



Trainer's Guide

Pavement

Labour-Based Technology

for Rural Road Works



Don Bosco Foundation
Training Center in Comoro

Table of Contents

1	Introduction	2
2	Overall training Programme	2
3	How to use these training guidelines	4
4	Time table/Training programme for Supervisors and Engineers	5
5	Comprehension level required:	9
6	Guidelines to training topics and session plans	9
	Opening and Introduction of the Training	10
	Code:	10
	Pre-Test	11
	Refresher Training for LBT in Rural Road Rehabilitation	12
	Introduction to Rigid Pavements	13
	Cobblestone Pavements	14
	Plum Concrete Pavements	15
	Un-reinforced Concrete Pavements	16
	Maintenance of Rigid Pavements	17
	Construction of Base Course.....	18
	Introduction to Flexible Pavements.....	20
	Bitumen and Emulsion Hazards	21
	Bituminous Materials, Tools, Plant and Equipment	22
	Operation of Motorised Hand Sprayer	24
	Latasir (LBT Hot mix) Pavements	25
	Cold mix Asphalt Pavements.....	26
	Prime Coat and Penetration Macadam Pavements	27
	Bitumen Emulsion Surface Treatment Pavements	28
	Maintenance of Flexible Pavements.....	29
	Post-Test	30
	Course Assessment	31
	Course Closure	32
	Annex 1 Pre and Post test.....	33
	Annex 2 Trainee daily assessment	35
	Annex 3 Trainee course evaluation	36
7.	Power Point Presentations	37

1 Introduction

These training guidelines for training of small scale contractors in the construction of rigid and flexible pavements using a predominately Labour Based approach have been developed to assist trainers in planning, organizing and implementing the training program. These training guidelines are supplementary to the established LBT Trainers Guide for Rural Road Rehabilitation and consist of practical advice and reference material for the training for the construction of the rigid and flexible pavements. As with the LBT Rural Road Rehabilitation Trainers Guide this supplementary document for rigid and flexible pavements does not contain extensive pedagogical theories and is also not meant to be a substitute to necessary teaching skills.

The supplementary training guidelines should therefore be used to assist the development of the trainer's plans and as reference material. The guidelines are to be used together with other training material such as: (i) Technical Manuals for the rigid and flexible pavements using predominantly labour-based approaches, (ii) pre-printed power points slides for rigid and flexible pavement construction training, (iii) Work Sheets for the pavement activities, (iv) samples of related exercises, and (v) existing site administrative formats, etc.

2 Overall training Programme

The training programme for the construction of rigid and flexible pavements offered to the engineers and works supervisors from domestic contractors has the prerequisite requirement for prequalification through the LBT Rural Road Rehabilitation training with the capacity to manage labour-based rural road works and an understanding of the technical aspects of the LBT training. Building from this the training for the rigid and flexible pavements has been designed as a package suitable for the conjoint training of the prequalified engineers and works supervisors, focusing on the technical and practical aspects for good construction and sustainable all-weather pavements. The bar chart below shows proposed nature and duration of training for the engineers and works supervisors.

Staff/nature of training		Weeks			
		Preparation	1	2	
Supervisor	Technical training				
	Practical training				
Engineer	Technical training				
	Practical training				
					Review

These training guidelines are developed for the rigid and flexible pavement training for engineers and works supervisors, delivered by Don Bosco Training Centre with the aim of equipping the engineers and supervisors with sufficient knowledge and

appropriate techniques to enable them to plan, implement and monitor the construction of rigid and flexible bituminous pavements using predominately labour-based and complementary small equipment based approaches.

The technical training for supervisors and engineers will be of the same duration as the trainees in both groups have passed through the prerequisite LBT training conducted by Don Bosco as the core skills training for rural road construction, The works supervisors and the engineers will therefore have a similar understanding of rural road construction and maintenance in Timor-Leste. An overview of the training topics is shown in the following table:

<i>Category</i>	<i>Code</i>	<i>Topics</i>
Supervisors/ Engineers		COURSE INTRODUCTION
	PAVE-1	✚ Opening and introduction
	PAVE-2	✚ Pre-test
Supervisors/ Engineers		LBT REVIEW PHASE
	PAVE-3	✚ Setting out
	“	✚ Quantities assessments
	“	✚ Earthworks, compaction, quarrying and drainage
	“	✚ Labour management, work organisation and administration
“	✚ Quality assurance	
Supervisors/ Engineers		RIGID PAVEMENTS
	PAVE-4	✚ Introduction to rigid pavements, terminology and overriding OSH requirements
	PAVE-5	✚ Construction of Cobblestone pavements (CSP)
	PAVE-6	✚ Construction of Plum concrete pavements (PCP)
	PAVE-7	✚ Construction of Unreinforced concrete pavements (UCP)
PAVE-8	✚ Maintenance of rigid pavements (best practice)	
Supervisors/ Engineers		FLEXIBLE PAVEMENTS
	PAVE-9	✚ Construction of road base course
PAVE-10	✚ Introduction to flexible pavements, terminology, safe handling and storage of bitumen, emulsions and sealing aggregates, burns and hazards from bitumen materials and overriding OSH requirements	

	PAVE-11	✚ Bitumen and emulsion seals, materials, plant and equipment, operation of motorised hand sprayer
	PAVE-12	✚ Construction of Latasir Labour-Based Hot mix pavements (HMP)
	PAVE-13	✚ Construction of Cold mix asphalt pavements (CMP)
	PAVE-14	✚ Construction of Penetration Macadam Surface pavements (PMP)
	PAVE-15	✚ Construction of Emulsion Surface Treatment pavements (ESP)
	PAVE-16	✚ Maintenance of flexible pavements (best practice)
		COURSE EVALUATION
Supervisors/ Engineers	PAVE-17	✚ Post test ✚ Course assessment ✚ Course closure

3 How to use these training guidelines

These training guidelines have been prepared as guide for trainers and should be read together with the **Technical Manuals for rigid and flexible pavement construction** and the core **Technical Manual for LBT for rural road rehabilitation**.

These training guidelines consist of:

- (i) the introduction and timetable / training programme
- (ii) guidelines for the rigid and flexible pavements training course elements
- (iii) sample of course assessment and tests
- (iv) sample of exercises
- (v) pre-printed power points slides presentation for each course element
- (vi) templates

The recommendations for the use of hand outs and flipcharts included in these training guidelines do not exclude the possibility of using overhead or video projection, where available. Some of the elements of the training programme are more suitable for active participation by the participants, and topics which may be new, need to be introduced in the form of a presentation or lecture. Wherever possible there should be variety in the presentation and involvement of the participants in order to retain their attention and interest in what is being presented. The modules include instruction / suggestions of how the trainer can present various topics. These are suggestions and can be replaced by the trainer's own ideas, provided the involvement of the participants is guaranteed.

