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ANNEX Joint Coordinating Committee (Excerpt from Record of Discussion, 2001)

I Summary

- 1. Summary of the Project**
- 2. Annual Training Plan**
- 3. Training Material**
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The Project for Capacity Building of the Alemgena Training and Testing Center of ERA

January 01, 2003

1. Project Goal etc.

(1) Goal

1) Project Purpose

The Project purpose is to enable the Alemgena Training and Testing Center of ERA (ATTC) to provide the target group (operators, mechanics, and supervisors) with proper training of MCM (Mechanized Construction Methods). A comparison of the present results of training at ATTC and the projected increase when the project goal achieved shows that the annual number of graduates can be expected to increase approximately three times.

2) Overall Goal

The overall goal is to strengthen qualitatively and quantitatively the Ethiopian human capacity of mechanized road construction and maintenance.

3) Ultimate Goal of Project, etc

The ultimate goal of the project is to facilitate Ethiopian Government's Road Sector Development Program (RSDP) made possible in cooperation with IDA, Japan, EU and other donors since September 1997 to improve the existing deteriorated road condition of the country. Even after completion of the RSDP, roads can continue to be maintained. Furthermore, increased employment opportunities in the road construction field can be expected.

(2) Training Courses

Established in 1956 in cooperation with USAID, ATTC has since engaged in the training of ERA staff and staff of other organizations to become engineers and technicians who can carry out road construction and maintenance using present facilities and equipment. However, it is facing problems in upgrading its aged equipment, and offering re-training opportunities to its trainers so that they can keep up with the latest equipment operating and maintenance technology and modern construction management methods.

This Project aims to urgently develop human resources required for road construction, such as both qualitatively and quantitatively insufficient engineers and skill workers who bear the road construction work and the road maintenance work, by renewing training equipment and machinery which are granted by Japan, and by technical transfer to its trainers from the Japanese experts with a focus on operation and maintenance of the latest construction equipment and contract management of road construction and maintenance works, and further transfer from re-trained trainers to their trainees.

1) Road Construction Equipment Management and Operation Course (Equipment Operator Training)

ATTC is expected to train 2,000 equipment operator helpers who work in ERA, Regional Road Agencies (RRA), and private companies to become equipment operators, thus expanding “quantity”, and re-train approximately 3,900 equipment operators in order to improve “quality” for meeting new machine operation and management requirements.

Dump truck operator course, bulldozer operator course, excavator operator course, motor grader operator course, loader operator course and roller operator course will be established.

2) Road Construction Equipment Mechanics Course (Equipment Mechanic Training)

There is a large need to train and re-train equipment mechanics who can appropriately maintain equipment and improve equipment operational efficiency (an estimated 20% the number of equipment operators are required). To meet this requirement, ATTC plans to update and enhance the current training course.

Beginning course, advanced course and management course will be established.

3) Road Construction and Maintenance Supervision of MCM Course (Supervisor Training)

As a policy of the Ethiopian government, road construction and maintenance will switch from a “direct management construction” to a “contracted construction”. So supervisors will be required mainly for contract management. At least 3 supervisors per each construction site will qualify for the training and will be trained, which will be an upgrade and enhancement of the current course.

2. Number of graduates during project

Number of graduates during project

	Year	2002	2003	2004	2005	2006
Project period	4years	Project Duration				
Number of graduates	Annual numbers of graduates	Cumulative number of graduates				
	523	0	523	1,046	1,569	1,700
Equipment operators	315	0	315	630	945	1,024
Dump truck	(90)	(0)	(90)	(180)	(270)	(294)
Bulldozer	(45)	(0)	(45)	(90)	(135)	(146)
Excavator	(45)	(0)	(45)	(90)	(135)	(146)
Motor grader	(45)	(0)	(45)	(90)	(135)	(146)
Loader	(45)	(0)	(45)	(90)	(135)	(146)

Roller	(45)	(0)	(45)	(90)	(135)	(146)
Equipment Mechanic	136	0	136	272	408	442
Beginning course	(48)	(0)	(48)	(96)	(144)	(156)
Advanced course	(48)	(0)	(48)	(96)	(144)	(156)
Management course	(40)	(0)	(40)	(80)	(120)	(130)
Supervisor	72	(0)	72	144	216	234

3. Background

Roads and bridges in Ethiopia have deteriorated due to long civil wars and lack of maintenance. This is greatly hindering economic and social development, and particularly the transportation of goods, which is important in improving production efficiency in the agricultural sector. The bad roads conditions also adversely affected the progress of the Poverty Reduction Program

The Ethiopian Government has taken road sector improvement as one of its priority issues, and launched the Road Sector Development Program (RSDP for 1997 to 2007) with support from International Development Association (IDA) and other donors. The program planned to improve federal roads in two stages: 4,192 kilometers in RSDP (I) from 1997 to 2002, and 9,774 kilometers in RSDP (II) from 2002 to 2007.

However, engineers and technicians who can take on road construction and maintenance work required to carry out this road development program are insufficient both quantitatively and qualitatively. The shortage particularly of equipment operators, equipment mechanics and supervisors, who will oversee the construction work, is a serious problem.

In response to sector needs the ERA has decided to strengthen the training capacity of the country's sole vocational training institute for mechanized construction methods (MCM), the Alemgena Training and Testing Center (ATTC), as a part of the RSDP, and urgently increase the necessary man power.

