecture (Quality Control and management of laboratory)
11/14 (Wed)	8:30 Additional Tests and Discussion

	Schedule and Training Contents
11/ 15 (Thu)	8:30 Report making 10:00 Closing Ceremony (Certificate of Achievement)
11/ 16 (Fri)	Report Making

Remarks *by Director of Road, MPW

1) Curriculum of Training Programme

1. Theory in Lecture

- Knowledge of concrete materials
- Basic principles of concrete technology
- Explanation of concrete laboratory testing

2. Practice in Laboratory

- Preparation of test samples for aggregate testing
- Sieve analysis testing of fine aggregates and coarse aggregates
- Specific gravity testing and water absorption of fine and coarse aggregates
- Content weight of fine and coarse aggregate testing
- Testing of coarse aggregate resistance by Los Angeles machine
- Impact resistance testing of coarse aggregates
- Crushing resistance testing of coarse aggregates
- Index testing of aggregates
- Testing of finer materials from 75 μ m (sieve no.200) for fine aggregates
- Testing of clay and breakable material in fine and coarse aggregates
- Organic testing in fine aggregates

(3) Asphalt Class

Table 7-19 Time Table for Asphalt Class

	Schedule and Training Contents
11/5 (Mon)	8:30 Registration 9:00 Opening Ceremony 10:00 General Explanation 11:00 Laboratory Visit 13:00 Lecture (Purpose of Training)
11/ 6 (Tue)	8:30 Lecture (Testing of Petroleum Asphalt, Cutback & Emulsified Asphalt)
11/ 7 (Wed)	8:30 Lecture (Testing of Aggregates) 13:00 Lecture (Testing of Marshall)
11/ 8 (Thu)	8:30 Laboratory (Asphalt Testing)
11/ 9 (Fri)	8:30 Laboratory (Aggregate Testing)

	Schedule and Training Contents
11/ 10 (Sat)	7:30 Study Tour to an Asphalt Mixing Plant and Road Construction Sites
11/ 11 (Sun)	Self Learning
11/12 (Mon)	8:30 Laboratory (Marshall Test)
11/ 13 (Tue)	8:30 Laboratory (Pavement Testing) 13:00 Lecture* (Roads in Indonesia) 14:30 Lecture (Quality Control and management of laboratory)
11/14 (Wed)	8:30 Additional Tests and Discussion
11/ 15 (Thu)	8:30 Report Making 10:00 Closing Ceremony (Certificate of Achievement)
11/ 16 (Fri)	Report Making

Remarks *by Director of Road, MPW

2) Curriculum of Training Programme

1. Theory in Lecture
   - General pavement structure
   - Evaluation of pavement performance
   - Road material (Asphalt, Aggregates, Sub grade)
   - Job mixed design for hot mixed asphalt concrete
   - Evaluation of structural performance
   - Explanation of Laboratory testing and field testing

2. Practice in Laboratory
   - Asphalt parameter
   - Aggregate parameter
   - Job mix design

3. Practice in Field
   - Benkelman beam
   - CBR field/ in situ
   - Dynamic cone penetrometer (DCP)

(4) Lecture on Laboratory Quality Management (November 13th)

Contents:

1) Laboratory Accreditation System
2) Preface of Laboratory Quality Management System
3) ISO/IEC 17025 Laboratory Quality Management System
4) Quality Document System

7.5.8 Results and Achievements of the Training

(1) Evaluation of Training

At an evaluation meeting held by RDCRB lecturers, JICA Expert member and from questionnaire to trainees, following items were discussed to be taken into consideration in future.

1) Participants were mostly very eager and interested in the training course with full attendance, while some were not due to bad health control and other reasons.
2) Many good questions arose during the course discussion that indicated their eagerness and necessity.
3) In the final test of soil course, the result was up to 85.8%, 3 persons excellent, 3 persons good and one was fair result.
4) Training period was limited due to conditions of RDCRB and budget. It was strongly requested and proposed to have another chance for advanced and intensive course if possible.
5) In order to continue the good relation-ship, information exchange of material tests and standards as well as researcher exchange program are expected in future.

(2) Conclusion and Recommendation

1) The training for material testing was successfully conducted under the well organized training program by RDCRB and JICA Team for 22 East Timor engineers and technicians as well.
2) Acting Director of DRD commented that the training was conducted successfully in general, however, the training duration seemed short so that it was difficult to master all the contents and it is expected to have another opportunity of training in Indonesia with minimum three (3) months duration.
3) Further training curriculum is necessary by taking longer term in future to assist East Timor in applying the training result to their daily work in DRD and to continue capacity development.
4) To set up a good foundation of material testing laboratory is also important basing on ISO/IEC 17025 to apply good laboratory practice and to have good quality results of laboratory testing.