4 Time table/Training programme for Supervisors and Engineers

SCHEDULE FOR SUPERVISOR AND ENGINEER TRAINING FOR RIGID AND FLEXIBLE PAVEMENT CONSTRUCTION

Week 1	Day-1	Day-2	Day-3	Day-4	Day-5
8:30-9:15	Opening for training, introduction and trainee pre-test	Cobblestone pavements: Work methods, quantities	Un-reinforced concrete pavements: OSH, quality control for construction	Latasir hotmix pavement: description of work, materials, tools and equipment, quantities and OSH	Penetration Macadam (PenMac) pavements: work method, quantities, quality control for the construction of prime coat and penetration macadam pavements
9:15-10:00		Cobblestone pavements: OSH, quality control for construction	Maintenance of rigid pavements: best practice	Latasir hotmix pavement: work method including mixing, spreading and hauling, compacting	Penetration Macadam (PenMac) pavements: measurement and quality control for construction
Cha dader/Tea break					
10:30-11:15	Refresher training: core prior relevant LBT training for rehabilitation of rural roads	Plum concrete pavements: materials, tools and equipment	Construction of road Base course	Latasir hotmix pavement: measurement and quality control for construction	Bitumen emulsion surface treatment pavements: application rates for bitumen/emulsion binder and sealing aggregates, material testing, application rates and compaction
11:15-12:00		Plum concrete pavements: work method and quantities	Construction of road Base course	Coldmix asphalt pavements: description of work, materials, tools and equipment, quantities and OSH	Bitumen emulsion surface treatment pavements: quality control for construction of bitumen emulsion surface treatments
Han Meudia/Lunch break					
13:30-14:15	Refresher training: core prior relevant LBT training for rehabilitation of rural roads	Plum concrete pavements: OSH, quality control for construction	Introduction to flexible pavements: safe handling and storage, personal protective and safety equipment, first aid, burn hazards. Environmental considerations	Coldmix asphalt pavements: work method including trial mixes, mixing, spreading, hauling and compacting	Maintenance of flexible pavements: best practice
14:15-15:00	Introduction to rigid pavements, terminology and overriding OSH	Un-reinforced concrete pavements: alternate options, concrete, materials, tools and	Bitumen and emulsion seals: materials, construction plant and equipment, preparation	Coldmix asphalt pavements: measurement and quality control for construction	Assessment and evaluation: trainee assessment of course

<i>Week 1</i>	<i>Day-1</i>	<i>Day-2</i>	<i>Day-3</i>	<i>Day-4</i>	<i>Day-5</i>
		equipment	for sealing operations, quantities assessment, damage and remedial works		
<i>Cha loraik/Tea break</i>					
<i>15:30-16:30</i>	Cobblestone pavements: materials, tools and equipment	Un-reinforced concrete pavements: work methods and quantities	Bitumen and emulsion seals: operation of motorised hand sprayer	Penetration Macadam (PenMac) pavements: description of work, materials, tools and equipment, OSH	Course closure: trainee post-test and course closure

SCHEDULE FOR SUPERVISOR AND ENGINEER TRAINING FOR RIGID AND FLEXIBLE PAVEMENT CONSTRUCTION

Week 2	Day-6	Day-7	Day-8	Day-9	Day-10
8:30-9:15	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Cobblestone pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
9:15-10:00					
Cha dader/Tea break					
10:30-11:15	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Cobblestone pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
11:15-12:00					
Han Meudia/Lunch break					
13:30-14:15	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Cobblestone pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
14:15-15:00					
Cha loraik/Tea break					
15:30-16:30	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Plum concrete pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Cobblestone pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Base course construction Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control

SCHEDULE FOR SUPERVISOR AND ENGINEER TRAINING FOR RIGID AND FLEXIBLE PAVEMENT CONSTRUCTION

Week 3	Day-11	Day-12	Day-13	Day-14	Day-15
8:30-9:15	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Coldmix asphalt pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
9:15-10:00					
Cha dader/Tea break					
10:30-11:15	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Coldmix asphalt pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
11:15-12:00					
Han Meudia/Lunch break					
13:30-14:15	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Coldmix asphalt pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control
14:15-15:00					
Cha loraik/Tea break					
15:30-16:30	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Latasir hotmix pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Penetration macadam pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Coldmix asphalt pavement Site practical, training and on-the-job instruction to carry out road construction activities that have been introduced in the class room, and quality control	Course evaluation, post-training assessment and course closure

5 Comprehension level required:

Each training topic/subject required difference level of knowledge or skill based in importance of the training topic. The comprehension levels are categorized as below:

Comprehension level:

- Level 1:** orientated / aware of the subject
- Level 2:** basic comprehension and/or basic skill(s) to carry out the given job
- Level 3:** full comprehension and/or fully developed skills to carry out the given job

6 Guidelines to training topics and session plans

The training topics should be presented as the guide suggests. Sessions correspond to the schedule in section 4 above. It is important to ask trainees to fill in the assessment of each training topic at the end of each day.





The following questions should be asked to the participants to check that the important training elements have been understood.

The following 4 questions should be posed at the end of each topic:








- (i) Level of understanding of each topic
- (ii) How the trainee felt about the training technique used by the trainer
- (iii) How well the trainee felt that training material responded to the training topics
- (iv) Any comments from the trainees?








A sample of the daily assessment form is attached in **Annex 1**.









Opening and Introduction of the Training		Code: PAVE-1
<p>Learning objective: Get know each other, background, experience and expectations. Ensure each participant is aware of the administrative arrangements and agree some ground rules so the sessions run smoothly. All training topics to be conducted throughout the training are introduced.</p>		
<p>Participants: ✚ Company Supervisors and Engineers</p>	<p>Time: 1h</p>	
<p>Trainer’s material and equipment ✚ Training Manuals in Rigid and Flexible Pavements ✚ Training Manual in LBT for Rural Road Rehabilitation ✚ Power point slide presentation ✚ Flip chart and Projector</p>	<p>Comprehension level : 3</p> <p>General Methodology: Class room.</p>	
<p>Hand out: ✚ Administrative Information ✚ Training Schedule</p>		
<p>How is this topic conducted It is important to get off to a good start. There may be an official opening before the actual training starts. Whether there is an official opening planned or not it is good to provide the context for the training, an overview of the course and what the expectations might be.</p> <ol style="list-style-type: none"> 1) All the trainees to introduce themselves start from the trainer. Each person should introduce him or herself by: name, where they come from, which company/institution they belong to, a brief description of their relevant experience. 2) Brief trainees about administrative arrangement during the training. 3) Explain how the trainees will be assessed and the requirements to achieve a Certificate. 4) Brief trainees about the training programme and the topics covered in the training, and techniques used for various sessions, the mix of lectures, exercises and practical training. 5) Introduce the "Technical Manual in Rigid and Flexible pavements. Explain that the technical manual will be distributed in the end of the class room training. Reintroduce the Training Manual in LBT for Rural Road Rehabilitation. 6) Explain the use of power point slides prepared to support the Technical Manual, and that print outs of the power point presentation will be distributed at the end of each session. 7) Setting rules for the training: After the introduction, the trainees should agree on a set of rules for the training. The rules shall then be written on a flip chart and displayed for the entire duration of the training. For instance: No smoking in the class room, to keep mobile phones on silent mode, to be punctual and disciplined, to respect each other, etc. 		
<p>Exercise Expectations: Each trainee is given a different colour Post-It to write his or her expectations of the training and what they hope to have learned from the training. All Post-It are posted on a flip chart paper. Read out some expectations and keep until the end of the class room training.</p>		