Number of graduates of ATTC

Ethiopia Fiscal Year	FY1998	FY1999	FY2000	FYAverage
Training Course				
Road Construction Equipment Management and Operation	48	74	35	52
Road Construction Equipment Mechanics	45	57	61	54
Road Construction and Maintenance Supervision of MCM	45	18	96	53
Total	138	149	192	159

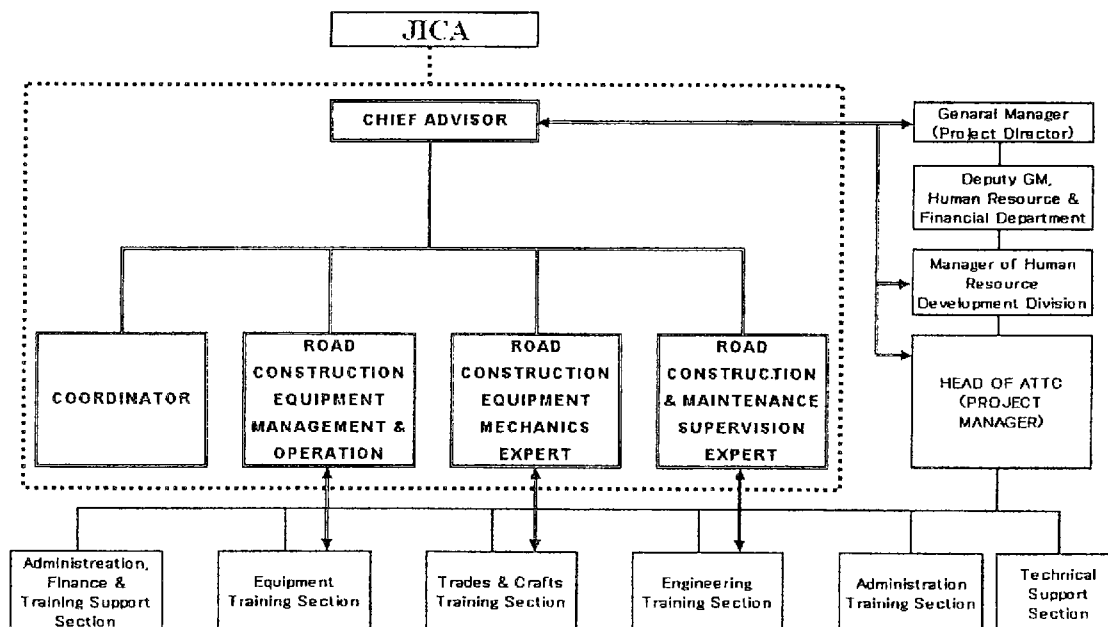
Source: JICA

Courses relevant to the Project have been extracted

4. Organization Structure for Implementation

Ethiopian Roads Authorities, Alemgena Training and Testing Center (ATTC)
 Project Director: General Manager of Ethiopian Roads Authority
 Project Manager: Head of Alemgena Training and Testing Center

JICA EXPERT TEAM ORGANIZATION



5. Input of Ethiopian Side

Counterparts and instructors, etc.
 Land, buildings and facilities
 Workshop, Laboratory
 Running expenses

6. Input of Japanese side

Provision of Equipment About 0.3 billion Yen (JFY 2001)
 Road construction Equipment, Training Machines and tools, and teaching aid materials
 Experts: 5 Long Term Experts
 Chief adviser, Coordinator
 Road Construction Equipment Management and Operation
 Road Construction Equipment Mechanics
 Road Construction and Maintenance Supervision of Mechanized Construction Methods
 Training Ethiopian Counterpart in Japan

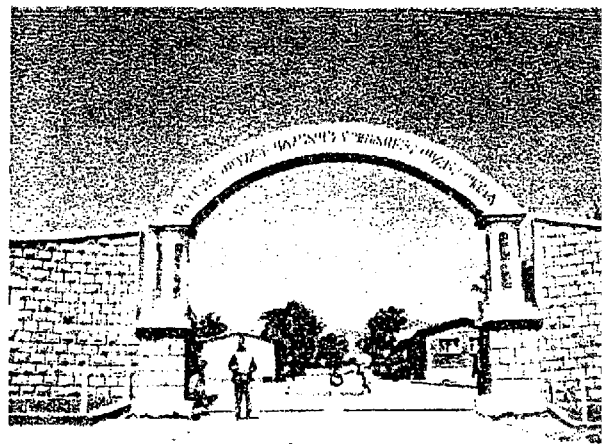
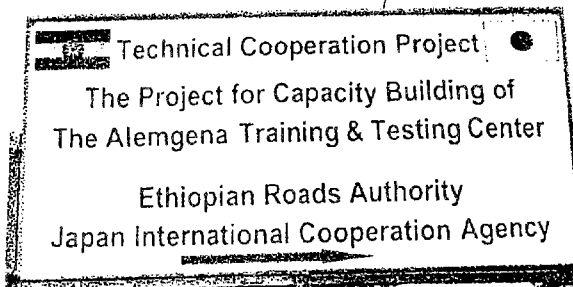
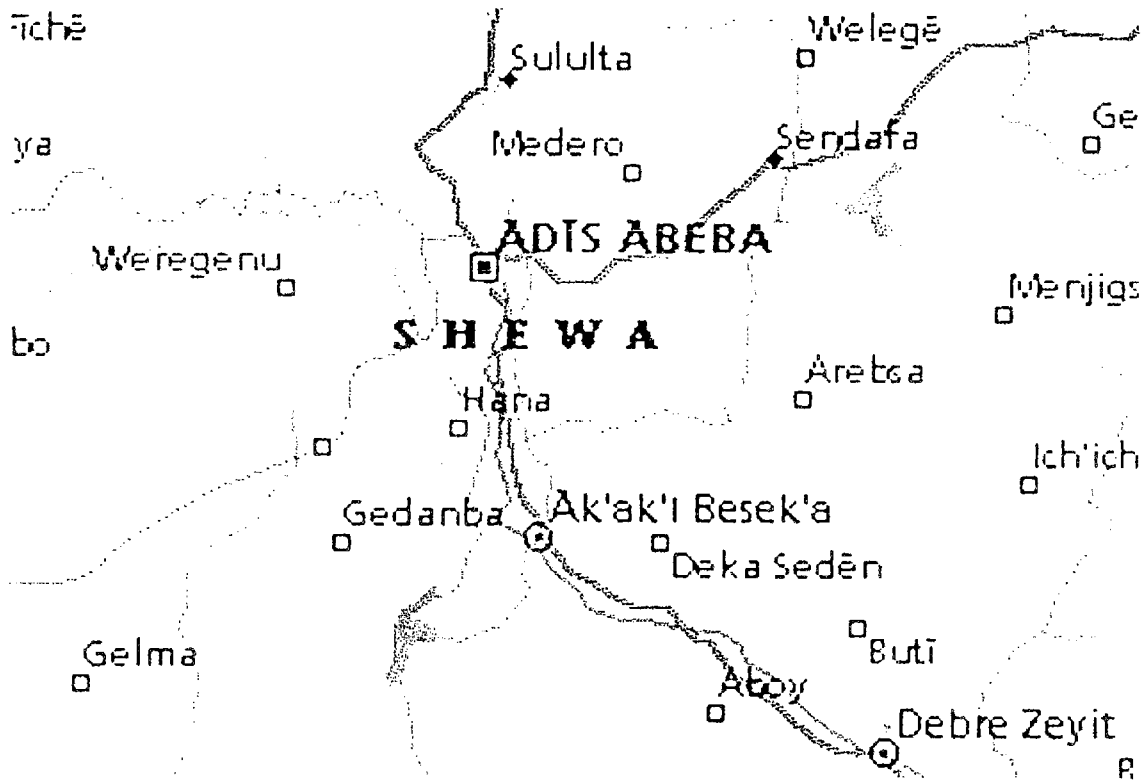
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7. Term of the Project