From the words of RDCRB Director," This is just a beginning, but to continue and to improve are more important. Ask anything to our staff whenever you are in need of our help. We are your friends."

Photographs of the Training in Indonesia

Trainees' Arrival at JAKARTA

RDCRB

Opening Ceremony

Opening Speech by DTR

Exchanging Presents

Lunch Break

General Explanation (Orientation)

Explanation of Facilities

Photographs of the Training in Indonesia

Desk Study on Soil Class

Desk Study on Asphalt Class

Desk Study on Concrete Class

Laboratory Training on Soil Class

Laboratory Training on Concrete Class

Laboratory Training on Asphalt Class

Study Tour

Closing Ceremony

7.6 USAGE PLAN OF MANUALS AND GUIDELINES

7.6.1 Penetration by the Seminar

In order to present the Projects outcome, "Road Guideline and Manual Seminar" is scheduled to be held at end of February 2008, as an activity of Work Category 3.

(1) Objectives

The main objectives of the seminar are to (i) report the contents, and to (ii) collect various comments for Road Guidelines and Manuals prepared by the Project, through discussion with stakeholders. In addition the third objective is to develop the Guidelines and Manuals to fulfil current demands of road maintenance works in Timor-Leste.

(2) Outline

With collaboration by the Project relevant, the Seminar is designed to present the Road Technical Maintenance and Test Manuals/Guidelines for road sector stakeholders. Planning and operation of the Seminar are conducted by Timor-Leste side, or the C/P initiative. The JICA Expert's supports will be limited on only the advice of creating presentation materials.

(3) Schedule, Venue

The Seminar is scheduled to take place from 27th February at Hotel Timor Dili city.

(4) Programme

Table 7-20 Seminar Programme

Date, Time & Venue: 27th (Wed) February, 2008 at Hotel Timor

Master of Seminar: Mr. Jose Gasper Piedade,
Permanent Secretary, Public Works, MOI

Time	Program	Lecturers, etc.
9:30 – 10:00	*Registration*	*All Participants*
10:00 – 10:10	Opening	Mr. Pedro Lay da Silva, Minister, MOI
10:10 – 10:30	General Explanation; ・ Objective of Seminar and Outline of DRBFC & DRD	Mr. Rui Guterres, Director, DRBFC,MOI
10:30 – 11:00	Keynote Lecture ; ・ "Outlook of Construction Industry in	Mr. Aderito L.C. de Araujo, Archtimor Engineering Consultant

	Timor Leste"	
11:00 – 11:30	Brief Explanation; ・ JICA Project for Capacity Development by Training, and Preparation of Guidelines and Manuals for Roads	Mr. Hisashi Muto, Leader for JICA Experts Team Japan Engineering Consultants Co., Ltd.
11:30 – 12:00	Report: ・ "Training in Indonesia"	Mr. Saturnino Gomes Brito, Ag. Director, DRD
12:00 – 13:15	*Lunch Buffet at Dining Hall*	*All Participants*
13:15 – 13:45 13:45 – 14:15 14:15 – 14:30	Lecture: ・ **Slope Protection Guideline** Lecture; ・ **Pavement Design Manual** Q&A	Mr. Milton Ramanata Monteiro Chief of Design Engineer, DRBFC , Mr. Jose Augosto I.S.Freitas, Chief of Bridge Design Engineer *All Participants*
14:30 – 14:45	*Coffee Break*	*All Participants*
14:45 – 15:05 15:05 – 15:25 15:25 – 15:45	Lecture; ・ **Soil Test Manual** & **Guideline** ・ **Concrete Test Manual** & **Guideline** ・ **Asphalt Test Manual** & **Guideline**	Mr. Adylson H.M. da Costa, Chief of Laboratory/Engineer, DRD Ms.Juliana P. das Neves, Chief of Laboratory/Engineer, DRD Mr. Hermenegildo Guterres, Chief of Laboratory/Engineer, DRD
15:45 – 16:00	Closing	Mr. Domingos Dos Santos CAEIRO, State Secretary, Public Works, MOI

(5) Questionnaire

To identify the necessity of revisions of the manuals and guidelines, the following questionnaire will be distributed to the participants. The questionnaire is designed as not only to evaluate performance of presentations, but also to utilize as precious sources of operational recommendations for future.