Pre-Test		Code: PAVE-2
<p>Learning objective:</p> <p>A written pre-test is given to the trainees to test their knowledge of the subject matter prior to the training. This will include a few questions relating to the main topics to be introduced in the training.</p> <p>The result of the pre-test will be compared with result of a post-test, which will be conducted at the end of the class room training. The trainees are in the post-test given the same questions and the same amount of time as in the pre-test. The result of the post-test will form part of the final assessment of the trainee.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 1h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Power point slide presentation  Flip chart and Projector 		<p>Comprehension level : 3</p> <p>General Methodology: Class room.</p>
<p>Hand out</p> <ul style="list-style-type: none">  Pre-Test questionnaire 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Explain the purpose of the pre-test and ask trainees to do their best. Explain that the same test will be given at the end of the classroom training. 2) Each trainee will be given the test and shall answer the questions individually 3) Trainees will be given maximum of 45 minutes to complete the test. They can submit their answers before that time if they feel they have finished the test. 		
<p>Exercise</p> <p>Pre-Test Sample in Annex 2</p>		




Refresher Training for LBT in Rural Road Rehabilitation		Code: PAVE-3
<p>Learning objective</p> <p>To refresh the understanding of the trainees on selected key components of the core training for LBT for Rural Road Rehabilitation. The trainees confirm their retained knowledge and ability in the nominated components.</p>		
<p>Participants:</p> <ul style="list-style-type: none"> ✚ Company Supervisors and engineers 		<p>Time: 3h (combined refresher training)</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none"> ✚ Training Manual in LBT for Rural Road Rehabilitation ✚ Power point slide presentation ✚ Flip chart and projector ✚ Work Sheets of selected LBT Rural Road Rehabilitation training components 		<p>Comprehension level : 3</p> <hr/> <p>General Methodology: Class room.</p>
<p>Hand out</p> <ul style="list-style-type: none"> ✚ Print out of power point presentation and Work Sheets of relevant key components of LBT for Rural Road Rehabilitation. 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Review the key points of the following LBT training with the trainees: <ul style="list-style-type: none"> ✚ Geometry and calculation of quantities (basic areas and volumes) LBT-3 ✚ Road terminology LBT-5 ✚ Sequence of construction activities LBT-9 ✚ Concrete works LBT-16a ✚ Work planning LBT-19, and Site administration LBT- 21 ✚ Social safeguards LBT-23 2) Facilitate discussion with the trainees sufficient to identify that they have retained the knowledge gained during the earlier LBT training and now applicable to the proposed new training in rigid and flexible pavements 3) Select key topics and ask a few trainees to present his/her understanding of the chosen topic on the white board / flip chart. 4) Discuss the results with the trainee group and reach a consensus on the group understanding of the topic and their retained knowledge. 5) As appropriate included several combined group exercises. For example draw a plan and cross section of a road on the flip chart and ask the group to define the features using the prescribed terminology of the earlier training. Give all dimensions, include camber and side drain. Ask a few trainees to split the road elements and identify different shapes and the method of calculation of the areas and volumes for the road pavement elements. 		
<p>Exercise</p> <p>Introduce questions requiring the trainees to expand on their knowledge of requisite components gained during the previous LBT training for rural road rehabilitation.</p>		








Introduction to Rigid Pavements		Code: PAVE-4
<p>Learning objective:</p> <p>To ensure that the trainees are able to understand the purpose and application for rigid pavements for rural roads in rural areas with steep gradients and heavy rainfall, also to appreciate the different options for rigid pavements (cobblestone/stone sets, Plum concrete and Un-reinforced concrete) and the relative advantage and construction requirements for each. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 	<p>Time: 1h</p>	
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in Rigid Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheets for introduction to rigid pavements 	<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>	
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of constructed rigid pavements and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a rigid pavement is, the materials used and purposes and advantages of rigid pavements. Write the answers on the flip chart 2) Use the power point to show pictures of constructed rigid pavements from ILO road works' in Indonesia for each type of rigid pavement. 3) Explain the basic differences between each type of rigid pavement. 4) Discuss the general requirements for materials, labour and equipment employed on the construction of each type of rigid pavement. 5) Ask the trainees, from their experience, where rigid pavements would be the best pavement option. Write down the answers on the flip chart and discuss these to derive a consensus of the views held by the trainees. 6) Compare the agreed response with the ERA (LO) assessment of the circumstances for the use of each rigid pavement construction, and discuss with the trainees. 		
<p>Exercise as a group</p> <p>In this session it is important that the trainees to develop an understanding of each type of rigid pavement, and the circumstances for the use of each type of construction.</p> <ul style="list-style-type: none">  Combined group participation using the flip chart. 		

Cobblestone Pavements		Code: PAVE-5
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of Cobblestone and stone set pavement construction. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 3h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in Rigid Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheet for cobblestone pavement construction 		<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of Cobblestone and stone set pavement construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what cobblestone and stone set pavement construction involves and why these pavements are used. Write the answer on the flip chart 2) Use the power point to show pictures of cobblestone and stone set pavement construction activities from ILO road works' in Indonesia and explain the suitability for the circumstances and reason for adopting this type of rigid pavement. 3) Explain where the cobblestones, stone sets and other materials required can be sourced, and how to calculate the quantities of cobblestones, or stone sets required. 4) Explain step by step method of how to construct the cobblestone and stone set pavements. Use the Work Sheet and power point slides for the explanation 5) Discuss requirements for quality control and have the trainees indicate requirements for quality control, writing the responses on a flip chart. Compare with the quality control provisions in the Training Manual for Rigid Pavement Construction for rural roads using the flip chart. 6) Exercise to calculate each type of material for cobblestone and/or stone set pavements. 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to develop the quality control system for the construction for cobblestone and stone set pavements.</p> <ul style="list-style-type: none">  Calculate the quantity of cobblestones, kerb stones and bedding sand required for a given example. 		