April 1, 2002 (Monday) to March 31, 2006 (Friday)

8. Project Site

Alemgena Training and Testing Center, which is located in the suburbs, 20km of southwest of Addis Ababa



Annual Training Plan (2nd year)

Road Construction Equipment Management and Operation Course

Course Title	No. of Trainee	Duration	Remarks
Bulldozer	5 (15/year)	01/04/03 ~ 30/05/03	1 Dozer
		01/09/03 ~ 31/10/03	
		01/12/03 ~ 30/01/04	
Excavator	10 (30/year)	01/04/03 ~ 30/05/03	2 HEs
		01/09/03 ~ 31/10/03	
		01/12/03 ~ 30/01/04	
Wheel Loader	10 (30/year)	01/04/03 ~ 30/05/03	2 WLs
		01/09/03 ~ 31/10/03	
		01/12/03 ~ 30/01/04	
Motor Grader	10 (30/year)	01/04/03 ~ 30/06/03	2 MGs
		01/09/03 ~ 28/11/03	
		01/01/04 ~ 31/03/04	
Dump Truck	10 (40/year)	01/05/03 ~ 31/05/03	1 DTs
		01/10/03 ~ 31/10/03	
		01/01/04 ~ 31/01/04	
		01/03/04 ~ 31/03/04	
Total	145/year		

Road Construction Equipment Mechanics Course

Course Title	No. of Trainee	Duration	Remarks
Technician	24 (72/year)	07/04/03~27/06/03	
		04/08/03~17/10/03	
		01/12/03~20/02/04	
Specialist	12 (36/year)	02/06/03~25/07/03	
		06/10/03~28/11/03	
		02/02/04~26/03/04	
Management	10 (30/year)	04/08/03~22/08/03	
		01/12/03~19/12/03	
		01/03/04~19/03/04	
Total	138/year		

Road Construction and Maintenance Supervision of MCM Course

Course Title	No. of Trainee	Duration	Remarks
Supervisor	20 (80/year)	01/04/03~04/06/03	
		01/07/03~28/08/03	
		30/09/03~29/11/03	
		29/12/03~26/02/04	
Total	80/year		

ANNUAL TRAINING PLAN(2nd year)

	APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV			DEC			JAN			FEB			MAR		
	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L	F	M	L

Road Construction Equipment Management and Operation Course

Bulldozer (B)	(B1)						(B2)						(B3)					
Excavator (E)	(E1)						(E2)						(E3)					
Wheel Loader (W)	(W1)						(W2)						(W3)					
Motor Grader (M)	(M1)						(M2)						(M3)					
Dump truck (D)	(D1)			(D2)			(D3)			(D4)								

Road Construction Equipment Mechanics Course

Technician (T)	(T1)						(T2)						(T3)					
Specialist (S)	(S1)						(S2)						(S3)					
Management (M)	(M1)						(M2)						(M3)					

Road Construction and Maintenance Supervision of MCM Course

Supervisor (C)	(C1)						(C2)						(C3)						(C4)					
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TRAINING MATERIAL

Road Construction Equipment Management and Operation Course

	Title / Contents	Current Status	Remarks
Textbook	Bulldozer Operation	Under making	
	Excavator Operation	Under making	
	Wheel Loader Operation	Under making	
	Motor Grader Operation	Under making	
	Roller Operation	Under making	
	Dump Truck Operation	Under making	
Video	Safety Operation	Plan is underway	
	Daily Maintenance	Plan is underway	
	Basic Operation of Bulldozer	Plan is underway	
	Basic Operation of Excavator	Plan is underway	
	Basic Operation of Wheel Loader	Plan is underway	
	Basic Operation of Motor Grader	Plan is underway	
	Basic Operation of Roller	Plan is underway	
	Basic Operation of Dump Truck	Plan is underway	
Transparency	Bulldozer Operation	Plan is underway	
	Excavator Operation	Plan is underway	
	Wheel Loader Operation	Plan is underway	
	Motor Grader Operation	Plan is underway	
	Roller Operation	Plan is underway	
	Dump Truck Operation	Plan is underway	
Wall Chart	Construction Equipment	Completed	

Road Construction Equipment Mechanics Course

Textbook	Engine , automotive	Reviewing	
	Power train, automotive	will be reviewed	
	Chasis, automotive	Reviewing	
	Structure and function, Bulldozer	Under making	
	Structure and function, Motor grader	Plan is underway	
	Structure and function, Wheel loader	Plan is underway	
	Structure and function, Hydraulic Excavator	Plan is underway	
	Hydraulics I	Under making	
	Hydraulics II	Plan is underway	
	Maintenanncce	Completed	
	Testing and Adjustment (Trouble shooting)	Plan is underway	
	Workshop Management	Plan is underway	
Video		Plan is underway	
Transparency	Engine, automotive	Reviewing	
	Power train, automotive	will be reviewed	
	Chasis, automotive	Reviewing	
Slide	Engine , automotive	○	
	Power train, automotive	○	
	Chasis, automotive	○	
Actual thing		Plan is underway	