ROAD TECHNICAL GUIDELINE AND MANUAL SEMINAR

Dili, 27 February 2008

QUESTIONNAIRE

NAME OF PARTICIPANT:

_____

NAME OF ORGANIZATION: _____

NAME OF POSITION:

_____

Please fill out and return to DRD staff after the closing of the Seminar

1. Please evaluate the Seminar:

'1': Excellent; '2': Good; '3': Satisfactory; '4': Unsatisfactory

	1 ++	2 +	3 -	4 --
How well did the moderator and support staff respond to your needs?				
Would you prefer less (- -) or more (++) ?				
presentation				
question-answer				
How useful was the content:				
Introduction to the Seminar themes and Outline of DRD				
Keynote Speech				
Outline of The Project for Capacity Development by Training, and Preparation of Guidelines and Manuals for Roads				
Report of Staff Training at Indonesia				
Slope Protection Guidelines				
Soil Material Test Manual				
Concrete Material Test Manual				
Pavement Design Manual				
Asphalt Material Test Manual				

2. What was the best topic(s) at the Seminar?

3. Which topics should be covered in more depth during the next Seminar?

4. Other than above, what could be improved?

5. Please describe any other comment, if you have.

Thank you.

CHAPTER 8 CONCLUSION AND RECOMMENDATION

As the results of the Project, the Pavement Design Manual and the Slope Protection Guideline as well as the Material Testing Guidelines/Manuals have been prepared properly and the level of testing skills became better than that of before the Project.

Prior to the conclusion of the Project, this chapter discusses the issues and measures as well as lessons through the Project implementations, first.

8-1 ISSUE, AND MEASURE ON PROJECT IMPLEMENTATION

Prior to the implementation of the Project, the following issues were raised from the facts obtained from the results of preliminary study, this section discuses measures taken in the implementation.

ISSUE 1

- Urging to the C/P having aggressive participation in the Project activity.

  Description:

  As the Project was designed for that the C/P by own become possible to maintain and develop the road networks in Timor-Leste, therefore it is important to urge the C/P having aggressive participation in the Project activity.

  In terms of the preparation of the manuals and guidelines, the Project requires the C/P to participate in the selection of applicable existing standards and contents with consultation of the JICA Experts although the actual drafting is entrusted to the Indonesian consultant firm.

MEASURE 1

The Project provides the necessary tools such as the guidelines/ manuals for road construction and maintenance in Timor-Leste. So the tools must be prepared reflecting the demands of DRD and DRBFC. At beginning of the Project, it was considered that the making ownership of the guidelines and manuals on the C/P was very important from early stage of the Project. So JICA Expert and the C/P had opportunities, as much as possible, to be at job site so as the C/P to identify the problems and demands in regard with the road construction and maintenance. As for the selection of contents on the manuals, JICA Experts suggested the C/P to set the contents to be measure and answer to the problems and demands raised at jobsite. By this suggestion, the ownership was made and the aggressive participation in the preparation of manuals could be

obtained.

ISSUE 2

- Consideration to limited numbers of the C/P

  Description:

  There are many testing equipments left without using in the DRD, because the DRD has no enough experienced members so that DRD can not conduct the testing. It was also supposed that average skill level of the DRD is extremely low; the Project requires starting from very basic and fundamental level on material testing.

  In addition, there are very limited numbers as 63 permanent personnel of the DRBFC and the DRD in total and there is a difficulty of increasing numbers either, the programme of the Project shall be established effectively with proper arrangement so as not to disturb the C/P's daily duty and other TA programme which is on-going.

MEASURE 2

Because of above situation, the JICA Experts Team always prepared the interpreter of English – Indonesian at the DRD office on entire project period. Moreover in case of training of new item, JICA Expert Team prepared Indonesian experts from local consulting firm. By this, the e training was carried out effectively and it was proved by the evaluation indicator prepared by the PDM.

In term of the arrangement of the schedule, the JICA Experts Team asked the C/P to submit his weekly schedule at every end of working day so as to avoid any conflict on the C/P's activity.

ISSUE 3

- Collaboration with other donor activities

  Description:

  ADB has been supporting on the road sector in Timor-Leste and the branches of DRD's laboratory at both Baucau and Maliana have been established as the result of the ADB's support. As ADB has been conducting the TA programme aiming strengthen capacity on material testing at Baucau and Maliana branch, the Project requires to collaborate with ADB's programme so as to avoid confusion in the MOI. Accordingly, it is very important to clarify the status of the Project as well as other donor similar activities.