Plum Concrete Pavements		Code: PAVE-6
<p>Learning objective:</p> <p>To ensure that the trainees are to organise, supervise and control quality of Plum concrete pavement construction. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 3h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in Rigid Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides for Plum concrete pavements construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what Plum concrete pavement construction involves and why these pavements are used. Write the answers on the flip chart 2) Use the power point to show pictures of Plum concrete pavement construction activities from ILO road works' in Indonesia and explain the suitability for the circumstances and reason for adopting this type of rigid pavement. 3) Explain step by step method of construction for Plum concrete rigid pavements. Use the Work Sheet and power point slides for the explanation. 4) Explain, in detail the material proportions for the concrete mix, testing including the slump test, and testing for concrete strength. Also explain requirements and methods for compacting and screeding concrete, surface finishes, and curing. 5) Explain how to calculate the quantities of concrete, boxing, and other materials, etc. 6) Discuss requirements for quality control and have the trainees indicate requirements for quality control for Plum concrete pavement construction writing the responses on a flip chart. Compare with the quality control provisions in the Training Manual for Rigid Pavements for rural roads again using the flip chart. 7) Exercise to calculate each type of material for Plum concrete pavements. 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to develop the quality control system for the construction for Plum concrete pavements.</p> <ul style="list-style-type: none">  Calculate the quantity of concrete and other materials for a given example.  Outline the steps (method) for construction. 		








Un-reinforced Concrete Pavements		Code: PAVE-7
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of un-reinforced concrete pavement construction. To understand the different options for construction and the implications of having non-productive labour, idle equipment, and material waste on company finances.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 3h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in Rigid Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of Un-reinforced Concrete Pavement construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask trainees to indicate the different options of un-reinforced pavement they are aware of. Write the responses on a flip chart and relate to the options covered in the Training Manual for Rigid Pavement Construction and the Work Sheet. 2) Ask a few trainees if they know what un-reinforced concrete pavement construction involves and why these pavements are used. Write the answers on the flip chart 3) Use the power point to show pictures of un-reinforced concrete pavement construction activities from ILO road works' in Indonesia and explain the suitability for the circumstances and reason for adopting this type of rigid pavement. 4) Explain step by step method of construction for the un-reinforced rigid pavement based on the Work Sheet and power point slides. 5) Explain, in detail the material proportions for the concrete mix, testing including the slump test, and testing for concrete strength. Also explain requirements and methods for compacting and screeding concrete, and surface finishing, and curing. 6) Explain how to calculate the quantities of concrete, boxing, and other materials, etc. 7) Discuss requirements for quality control and have the trainees indicate requirements for quality control, un-reinforced concrete pavement construction writing the responses on a flip chart. Compare with the quality control provisions in the Training Manual for Rigid Pavement construction for rural roads using the flip chart. 8) Exercise to calculate each type of material for un-reinforced concrete pavements. 		
<p>Exercise as a group</p> <p>In this session it is important that together with the trainees to develop the quality control system for un-reinforced concrete pavement construction.</p> <ul style="list-style-type: none">  Calculate the amount of aggregate, cement, water and boxing needed for a given example.  Outline the steps for construction, particularly material tests and joint construction. 		









Maintenance of Rigid Pavements		Code: PAVE-8
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality for the maintenance of Cobblestone, Plum concrete and Un-reinforced concrete pavements. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 	<p>Time: 1h</p>	
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in LBT for Rural Road Construction  Training Manual for Rigid Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheets 	<p>Comprehension level : 3</p> <p>General methodology: Class room</p>	
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides for construction of rigid pavements and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees to outline their understanding of road inspection and the routine and planned maintenance requirements for the Cobblestone, Plum concrete and Un-reinforced concrete rigid pavements and the planning and implementation of the maintenance activities. Write the answer on the flip chart 2) Use the power point to show pictures and diagrams illustrating maintenance requirements for each type of rigid pavement. Use photographs from ILO activities in Indonesia and Timor-Leste to explain and exemplify the maintenance requirements. 3) Explain step by step of approach for the primary maintenance activities and tasks based on the power point slides and the Work Sheets 4) Show how to calculate the resources and labour required for the primary maintenance tasks. 5) Show how maintenance needs should be scheduled, estimated and programmed. 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to develop the quality control system for the maintenance of the rigid pavements.</p>		








Construction of Base Course		Code: PAVE-9
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of road base course operation and understand of various type road surfacing options. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 	<p>Time: 2h</p>	
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in LBT for Rural Road Construction  Training Manual for Rigid and Flexible Pavements  Power point slide presentation  Flip chart and projector  Work Sheets 	<p>Comprehension level : 3</p> <p>General methodology: Class room and field practice</p>	
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of base course construction (environment and OSH points), Work Sheet Base Course 		
<p>How is this topic conducted? Ask trainees to give examples of different types of road surface paving options and write the answer on the flip charts. Provide a brief explanation of each of the paving options listed (list all common if not identified by the trainees) their uses and function. Explain which ones may be more suitable for rural road contraction.</p> <ol style="list-style-type: none"> 1) Show different pavement options for rural roads on the power point of. Explain function and uses for each of the difference type of surfacing. (including Penetration Macadam and Latasir) 2) Explain that all surfacing types need to have firm road base course to support the surface 3) Ask trainees to give examples of different road base courses and their functions and write the answer in the flip chart. Provide a brief explanation of each of the base courses relevant to rural road construction their uses and function. Explain which ones may be more suitable for rural road contraction. 4) Show power point pictures of some different road base course, such as Latasir and Telford, and explain that we are using different size materials to complete the base course. Show the picture of base use steel shutter system for spreading the base course. Explain that alternative to have materials supplied from the crushing plant is to crush manually or to find natural materials of different sizes locally. 5) Explain step by step how to construct the base course using different sizes of stone, and base course using crushed aggregate from stone crusher. 6) Explain how the quality control is carried out before during the after the activities is carried out (this sample can be taken from Work Sheets). 7) Ask trainees if there are any environmental aspects to consider for this activity. Explain environmental aspects for road base course. 8) Ask trainees if there are any safety of health aspects to consider for this activity. Explain health and safety aspects for road base course. 		

Exercise in groups

- ✚ Calculate road base course material by giving dimension of the layer to be constructed.
- ✚ Calculate number of WD required of 2 options of the base course.
- ✚ Together with the trainees to develop the quality control system for the construction of base course.