Road Construction and Maintenance Supervision of MCM Course

Textbook	Road Construction & equipment	Under making	
	Site management (Checking sheet)	Under making	
Video	Construction works Today in Japan (Volume1)	Purchased	
	Construction works Today in Japan (Volume2)	Purchased	
	Construction works Today in Japan (Volume3)	Purchased	
	Construction works Today in Japan (Volume4)	Purchased	
Transparency	Introduction of road construction	Under making	

PROJECT OPERATION SCHEDULE (FOUR YEARS)

	2002				2003				2004				2005				2006								
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
1. Training management is more effective																									
1-1 Collect training needs using TNA																									
1-1-1 Baseline survey																									
1-2 Establish management know-how																									
1-2-1 Improvement of training management																									
1-2-2 Trainees recruitment																									
1-3 Conduct monitoring and evaluation																									
1-3-1 Monitoring and evaluation based on POS by JOC																									
2. Efficient training course program is prepared																									
2-1 Organize a system to formulate curriculum																									
2-1-1 Training course reviewing and designing																									
2-2 Prepare teaching materials																									
2-2-1 Textbook preparing																									
3. Levels of the technical skills and teaching capacity of instructors are improved																									
3-1 Train instructors																									
3-1-1 Instructor training at ATTC																									
3-1-2 Counterpart training in Japan																									
3-1-3 Dispatching short term expert by JICA																									
4. Training equipment and materials are properly arranged and managed																									
4-1 Maintain equipment properly																									
4-1-1 Transportation of equipment provided by Japan																									
4-1-2 Construction of garage for construction equipment																									
4-1-3 Reformation and expansion of workshop																									
4-1-4 Reformation of laboratory																									
4-1-5 Equipment installation																									
4-1-6 Dispatch of an engineer by JICA																									
4-1-7 Maintenance of training equipment etc.																									
4-1-8 Holding a handover ceremony																									
5. A method of training needs analysis (TNA) for the public and private sector's business needs is developed and the training plan is prepared by the TNA																									
5-1 Conducting of training needs analysis																									
New Training Course																									

II Road Construction Equipment Management and Operation Course

1. Summary of Project Operation Schedule

2. Curriculum

- 2-1 Dozer
- 2-2 Loader
- 2-3 Excavator
- 2-4 Motor Grader
- 2-5 Dump Truck

3. Lesson Plan

- 3-1 Dozer
- 3-2 Loader
- 3-3 Excavator
- 3-4 Motor Grader
- 3-5 Dump Truck

SUMMARY OF PROJECT OPERATION SCHEDULE (EQUIPMENT OPERATION)

14/02/2003

Outputs Activities	2002										2003										2004						
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR			
1. Training management is more effective																											
1-1 Collect training needs (road conditions, needs, skilllevels of C/Ps, instructors, the private and ERA staff) using TNA			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Baseline survey			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Execution of present training course									←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
1-2 Establish management know-how	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Improvement of training management	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Trainee recruitment													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Execution of new training course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Dozer operation course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Loader operation course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Excavator operation course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Motor Grader operation course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Dump Truck operation course													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
1-3 Conduct monitoring and evaluation													←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
2. Efficient training course program is prepared																											
2-1 Organize a system to formulate curriculum																											
Making of curriculum and technology transfer of method			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
2-2 Preparing teaching materials																											
Transportation of equipment provided by Japan			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Receiving inspection			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Construction of garage for construction equipment																											
Equipment installation			←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←	←
Preparing teaching materials																											
3. Levels of the technical skills and teaching capacity of instructors are improved																											
3 Train instructors																											
Instructor training																											
Counterpart training in Japan																											
4. Training equipment and materials are properly arranged and managed																											
4 Maintain equipment properly																											
Maintenance of training equipment etc.																											
6. Dispatch short term expert by JICA																											
Joint coordinating committee																											
Handover ceremony																											

NEW TRAINING COURSE (OPERATOR COURSE : DOZER)

	Revised		Remarks	
Target of training	Skilful operator			
Training Capacity	5Person/One training course			
Training Period(Net days/Net hours)	2Months(45working days/213.5hours)			
Training times per year	3times/year			
Number of trainees per year	15persons/year (1 Dozer)			
Entry requirement	ERA's criteria 10th grade complete and above that or 8th grade complete plus 1year of experience in Equipment operation or 6th grade complete plus 2years of experience in Equipment operation			
Textbook	In English and are handout (C/P translate it from English into Amharic)			
Language for lecture	Amharic and English			
Training fee	2631Birr/Course*Person			
Course composition (Curriculum)	Present training course	New Training course		
		Classroom lecture	Operation practice (h/person)	
1. General idea of construction machinery		2.0Hours		
2. Outline of construction equipment and construction mechanization		2.0Hours		
3. Basic knowledge of civil engineering		2.5Hours		
4. Construction materials and pavement		1.5Hours		
5. Fundamentals of engineering		3.0Hours		
6. Basic knowledge of machine structure				
Engine	x	2.5Hours		
Power train	x	1.5Hours		
Undercarriage		1.5Hours		
Hydraulic system		2.5Hours		
Fuel, lubricant and tire		2.0Hours		
7. Tools		1.5Hours		
8. General idea of Dozer	x	2.0Hours		
9. Structure and function of Dozer		4.0Hours		
10. Basic knowledge on construction work method and equipment operation	x			
Basic	x	4.0Hours	25.0 (5.0)Hours	
Excavating and digging	x	0.5Hours	50.0 (10.0)Hours	
Pushing around a corner	x	0.5Hours	10.0 (2.0)Hours	
Leveling and slopecutting	x	0.5Hours	50.0 (10.0)Hours	
Compacting	x	0.5Hours	10.0 (2.0)Hours	
Ripping	x	0.5Hours	10.0 (2.0)Hours	
Grubbing and stumping	x	0.5Hours	10.0 (2.0)Hours	
11. Maintenance	x	2.0Hours	5.0 (1.0)Hours	
12. Operation report		1.0Hours		
13. Machine cost and cycle time		3.0Hours		
14. Safety operation	x	2.0Hours		