MEASURE 3

Actually ADB provided an expert to the DRD Laboratory in Dili some time, the ADB's support to Dili Laboratory was one of the progremme of TA of the construction project. This ADB's programme targeted particular testing items which are considered to be necessary for its

project implementation and hence it was not overall supporting programme to the DRD. There were some overlapped testing items with the ADB's programme and however the methodology and contents of the training was adjusted between the JICA Experts and ADB Expert through the discussion. Accordingly there was no confusion on the both training. In addition, the results of the ADB's training were referred to the Project programme and also itemized on the workshop and discussion of the Project.

Other than the ADB's programme, the Project collaborated with the CBRM for the capacity development on slope movement and quality control of construction material.

ISSUE 4

・ Language to be used in the manual and guidelines

Description:

It was agreed in the R/D that English is used on text of the manual and guidelines; on the other hand, the English education is not provided to the personnel who is supposed to use the manuals and guideline. In this circumstance, the Project requires to select English or Indonesian for the manuals and guidelines finally through the discussion with C/P. and by the consideration of appropriateness and effectiveness.

MEASURE 4

AS explained on Chapter 2, the following manner is introduced on the preparation of manuals and guidelines;

- Material Testing Manuals : Indonesian language is used
- Material Testing Guidelines: Indonesian language is used
- Pavement Design Manual: English language is used
- Slope Protection Guidelines: English language is used

ISSUE 5

・ Establishment of cooperation ship with Indonesia in the technical assistance

Description:

Up to present, there is no JICA project with supporting by the Indonesian relevant to Timor-Leste. However the discussion regarding the technical cooperation by Indonesia has already been started between two countries. The Project requires considering use of Indonesian expert, consultant and institution for the implementation.

MEASURE 5

Apart from particular issues, there is no longer any conflict between Timor-Leste and Indonesia, especially at civilian level.

In terms of road sector, there is no authorized standard and manuals in Timor-Leste, the Indonesian standards are still being used.

From above, the Project decided to use Indonesian institution and consulting firm on the programme of the Project.

As the comment of the director of the RDCRB at the Training in Indonesia represents the relationship between the two countries which was “This is just a beginning, but to continue and to improve are more important. Ask anything to our staff whenever you are in need of our help. We are your friends.”, there is already good cooperation ship by Indonesia in the technical assistance. .

8-2 PROBLEMS TO BE SOLVED BY TIMOR-LESTE SIDE

It is supposed that biggest problems to be solved are to obtain the budget and appropriate human resources to fulfill the requirements. Fortunately, the annual budget dropping to the road sector is being increased, however, the executive agency such as the MOI is not able to use annual budget within its period. Despite this circumstance, the paying salary to the public officers tends to be delayed and its amount is lower comparing to that of the private sector.

In connection with above, the following problems are observed;

(1) Insufficient accuracy on the DRD testing result
(2) A few motivation on the duty
(3) A few existing function of research and development

The detailed descriptions of the above mentioned problems and issues are as follows:

(1) Insufficient accuracy on the DRD testing result

After the training by the Project, the level of the knowledge and skills of the testing has been improved, however still they have following problems;

- The majority of the DRD member is not civil engineer/technician, and civil engineer is not employed due to lack of budget, which means that there is not enough qualified engineer who supervise the testing.
- Some equipment is not maintained properly and some parts are missing, due to shortage of the budget

- The Project prepared the Draft Design Manual for Pavement, Guideline for Slope Protection and Material Testing Guidelines/Manuals, however those are just stared to use due to the shortage of training time caused by the schedule change of the Project for the security condition reason in Timor-Leste.

(2) A few motivation on the duty

The DRD does not conducts the testing frequently, testing is carried out by the order basis from either contractor or construction supervisor, and after finishing the testing the members are resting without practice and study. This circumstance is made by the following reasons;

- No frequent order of testing due to undeveloped civil construction industry and less reliability on the DRD's testing results in past.
- No library and database established in the DRD for the study of testing.
- No staff evaluation system is introduced from the point of view of work efficiency or output/result basis; therefore members have a few motivations on their duty and improvement of skills.