Introduction to Flexible Pavements		Code: PAVE-10a
<p>Learning objective:</p> <p>To ensure that the trainees are able to understand the purpose and application for flexible bituminous pavements for rural roads, also to appreciate the different options for flexible pavements (Latasir Labour-Based Hot mix, Cold mix, Penetration Macadam, and Bitumen Emulsion Surface Treatments) and the construction requirements for each. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 1h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual for Flexible Pavement Construction for rural roads  Training Manual in LBT for Rural Road Construction  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of introduction to flexible pavement construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a flexible pavement is and why it is used. Write the answer on the flip chart 2) Use the power point to show pictures of general flexible pavement activities from ILO road works' in Indonesia and explain the types of flexible pavement and their use. 3) Use power point and Work Sheet to emphasize the requirements for the safe handling and storage of bitumen, emulsions and sealing aggregates. 4) Ask the trainees to identify the potential environmental impacts and/or risks of storing, handling and applying bitumen, emulsions and sealing aggregates. Write down on the flip chart and compare with the environmental risks identified in the Training Manual for flexible pavements. Discuss the steps / provisions to be taken to mitigate the risks and impacts. 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to develop the understanding of each type of flexible pavement and the overall requirements for the safe storage, handling and application of the materials used, and the management of potential environmental risks.</p>		










Bitumen and Emulsion Hazards		Code: PAVE-10b
<p>Learning objective:</p> <p>To ensure that the trainees are fully conversant with the significant health hazards and risks associated with the heating, handling and application of hot bitumen and emulsions, including personal safety, the safety of worker groups, and the community and road users.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 1h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual in Flexible Pavement Construction for rural road construction  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides and Work Sheets illustrating the risks and preventive measures to be taken to minimise or avoid the potential risks 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what the health hazards and risks from bitumen and emulsions are and the relevant seriousness of the potential risks identified. Write the answer on the flip chart 2) Use the power point to show pictures of bitumen and emulsion work activities in progress to illustrate the potential risks and explain the responses to be taken for minimising the risk. 3) Explain the work practices and guidelines for safe work operations, including the requirement for, and provision of, personal protective and safety equipment. 4) Explain the risk of fire and explosion and again the work practices and guidelines for safe working conditions, including the requirement for appropriate (dry powder or CO₂ fire extinguishers 5) Explain the potential for severe burns from hot bitumen and the requirements for initial first aid response and hospitalisation. Ensure the trainees are conversant with the step by step provisions and explanations of the BURN HAZARD CARDS and their use 6) Emphasize the requirements for the treatment of bitumen burns, the need for available on-site transport to move the burn victim to a hospital or medical centre, the availability of adequate clean, fresh water for cooling and washing burns, and an adequate first aid kit for minor burns. 7) Conduct group session using flip chart to ensure the trainees are fully conversant with the key aspects of the BITUMEN BURN HAZARD RISKS AND THE PROVISIONS FOR MANAGING THESE HAZARDS, FOR BURN VICTIMS IN THE EVENT OF AN ACCIDENT. 		
<p>Exercise as a group</p> <ul style="list-style-type: none">  Outline requirements for the safe storage, handling and use of bitumen and emulsions.  Describe the nature of burn hazards, first aid and subsequent treatment and care of burn victims. 		










Bituminous Materials, Tools, Plant and Equipment		Code: PAVE-11a
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of flexible pavement construction with knowledge of the bituminous materials, the tools and equipment for LBT activities, also the plant and equipment for larger equipment-based bitumen emulsion surface treatment activities. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 	<p>Time: 1h</p>	
<p>Trainer’s material and equipment</p> <ul style="list-style-type: none">  Training Manual in Flexible Pavement Construction for rural roads  Power point slide presentation  Flip chart and projector  Work Sheets 	<p>Comprehension level : 3</p> <p>General methodology: Class room</p>	
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of flexible pavement activities and Work Sheets 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees identify the tools and equipment required for the construction of the flexible pavements assuming a LBT approach. Write the answer on the flip chart. 2) Ask few trainees identify the tools and equipment required for the construction of larger bitumen emulsion surface treatments assuming an equipment-based approach. Write the answer on the flip chart 3) Use the power point to show pictures of flexible pavement construction from ILO road works in Indonesia for the pavement types covered by the training. Identify and describe the equipment being used. 4) With the trainees review the information noted earlier on the flip chart and adjust findings on the equipment. 5) Facilitate trainee discussion and explain the work required to prepare the road construction for the application of the flexible surface treatment, and requirements and the tests for acceptance prior to the pavement surface treatment works. 6) Discuss remedial works, if required to render the pavement ready for the application of the surface treatments 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to impart a comprehensive understanding of the resources, tools, plant and equipment required for the efficient construction of the flexible pavement surface treatments.</p> <ul style="list-style-type: none">  Describe the difference between bitumen and emulsions, and between cationic and anionic emulsions. 		

- ✚ List and describe the equipment required for labour-based seal activities.
- ✚ List and describe the plant and equipment required for equipment-based seal activities.









Operation of Motorised Hand Sprayer		Code: PAVE-11b
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control the application of bitumen and emulsions using a standard motorised hand sprayer. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none"> ✚ Company Supervisors and Engineers 		<p>Time: 1h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none"> ✚ Training Manual in Flexible Pavement Construction for rural roads ✚ Standard motorised hand sprayer for classroom reference and demonstration ✚ Power point slide presentation ✚ Flip chart, projector and Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none"> ✚ Power point slides of flexible pavement activities and Work Sheets 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Use the power point to show pictures of the operation of a motorised hand sprayer from ILO roads works elsewhere. Refer to Work Sheets to exemplify the operation of the sprayer. 2) Refer to the motorised hand sprayer available for the classroom demonstration. Explain operation and maintenance requirements, and the procedure for preparing the unit for work activities and the cleaning of the unit following the spray activities, in readiness for other spraying activities. 3) Explain the step by step method for work activities using a motorised hand sprayer, including the testing to establish delivery and application rates, and the monitoring and dipping of drums to confirm compliance with specified application rates. Describe use of spray screens, protective paper for the construction of joints, spray height and sequencing of spraying, and maintaining spray height. 4) Explain requirement to manage spray application to prevent bitumen and emulsion runs along pavement edge and clearing of bitumen and emulsion from sprayer during work stoppages. 5) Facilitate trainee discussion and feedback to confirm trainee understanding of the operation of the motorised hand sprayer and the methods for applying bitumen and emulsion binders. Note responses on flip chart and compare with Training Manual and Work sheet. 		
<p>Exercise as a group</p> <p>In this session it is important together with the trainees to gain a comprehensive understanding of the operation of the motorised hand sprayer.</p> <ul style="list-style-type: none"> ✚ Outline the processes for determining spray height, coverage and for determining spray application rates ✚ Outline main steps for operation of unit, with particular reference to seal joints, protection from overspray 		








Latasir (LBT Hot mix) Pavements		Code: PAVE-12
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of Latasir Labour-Based hot mix) road surface operations. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none"> ✚ Company Supervisors and Engineers 		<p>Time: 3h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none"> ✚ Training Manual for Flexible Pavement Construction for rural roads ✚ Training Manual in LBT for Rural Road Construction ✚ Power point slide presentation ✚ Flip chart and projector ✚ Work Sheets 		<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none"> ✚ Power point slides of Latasir pavement construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a Latasir (hot mix) pavement is and why it is used. Write the answer on the flip chart 2) Use the power point to show pictures of Latasir pavement construction activities from ILO road works' in Indonesia and explain the pavement type 3) Explain step by step method for the construction of the Latasir pavement using the Work Sheet and power point slides. 4) Explain and emphasize the OSH requirements 5) Emphasize the preparation required and the standard of pavement construction for the application of the Latasir surface treatment. 6) Explain each type of material in the Latasir mix and the arrangements for heating, hauling, placement and compaction of the Latasir pavement surface. Show how to calculate required labour and tools/ equipment, the quantities of bitumen and other materials. 7) Using the flip chart develop with the trainees the quality control system for the Latasir pavement activities 8) Explain how to control the mix and temperature when heating the Latasir material 9) Exercise to calculate each type of material for the Latasir pavement mix 		
<p>Exercise as a group</p> <ul style="list-style-type: none"> ✚ Describe what a Latasir seal pavement is and the steps (method) for construction. ✚ Outline the materials used the mix ratios and calculate the amount of aggregate, filler and bitumen needed for a given example. ✚ In this session it is important to develop the quality management system with the trainees. 		