NEW TRAINING COURSE (OPERATOR COURSE : LOADER)

	Revised		Remarks
Target of training	Skilful operator		
Training Capacity	5Person/One training course		
Training Period(Net days/Net hours)	2Months(42working days/198.0hours)		
Training times per year	3times/year		
Number of trainees per year	30persons/year (2 Loaders)		
Entry requirement	ERA's criteria 10th grade complete and above that or 8th grade complete plus 1year of experience in Equipment operation or 6th grade complete plus 2years of experience in Equipment operation		
Textbook	In English and are handout (C/P translate it from English into Amharic)		
Language for lecture	Amharic and English		
Training fee	1485Birr/Course*Person		
Course composition (Curriculum)	Present training course	New Training course	
		Classroom lecture	Operation practice
1. General idea of construction machinery		2.0Hours	(h/person)
2. Outline of construction equipment and construction mechanization		2.0Hours	
3. Basic knowledge of civil engineering		2.5Hours	
4. Construction materials and pavement		1.5Hours	
5. Fundamentals of engineering		3.0Hours	
6. Basic knowledge of machine structure			
Engine	x	2.5Hours	
Power train	x	1.5Hours	
Undercarriage		1.5Hours	
Hydraulic system		2.5Hours	
Fuel, lubricant and tire		2.0Hours	
7. Tools		1.5Hours	
8. General idea of Loader	x	2.0Hours	
9. Structure and function of Loader		4.0Hours	
10. Basic knowledge on construction work method and equipment operation			
Basic	x	4.0Hours	25.0 (5.0)Hours
Leveling	x	0.5Hours	25.0 (5.0)Hours
Loading	x	0.5Hours	25.0 (5.0)Hours
Digging	x	0.5Hours	25.0 (5.0)Hours
Dumping	x	0.5Hours	25.0 (5.0)Hours
Hauling	x	0.5Hours	25.0 (5.0)Hours
11. Maintenance	x	2.0Hours	5.0 (1.0)Hours
12. Operation report		1.0Hours	
13. Machine cost and cycle time		3.0Hours	
14. Safety operation	x	2.0Hours	

NEW TRAINING COURSE (OPERATOR COURSE : EXCAVATOR)

	Revised		Remarks
Target of training	Skilful operator		
Training Capacity	5Person/One training course		
Training Period(Net days/Net hours)	2Months(42working days/197.0hours)		
Training times per year	3times/year		
Number of trainees per year	30persons/year (2 Excavators)		
Entry requirement	ERA's criteria 10th grade complete and above that or 8th grade complete plus 1year of experience in Equipment operation or 6th grade complete plus 2years of experience in Equipment operation		
Textbook	In English and are handout (C/P translate it from English into Amharic)		
Language for lecture	Amharic and English		
Training fee	1650Birr/Course*Person		
Course composition (Curriculum)	Present training course	New Training course	
		Classroom lecture	Operation practice
1. General idea of construction machinery		2.0Hours	(h/person)
2. Outline of construction equipment and construction mechanization		2.0Hours	
3. Basic knowledge of civil engineering		2.5Hours	
4. Construction materials and pavement		1.5Hours	
5. Fundamentals of engineering		3.0Hours	
6. Basic knowledge of machine structure			
Engine	x	2.5Hours	
Power train	x	1.5Hours	
Undercarriage		1.5Hours	
Hydraulic system		2.5Hours	
Fuel, lubricant and tire		2.0Hours	
7. Tools		1.5Hours	
8. General idea of Excavator	x	2.0Hours	
9. Structure and function of Excavator		4.0Hours	
10. Basic knowledge on construction work method and equipment operation	x		
Basic	x	4.0Hours	25.0 (5.0)Hours
Excavating	x	0.5Hours	75.0 (15.0)Hours
Loading	x	0.5Hours	25.0 (5.0)Hours
Bench cutting	x	0.5Hours	25.0 (5.0)Hours
11. Maintenance	x	2.0Hours	5.0 (1.0)Hours
12. Operation report		1.0Hours	
13. Machine cost and cycle time		3.0Hours	
14. Safety operation	x	2.0Hours	

NEW TRAINING COURSE (OPERATOR COURSE : MOTOR GRADER)

	Revised		Remarks
Target of training	Skillful operator		
Training Capacity	5Person/One training course		
Training Period(Net days/Net hours)	3Months(69working days/324.0hours)		
Training times per year	3times/year		
Number of trainees per year	30persons/year (2 Motor Graders)		
Entry requirement	ERA's criteria 10th grade complete and above that or 8th grade complete plus 1year of experience in Equipment operation or 6th grade complete plus 2years of experience in Equipment operation		
Textbook	In English and are handout (C/P translate it from English into Amharic)		
Language for lecture	Amharic and English		
Training fee	1421Birr/Course*Person		
Course composition (Curriculum)	Present training course	New Training course	
		Classroom lecture	Operation practice
			(h/person)
1. General idea of construction machinery		2.0Hours	
2. Outline of construction equipment and construction mechanization		2.0Hours	
3. Basic knowledge of civil engineering		2.5Hours	
4. Construction materials and pavement		1.5Hours	
5. Fundamentals of engineering		3.0Hours	
6. Basic knowledge of machine structure			
Engine	x	2.5Hours	
Power train	x	1.5Hours	
Undercarriage		1.5Hours	
Hydraulic system		2.5Hours	
Fuel, lubricant and tire		2.0Hours	
7. Tools		1.5Hours	
8. General idea of Motor Grader	x	2.0Hours	
9. Structure and function of Motor Grader		4.0Hours	
10. Basic knowledge on construction work method and equipment operation			
Basic	x	4.0Hours	25.0 (5.0)Hours
Leveling	x	0.5Hours	100.0 (20.0)Hours
Ditching	x	0.5Hours	25.0 (5.0)Hours
Bank cutting	x	0.5Hours	25.0 (5.0)Hours
Mixing	x	0.5Hours	25.0 (5.0)Hours
Spreading	x	0.5Hours	25.0 (5.0)Hours
Slope cutting	x	0.5Hours	25.0 (5.0)Hours
Scarifying	x	0.5Hours	25.0 (5.0)Hours
11. Maintenance	x	2.0Hours	5.0 (1.0)Hours
12. Operation report		1.0Hours	
13. Machine cost and cycle time		3.0Hours	
14. Safety operation	x	2.0Hours	