(3) A few existing function on research and development

The DRD is identified by its TOR to have tow functions such as testing of construction materials for construction quality control as well as research and development on necessary technology of construction in Timor-Leste. However due that there is few members who realize what the most required technology is for the country, thus the function of the research and development is not activated.

In order to activate the function and to remind the DRD members necessary mission on the function, the followings activity has been made but with some problem;

- JICA Experts and JICA long term adviser in Timor-Leste conducted the workshop on the Road Geometric Standard for the country which was considered to be essential before the preparation of the Guidelines and Manuals of the Project but the output was not finalized.

Initially, the road policy development and identifying of other necessary document in the road work were commissioned to the JICA long term adviser, however due to the security crisis, the JICA long term adviser was no longer possible to stay at Timor-Leste.

Moreover, the DRD is involved in improper arrangement on the civil construction activity,

that is;

Currently the DRD faces a problem on the quality control system by the DRD that contractor requests the DRD to test the construction materials to be used for approval purpose however its request is sometime made after the work done. This circumstance is caused by the following background;

- No power for making order to the Contractor is given to the DRD。
- The test result by the DRD is recognized as not reliable by either Contractor or supervisor from their past experience.
- The objective of the DRD's control is not identified and authorized by any decree or law.

8-3 CONCLUSION AND RECOMMENDATIONS

In order to solve above mentioned problems and issues, the following countermeasures are recommended.

(1) Provide expert/supervisor /qualified civil engineer to the DRD
(2) Introduce new system on staff evaluation to the DRD
(3) Activate the function of research and development of the DRD
(4) Establish Government order or decree to identify DRD function

(1) Provide expert/supervisor/qualified civil engineer to the DRD

For the improvement of the accuracy on the DRD testing, the following counter measures are proposed;

- Request the continuous training using the Test Manuals prepared by the Project
- Request expert who is able to manage laboratory and testing quality
- Employ qualified engineer with sufficient salary and some incentive
- Establish new maintenance program on equipments and human resources

In addition, the technical audit to the DRD's activity shall also be introduced and it is conducted by third party. However there is no technical institution which is able to audit the activity of DRD in Timor-Leste so that foreign institution such as the RDCRB is proposed to appoint. The Government shall make some efforts of establishing relation-ship and/or making of agreement between two countries in the engineering field.

(2) Introduce new system on staff evaluation on the DRD

In order to improve the member's motivation, the following change is recommended;

- Change member evaluation system by skill level and result of activity basis and review employment contract to temporary members by availability of execution of the testing

By this change, the motivation of members is expected to be increased and it will result to improve accuracy of testing results of the DRD.

(3) Activate the function of research and development of the DRD

In order to activate the required function of research and development in the DRD, the following actions would be necessary;

- Establish the strategy and/or the program by the MOI for activation of the function
- Employ civil engineers even it is temporary for the strengthening of the function
- Request to conduct technical assistance program for the preparation design manual and standard on the Road Geometry and other necessary standard, manual and guideline for the road works.
- Request to conduct continuous training on pavement design and slop protection using the prepared design manual and guideline by the Project,

(4) Establish the decree to identify the DRD function

As mentioned above, the material quality control system to the construction activity by the DRD is ignored and not functioned actually. This circumstance makes huge loss of national asset and therefore the Government shall take prompt action so as the system to function and be improved.

As also mentioned, the circumstance is because of past low quality of testing by the DRD, however, the DRD level became improved by the Project and the remaining issue is maintaining the level after the Project.

In terms of the maintaining the level, the JICA Experts propose the counter-measure mentioned above. Besides of the proposals, the JICA Experts also feel a necessity of legal authorization of the material quality control system such as by decree, and the decree is expected to identify the DRD 's function and give the power or light to the DRD for the enforcement.

In addition, the DRD itself has to accept the regular technical audit as proposed above, this audit shall also be authorized by the decree.

To establish the decree, the following steps shall be made;

- Confirm the procedure for establishment of the decree
- Establish the evaluation committee for decree by the authorities such as professors of university and layers.

8-4 AVAILABLE LESSONS TO BE APPLIED TO OTHER PROJECTS

The Project introduced the Training in Indonesia and the result of the training was successful. In the Training, there was no problem in the communication between the lecturer and the trainee as the lecturer and the trainee have same historical engineering background.

As the above result proves that training in the neighboring country is very effective, if the neighboring country possesses developed subjects to be possible to transfer and uses same language of the trainee, the result of the training will be maximized.
In case of Timor-Leste, the training in Indonesia is available to expand to other field.