Cold mix Asphalt Pavements		Code: PAVE-13
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of Cold mix asphalt road surface operations by both manual and concrete mixer methods for manufacturing the Cold mix. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 3h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual for Flexible Pavement Construction for rural roads  Training Manual in LBT for Rural Road Construction  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of Cold mix asphalt construction and Work Sheets 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a Cold mix asphalt pavement is and why it is used. Write the answer on the flip chart 2) Use the power point to show pictures of Cold mix asphalt pavement construction activities from ILO road works' in Indonesia and explain the pavement type 3) Explain step by step method for the construction of the Cold mix asphalt pavement (mixed manually and by concrete mixer) using the Work Sheets and power point slides. 4) Explain and emphasize the OSH requirements 5) Emphasize the preparation required and the standard of pavement construction for the application of the Cold mix asphalt surface treatment 6) Explain each type of material in the Cold mix and the arrangements for hauling, placement and compaction of the Cold mix material. Show how to calculate required labour and tools/ equipment, the quantities of bitumen and other materials 7) Using the flip chart develop with the trainees the quality control system for the Cold mix asphalt pavement activities 8) Exercise to calculate each type of material for the cold mix pavement mix 		
<p>Exercise as a group</p> <p>In this session it is important that together with the trainees to develop the quality control system for the construction for Cold mix asphalt pavement surfaces.</p> <ul style="list-style-type: none">  Describe the materials used and the mix ratios for the Latasir seal.  Calculate the amount of aggregate, filler and bitumen needed for a given example. 		


Prime Coat and Penetration Macadam Pavements		Code: PAVE-14
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of Prime coat and Penetration Macadam (PenMac) pavement surface operations. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 	<p>Time: 3h</p>	
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual for Flexible Pavement Construction for rural roads  Training Manual in LBT for Rural Road Construction  Power point slide presentation  Flip chart and projector  Work Sheets 	<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>	
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of Prime coat and PenMac construction and Work Sheet 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a prime coat is and why it is used. Write the answer on the flip chart 2) Use the power point to show pictures of prime coat activities from ILO road works' in Indonesia and explain the two types of prime coats, which are emulsion and cut back. 3) Explain step by step construction of the prime coat based on the Work Sheet and power point slides 4) Show how to calculate the amount of bitumen for the prime coat 5) Ask the trainees if they know what the PenMac is. Show Pictures of PenMac activities from ILO Road project in Indonesia 6) Explain step by step how to construct the PenMac pavement. Use the Work Sheet for the explanation 7) Explain how to control temperature when heating asphalt 8) Using the flip chart develop with the trainees the quality control system for the Penetration Macadam pavement construction 9) Exercise to calculate each type of material for PenMac: (aggregate, bitumen) 		
<p>Exercise in groups</p> <p>In this session it is important that together with the trainees to develop the quality control system for the construction for PenMac activity.</p> <ul style="list-style-type: none">  Calculate the amount of aggregate and bitumen needed for a given example.  Describe the materials used and the normal application rate for the Prime coat. 		

Bitumen Emulsion Surface Treatment Pavements		Code: PAVE-15
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality of Bitumen Emulsion Surface Treatments for rural road pavements. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none"> ✚ Company Supervisors and Engineers 		<p>Time: 2h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none"> ✚ Training Manual for Flexible Pavement Construction for rural roads ✚ Power point slide presentation ✚ Flip chart and projector ✚ Work Sheets 		<p>Comprehension level : 3</p> <hr/> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none"> ✚ Power point slides of Bitumen Emulsion Surface Treatment Work Sheets 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Ask few trainees if they know what a bitumen emulsion surface treatment is and why it is used. Write the answer on the flip chart 2) Use the power point to show bitumen emulsion surface treatment activities from ILO road works' in Indonesia and/or elsewhere and explain the differences between single and double bitumen emulsion surface treatments 3) Explain step by step method of construction for the bitumen emulsion surface treatments based on the Work Sheet and power point slides 4) Show how to calculate the amount of bitumen emulsion for the single and double surface treatments 5) Explain how to control temperature when heating bitumen and emulsions 6) Using the flip chart develop with the trainees the quality control system for the bitumen emulsion surface treatment pavement construction 7) Exercise to calculate each type of material for bitumen emulsion surface treatments 		
<p>Exercise as a group</p> <p>In this session it is important that together with the trainees to develop the quality control system for the construction for bitumen emulsion surface treatment.</p> <ul style="list-style-type: none"> ✚ Describe the steps (method) of construction for a double emulsion surface treatment. ✚ Describe how to establish the average least dimension for the seal aggregate and emulsion application rates for the first and second seal coats. ✚ Calculate the amount of surfacing aggregate and bitumen/emulsion needed for a given example. 		

Maintenance of Flexible Pavements		Code: PAVE-16
<p>Learning objective:</p> <p>To ensure that the trainees are able to organise, supervise and control quality for the maintenance of Latasir Labour-Based Hot mix, Cold mix. Penetration Macadam and Bitumen and Emulsion Surface Treatment pavements. To understand the implications of having non-productive labour, idle equipment, and material waste on company finances</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 1h</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manual for Flexible Pavement Construction for rural roads.  Training Manual in LBT for Rural Road Construction  Power point slide presentation  Flip chart and projector  Work Sheets 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Power point slides of the related types of flexible pavement construction and Work Sheets 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 6) Ask few trainees to outline their understanding of road inspection and the routine and planned maintenance requirements for the Latasir labour-based hot mix, cold mix, penetration macadam and bitumen/ emulsion surface treatment pavements and the planning and implementation of the maintenance activities. Write the answer on the flip chart 7) Use the power point to show pictures and diagrams illustrating the maintenance requirements for each type of flexible pavement. Use photographs from ILO activities in Indonesia and Timor-Leste to explain and exemplify maintenance requirements. 8) Explain step by step of approach for the primary maintenance activities and tasks based on the power point slides and the Work Sheets 9) Show how to calculate the resource and labour required for the primary maintenance tasks. 10) Show how maintenance needs should be scheduled, estimated and programmed. 		
<p>Exercise in groups</p> <ul style="list-style-type: none">  In this session it is important together with the trainees to develop the quality control system for the maintenance of the rigid pavements. 		