NEW TRAINING COURSE (OPERATOR COURSE : DUMP TRUCK)

	Revised		Remarks	
Target of training	Skilful operator			
Training Capacity	10Person/One training course			
Training Period(Net days/Net hours)	1Months(24working days/116.5hours)			
Training times per year	4times/year			
Number of trainees per year	40persons/year (1 Dump Truck)			
Entry requirement	ERA's criteria 10th grade complete and above that plus 4th grade driving licence or 8th grade complete plus 1year of experience on driving plus 4th grade driving licence or 6th grade complete plus 2years of experience on driving plus 4th grade driving licence			
Textbook	In English and are handout (C/P translate it from English into Amharic)			
Language for lecture	Amharic and English			
Training fee	250Bir/Course*Person			
Course composition (Curriculum)	Present training course	New Training course		
		Classroom lecture	Operation practice	
1. General idea of construction machinery		2.0Hours	(h/person)	
2. Outline of construction equipment and construction mechanization		2.0Hours		
3. Basic knowledge of civil engineering		2.5Hours		
4. Construction materials and pavement		1.5Hours		
5. Fundamentals of engineering		3.0Hours		
6. Basic knowledge of machine structure				
Engine	x	2.5Hours		
Power train	x	1.5Hours		
Suspention system		1.5Hours		
Hydraulic system		2.5Hours		
Fuel, lubricant and tire		2.0Hours		
7. Tools		1.5Hours		
8. General idea of Dump Truck	x	2.0Hours		
9. Structure and function of Dump Truck		4.0Hours		
10. Basic knowledge on construction work method and equipment operation	x			
Basic	x	4.0Hours	10.0 (1.0)Hours	
Driving	x	0.5Hours	20.0 (2.0)Hours	
Loading and dumping	x	0.5Hours	40.0 (4.0)Hours	
11. Maintenance	x	2.0Hours	5.0 (0.5)Hours	
12. Operation report		1.0Hours		
13. Machine cost and cycle time		3.0Hours		
14. Safety operation	x	2.0Hours		

Lesson Plan : Dozer

Subject	Lecture	Practice	Venue	Instructor	Training Material	Sub-subject	Contents of training	Training Goal	Remark
General idea of construction machinery	2.0	(h/person)	Class room	Ato. Wogayehu	Text book	History of construction equipment Classification of construction equipment	Know the history of construction equipment Know a kind of general construction equipment	Get right knowledge about construction equipment	
Outline of construction equipment and construction mechanization	2.0		Class room	Ato. Wogayehu	Text book	Characteristic of construction equipment Selection of construction equipment	Understand a characteristic of construction equipment Be able to choose construction equipment accord with site condition	Understand a characteristic of construction equipment	
Basic knowledge of civil engineering	2.5		Class room	Ato. Wogayehu	Text book	Fundamentals of soil and rock	Understand a characteristic and a property of soil and rock	Get necessary basic engineering works knowledge as an operator	
Construction materials and pavement	1.5		Class room	Ato. Wogayehu	Text book	Fundamentals of cement concrete and pavement	Understand a characteristic and a property of concrete pavement and asphalt pavement	Get necessary basic road knowledge as an operator	
Fundamentals of engineering	3.0		Class room	Ato. Wogayehu	Text book	Mechanical engineering Electrical engineering Machine element	Understand a basic matter of the dynamics and physics Understand a basic matter of the electrical engineering Understand a basic matter of the machine element	Get necessary basic engineering knowledge as an operator	
Basic knowledge of machine structure Engine	2.5		Class room	Ato. Wogayehu	Text book, Video	Outline of engine Intake and exhaust system Fuel system Lubricant system Cooling system Electric system	Understand an outline and a kind of engine Understand each system of engine	Get necessary basic engine knowledge as an operator	
Basic knowledge of machine structure Power train	1.5		Class room	Ato. Wogayehu	Text book	Outline of power train Clutch system Transmission Differential	Understand an outline and a kind of power train Understand each system of power train	Get necessary basic power train knowledge as an operator	
Basic knowledge of machine structure Undercarriage	1.5		Class room	Ato. Wogayehu	Text book	Outline of undercarriage Steering system	Understand an outline and a kind of undercarriage Understand each system of undercarriage	Get necessary basic undercarriage knowledge as an operator	
Basic knowledge of machine structure Hydraulic system	2.5		Class room	Ato. Wogayehu	Text book	Outline of hydraulic system Pump Cylinder Motor Valve	Understand an outline and a kind of hydraulic system Understand each system of hydraulic system	Get necessary basic hydraulic system knowledge as an operator	
Basic knowledge of machine structure Fuel, lubricant and tire	2.0		Class room	Ato. Wogayehu	Text book, Video	Lubricant Fuel Tire	Understand a basic matter about lubricant Understand a basic matter about fuel Understand a basic matter about tire	Get necessary basic lubricant, fuel and tire knowledge as an operator	
Tools	0.5 1.0		Class room Workshop	Ato. Wogayehu Ato. Wogayehu	Text book Exercise	Tool	Understand a kind of tools and the direction for uses	Get necessary basic tool knowledge as an operator and can treat it properly	
General idea of Dozer	2.0		Class room	Ato. Wogayehu	Text book, Scale model, Video	Outline of dozer	Understand an outline and a kind of dozer	Get right knowledge about dozer	
Structure and function of Dozer	4.0		Class room	Ato. Wogayehu	Text book, Scale model	Structure and function	Understand a structure and function of dozer	Get right knowledge about structure and function of dozer	
Basic knowledge on construction work Basic operation	4.0	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	How to operate Basic operation Practice of basic operation	Understand a basic matter from riding to moving of construction equipment Understand basic how to move construction equipment Practical training in basic operation	Be able to do effective construction equipment operation	(29L/h) 145L/person
Basic knowledge on construction work Excavating and digging operation	0.5	50.0 (10.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Excavating and digging operation Practice of excavating and digging operation	Understand excavating and digging operation Practical training in excavating and digging operation	Understand excavating and digging, and can do it	290L/person
Basic knowledge on construction work Pushing around a corner operation	0.5	10.0 (2.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Pushing around a corner operation Practice of pushing around a corner operation	Understand pushing around a corner operation Practical training in pushing around a corner operation	Understand pushing around a corner, and can do it	58L/person
Basic knowledge on construction work Leveling and slopecutting operation	0.5	50.0 (10.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Leveling and slopecutting operation Practice of leveling and slopecutting operation	Understand leveling and slopecutting operation Practical training in leveling and slopecutting operation	Understand leveling and slopecutting, and can do it	290L/person
Basic knowledge on construction work Compacting operation	0.5	10.0 (2.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Compacting operation Practice of compacting operation	Understand compacting operation Practical training in compacting operation	Understand compacting, and can do it	58L/person
Basic knowledge on construction work Ripping operation	0.5	10.0 (2.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Ripping operation Practice of ripping operation	Understand ripping operation Practical training in ripping operation	Understand ripping, and can do it	58L/person
Basic knowledge on construction work Gridding and stumping operation	0.5	10.0 (2.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Scale model Dozer	Gridding and stumping operation Practice of gridding and stumping operation	Understand gridding and stumping operation Practical training in gridding and stumping operation	Understand gridding and stumping, and can do it	58L/person
Maintenance	2.0	5.0 (1.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mihiref	Text book, Video Dozer	Outline of maintenance Practice of maintenance	Understand necessity of maintenance Practical training in maintenance	Understand significance of maintenance, and can do it	Total 957L/person
Operation report	1.0		Class room	Ato. Wogayehu	Text book	Outline of operation report Method of operation report	Understand necessity of operation report Be able to write the operation report	Understand significance of operation report, and can do it	
Machine cost and cycle time	3.0		Class room	Ato. Wogayehu	Text book	Machine cost Cycle time	Understand a basic matter about cost Understand a basic matter about cycle time	Be able to make an effective construction equipment operative plan	
Safety operation	2.0		Class room	Ato. Wogayehu	Text book, Video	Safety operating Causes of accidents	Understand safe construction equipment operation Understand a cause of accident	Be able to do safe construction equipment operation without accident	