Post-Test		Code: PAVE-17a
<p>Learning objective:</p> <p>A Post Test should be carried out to test knowledge of the trainees at the end of the class room training. This test should be the same as the Pre Test and trainees should be given the same amount of time to answer the questions. Asking the same questions before and after the training will provide a measure of (i) the current level of understanding and (ii) the increase in knowledge of the subject matter.</p>		
<p>Participants:</p> <ul style="list-style-type: none">  Company Supervisors and Engineers 		<p>Time: 1h (inclusive with course assessment)</p>
<p>Trainer's material and equipment</p> <ul style="list-style-type: none">  Training Manuals in Rigid and Flexible Pavements for Rural Road Construction  Power point slide presentation  Flip chart and projector  Post-Test 		<p>Comprehension level : 3</p> <p>General methodology: Class room</p>
<p>Hand out</p> <ul style="list-style-type: none">  Post-Test 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) Explain that the result of the Post Test is used as part of the overall assessment of the trainees, which is a combination of the Post Test score, assessment of the trainee in the class room and during the field practice. 2) The Post Test questions should be handed out to the trainees individually. Give the trainees time to answer the questions (same as Pre Test). 		
<p>Exercise</p> <ul style="list-style-type: none">  Post-Test is included in Annex 2 		

Course Assessment		Code: PAVE-17b
<p>Learning objective:</p> <p>It is important that there is an evaluation of the training to ascertain whether it has been useful or not. This session will provide an opportunity for the participants to provide feedback</p>		
<p>Participants:</p> <ul style="list-style-type: none"> ✚ Company Supervisors and Engineers 	<p>Time: 1h (inclusive with post-test)</p>	
<p>Trainer's material and equipment</p> <ul style="list-style-type: none"> ✚ Flip chart and projector ✚ Course Evaluation Form 	<p>Comprehension level : 3</p>	
	<p>General methodology: Class room</p>	
<p>Hand out</p> <ul style="list-style-type: none"> ✚ Course Evaluation Form 		
<p>How is this topic conducted</p> <ol style="list-style-type: none"> 1) In this session the expectations can be revisited to see if the training has covered them or if indeed the training has been very different from that which was anticipated. 2) Give the trainees a copy of the evaluation form and encourage them to fill in properly as this is important for future training. The trainees can chose if they want to put their name or fill it in anonymously. Collect the evaluations and keep for compilation. 		
<p>Exercise</p> <ul style="list-style-type: none"> ✚ Course Evaluation a sample in Annex 3 		

Course Closure	Code: PAVE-17c
<p>Learning objective</p> <p>At the end of the class room training before closure it is important to revisit the expectation submitted by the training before the starting of the training, to sum up the class room training and to inform about the practical training.</p>	
<p>How is this topic conducted</p> <p>Compare the expectation and training topics that have been conducted.</p> <p>Provide your feedback to the trainees, and explain again the methodology for the assessment and the requirements to attain the certificate</p> <p>All persons who have attended should be thanked including any guests or officials, and the class room training closed.</p>	
<p>Exercise</p> <p> N/A</p>	

Annex 1 Pre and Post test



Name: [To be entered]

Company/Agency: [To be entered]

Date: [To be entered]

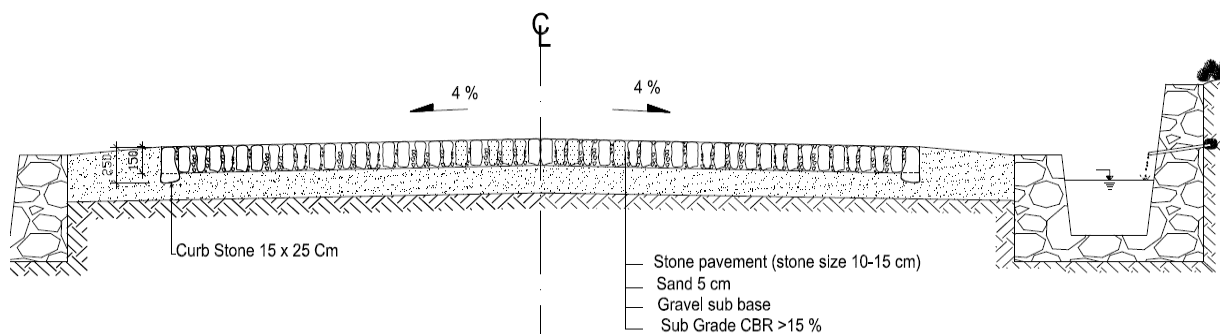
PRE- AND POST-TEST FOR SUPERVISOR AND ENGINEERS TRAINING COURSE: RIGID AND FLEXIBLE PAVEMENT CONSTRUCTION

There are 5 questions for the testing. Please answer the questions and submit the result within 30 minutes.

QUESTIONS:

1. Provide a short statement describing each of the following types of rigid and flexible road pavement, the main tools and equipment and materials used in their construction. Select four of the following pavements and provide several paragraphs for each:
 - a) Cobblestone or stone set pavements
 - b) Plum concrete pavements
 - c) Un-reinforced concrete pavements
 - d) Latasir hot mix pavements
 - e) Cold mix pavements
 - f) Penetration macadam pavements
 - g) Bitumen emulsion surface treatments


2. Calculate the quantity of kerb (curb) stones, paving stones and sand bedding materials required for a 1.5 km long by 4 m wide cobblestone pavement constructed to the following cross section.



- a) Volume of excavation (m^3) for stone kerbs (m^3) assuming 25 cm width and 30 cm depth of excavation for kerb stone placement.
- b) Volume of sand bedding (m^3) under cobblestone pavement assuming a 5 cm depth
- c) Number of stone cobblestones required assuming an average surface dimension of 15 cm wide by 30 cm long

3. Calculate the quantity of bitumen emulsion and sealing aggregate (chip) required for a 2.0 km long by 4 m wide double layer bitumen emulsion surface treatment.
 - a) First coat bitumen emulsion (kg) applied at rate of 1.2 kg/m²
 - b) Second coat bitumen emulsion (kg) applied at rate of 0.8kg/m²
 - c) First layer of 12 mm nominal size sealing aggregate (m³) applied at rate of 0.015 m³ per m². Allow 5% for wastage and loss
 - d) Second layer of 12 mm nominal size sealing aggregate (m³) applied at rate of 0.008 m³ per m². Allow 5% for wastage and loss
4. Describe the hazards to health from bitumen and emulsion sealing activities and elaborate on the hazard of potential bitumen burns, first aid response and the methods for dealing with bitumen burns and handling burn victims. Discuss methods for extinguishing bitumen fires, including the use of water?