Lesson Plan : Loader

Subject	Lecture	Practice	Venue	Instructor	Training Material	Sub-subject	Contents of training	Training Goal	Remark
General idea of construction machinery	2.0	(h/person)	Class room	Ato. Wogayehu	Text book	History of construction equipment Classification of construction equipment	Know the history of construction equipment Know a kind of general construction equipment	Get right knowledge about construction equipment	
Outline of construction equipment and construction mechanization	2.0		Class room	Ato. Wogayehu	Text book	Characteristic of construction equipment Selection of construction equipment	Understand a characteristic of construction equipment Be able to choose construction equipment accord with site condition	Understand a characteristic of construction equipment	
Basic knowledge of civil engineering	2.5		Class room	Ato. Wogayehu	Text book	Fundamentals of soil and rock	Understand a characteristic and a property of soil and rock	Get necessary basic engineering works knowledge as an operator	
Construction materials and pavement	1.5		Class room	Ato. Wogayehu	Text book	Fundamentals of cement concrete and pavement	Understand a characteristic and a property of concrete pavement and asphalt pavement	Get necessary basic road knowledge as an operator	
Fundamentals of engineering	3.0		Class room	Ato. Wogayehu	Text book	Mechanical engineering Electrical engineering Machine element	Understand a basic matter of the dynamics and physics Understand a basic matter of the electrical engineering Understand a basic matter of the machine element	Get necessary basic engineering knowledge as an operator	
Basic knowledge of machine structure Engine	2.5		Class room	Ato. Wogayehu	Text book, Video	Outline of engine Intake and exhaust system Fuel system Lubricant system Cooling system Electric system	Understand an outline and a kind of engine Understand each system of engine	Get necessary basic engine knowledge as an operator	
Basic knowledge of machine structure Power train	1.5		Class room	Ato. Wogayehu	Text book	Outline of power train Clutch system Transmission Differential	Understand an outline and a kind of power train Understand each system of power train	Get necessary basic power train knowledge as an operator	
Basic knowledge of machine structure Undercarriage	1.5		Class room	Ato. Wogayehu	Text book	Outline of undercarriage Steering system	Understand an outline and a kind of undercarriage Understand each system of undercarriage	Get necessary basic undercarriage knowledge as an operator	
Basic knowledge of machine structure Hydraulic system	2.5		Class room	Ato. Wogayehu	Text book	Outline of hydraulic system Pump Cylinder Motor Valve	Understand an outline and a kind of hydraulic system Understand each system of hydraulic system	Get necessary basic hydraulic system knowledge as an operator	
Basic knowledge of machine structure Fuel, lubricant and tire	2.0		Class room	Ato. Wogayehu	Text book, Video	Lubricant Fuel Tire	Understand a basic matter about lubricant Understand a basic matter about fuel Understand a basic matter about tire	Get necessary basic lubricant, fuel and tire knowledge as an operator	
Tools	0.5 1.0		Class room Workshop	Ato. Wogayehu Ato. Wogayehu	Text book Exercise	Tool	Understand a kind of tools and the direction for uses	Get necessary basic tool knowledge as an operator and can treat it properly	
General idea of Loader	2.0		Class room	Ato. Wogayehu	Text book, Scale model, Video	Outline of loader	Understand an outline and a kind of loader	Get right knowledge about loader	
Structure and function of Loader	4.0		Class room	Ato. Wogayehu	Text book, Scale model	Structure and function	Understand a structure and function of loader	Get right knowledge about structure and function of loader	
Basic knowledge on construction work Basic operation	4.0	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	How to operate Basic operation Practice of basic operation	Understand a basic matter from riding to moving of construction equipment Understand basic how to move construction equipment Practical training in basic operation	Be able to do effective construction equipment operation	(18L/h) 90L/person
Basic knowledge on construction work Leveling operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	Leveling operation Practice of leveling operation	Understand leveling operation Practical training in leveling operation	Understand leveling, and can do it	90L/person
Basic knowledge on construction work Loading operation	0.5	25.0 (3.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	Loading operation Practice of loading operation	Understand loading operation Practical training in loading operation	Understand loading, and can do it	90L/person
Basic knowledge on construction work Digging operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	Digging operation Practice of digging operation	Understand digging operation Practical training in digging operation	Understand digging, and can do it	90L/person
Basic knowledge on construction work Dumping operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	Dumping operation Practice of dumping operation	Understand dumping operation Practical training in dumping operation	Understand dumping, and can do it	90L/person
Basic knowledge on construction work Hauling operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Scale model Loader	Hauling operation Practice of Hauling operation	Understand hauling operation Practical training in hauling operation	Understand hauling, and can do it	90L/person
Maintenance	2.0	5.0 (1.0)	Class room TPU site	Ato. Wogayehu Ato. Mitiku Ato. Beyene Ato. Mengistu	Text book, Video Loader	Outline of maintenance Method of maintenance Practice of maintenance	Understand necessity of maintenance Be able to do the maintenance(Daily, Monthly,...) Practical training in maintenance	Understand significance of maintenance, and can do it	Total 540L/person
Operation report	1.0		Class room	Ato. Wogayehu	Text book	Outline of operation report Method of operation report	Understand necessity of operation report Be able to write the operation report	Understand significance of operation report, and can do it	
Machine cost and cycle time	3.0		Class room	Ato. Wogayehu	Text book	Machine cost Cycle time	Understand a basic matter about cost Understand a basic matter about cycle time	Be able to make an effective construction equipment operative plan	
Safety operation	2.0		Class room	Ato. Wogayehu	Text book, Video	Safety operating Causes of accidents	Understand safe construction equipment operation Understand a cause of accident	Be able to do safe construction equipment operation without accident	