Annex 2 Trainee daily assessment

				
Data: [Enter date]				
FORMULARIO AVALISAUN LORON - LORON NIAN Tau marka (✓) ba iha kotak laran tuir valor compresau ita boot nian.				
Training Subject 1 [Enter session title]	Diak los	Diak	Nato'on	La diak / La comprende
	☺☺	☺	☹	☹☹
Oinsa ita boot nia compresau / hatene, (How is your understanding)				
Oinsa ho metodu husi treinador nian (How was the teaching method of the trainer)				
Kopia hirak ne'ebe ita bo'ot simu ne'e oinsa (how is the training material)				
Training Subject 2 [Enter session title]	Diak los	Diak	Nato'on	La diak / La comprende
	☺☺	☺	☹	☹☹
Oinsa ita boot nia compresau / hatene				
oinsa ho metodu husi treinador nian				
Kopia hirak ne'ebe ita bo'ot simu ne'e oinsa				
Training Subject 3 [Enter session title]	Diak los	Diak	Nato'on	La diak / La comprende
	☺☺	☺	☹	☹☹
Oinsa ita boot nia compresau / hatene				
oinsa ho metodu husi treinador nian				
Kopia hirak ne'ebe ita bo'ot simu ne'e oinsa				
Training Subject 4 [Enter session title]	Diak los	Diak	Nato'on	La diak / La comprende
	☺☺	☺	☹	☹☹
Oinsa ita boot nia compresau / hatene				
oinsa ho metodu husi treinador nian				
Kopia hirak ne'ebe ita bo'ot simu ne'e oinsa				
Sujestaun ruma (relevante ho Topiku ka Seluk): (Suggestions/ comments)				

Annex 3 Trainee course evaluation



EVALUATION ON TECHNICAL TRAINING IN RIGID AND FLEXIBLE RURAL ROAD CONSTRUCTION

PERIOD FROM : [Start date] to [Finish date]

Date:[Date of return]

Thank you for successfully completing the class room training on Rigid/Flexible road construction .

Please fill in the assessment questionnaires below which is meant to:

- assess your understanding of the training
- monitor Effectiveness of the Training in order to improve for next training

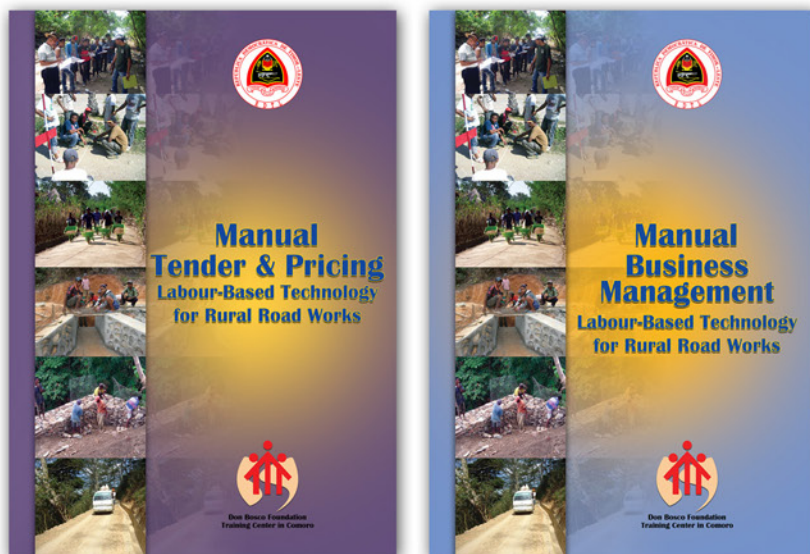
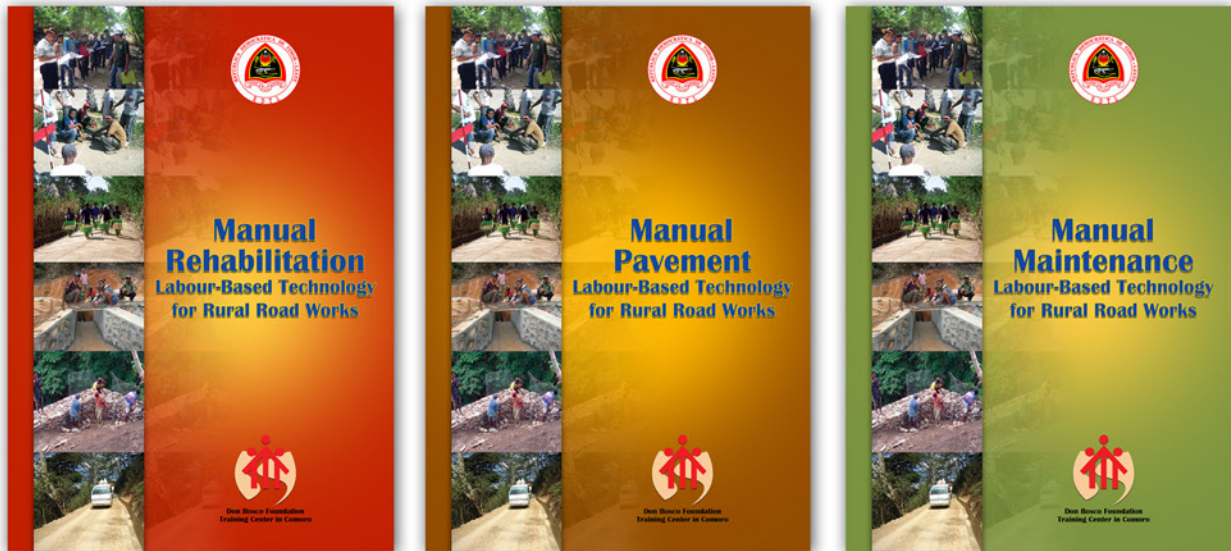
QUESTIONARS: (please cross the box of your answers)

1	How was the training conducted in general ?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
2	Did the trainers guided you to understand the material ?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
3	Will the result of this training course be of use to you in your work?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
4	Were the training materials (hand out) responded to the training topics?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
5	Did this training respond to your expectations?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
6	How do you rate about the effectiveness of the training delivery ?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
7	How do you rate your understanding in the training ?	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Fair <input type="checkbox"/>	Not enough <input type="checkbox"/>
8	Any other comment:.....				

Thank you very much for the information given herein and your good conduct during the training. We shall use it to improve on next training.

7. Power Point Presentations

Labour-based rural road work manuals for training provided by Don Bosco Training Center



International
Labour
Organization



NEW ZEALAND
FOREIGN AFFAIRS & TRADE
Aid Programme

Training modules developed through the Enhancing Rural Access Project, with technical support from the ILO and funding from the European Union and the Government of New Zealand