Lesson Plan : Excavator

Subject	Lecture	Practice	Venue	Instructor	Training Material	Sub-subject	Contents of training	Training Goal	Remark
General idea of construction machinery	2.0	(h/person)	Class room	Ato. Wogayehu	Text book	History of construction equipment Classification of construction equipment	Know the history of construction equipment Know a kind of general construction equipment	Get right knowledge about construction equipment	
Outline of construction equipment and construction mechanization	2.0		Class room	Ato. Wogayehu	Text book	Characteristic of construction equipment Selection of construction equipment	Understand a characteristic of construction equipment Be able to choose construction equipment accord with site condition	Understand a characteristic of construction equipment	
Basic knowledge of civil engineering	2.5		Class room	Ato. Wogayehu	Text book	Fundamentals of soil and rock	Understand a characteristic and a property of soil and rock	Get necessary basic engineering works knowledge as an operator	
Construction materials and pavement	1.5		Class room	Ato. Wogayehu	Text book	Fundamentals of cement concrete and pavement	Understand a characteristic and a property of concrete pavement and asphalt pavement	Get necessary basic road knowledge as an operator	
Fundamentals of engineering	3.0		Class room	Ato. Wogayehu	Text book	Mechanical engineering Electrical engineering Machine element	Understand a basic matter of the dynamics and physics Understand a basic matter of the electrical engineering Understand a basic matter of the machine element	Get necessary basic engineering knowledge as an operator	
Basic knowledge of machine structure Engine	2.5		Class room	Ato. Wogayehu	Text book, Video	Outline of engine Intake and exhaust system Fuel system Lubricant system Cooling system Electric system	Understand an outline and a kind of engine Understand each system of engine	Get necessary basic engine knowledge as an operator	
Basic knowledge of machine structure Power train	1.5		Class room	Ato. Wogayehu	Text book	Outline of power train Clutch system Transmission Differential	Understand an outline and a kind of power train Understand each system of power train	Get necessary basic power train knowledge as an operator	
Basic knowledge of machine structure Undercarriage	1.5		Class room	Ato. Wogayehu	Text book	Outline of undercarriage Steering system	Understand an outline and a kind of undercarriage Understand each system of undercarriage	Get necessary basic undercarriage knowledge as an operator	
Basic knowledge of machine structure Hydraulic system	2.5		Class room	Ato. Wogayehu	Text book	Outline of hydraulic system Pump Cylinder Motor Valve	Understand an outline and a kind of hydraulic system Understand each system of hydraulic system	Get necessary basic hydraulic system knowledge as an operator	
Basic knowledge of machine structure Fuel, lubricant and tire	2.0		Class room	Ato. Wogayehu	Text book, Video	Lubricant Fuel Tire	Understand a basic matter about lubricant Understand a basic matter about fuel Understand a basic matter about tire	Get necessary basic lubricant, fuel and tire knowledge as an operator	
Tools	0.5		Class room	Ato. Wogayehu	Text book	Tool	Understand a kind of tools and the direction for uses	Get necessary basic tool knowledge as an operator and can treat it properly	
	1.0		Workshop	Ato. Wogayehu	Exercise				
General idea of Excavator	2.0		Class room	Ato. Wogayehu	Text book, Scale model, Video	Outline of excavator	Understand an outline and a kind of excavator	Get right knowledge about excavator	
Structure and function of Excavator	4.0		Class room	Ato. Wogayehu	Text book, Scale model	Structure and function	Understand a structure and function of excavator	Get right knowledge about structure and function of excavator	
Basic knowledge on construction work Basic operation	4.0	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mitiku Ato. Beyene	Text book, Scale model Excavator	How to operate Basic operation Practice of basic operation	Understand a basic matter from riding to moving of construction equipment. Understand basic how to move construction equipment. Practical training in basic operation.	Be able to do effective construction equipment operation	(20L/h) 100L/person
Basic knowledge on construction work Excavating operation	0.5	75.0 (15.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mitiku Ato. Beyene	Text book, Scale model Excavator	Excavating operation Practice of excavating operation	Understand excavating operation Practical training in excavating operation	Understand excavating, and can do it	300L/person
Basic knowledge on construction work Loading operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mitiku Ato. Beyene	Text book, Scale model Excavator	Loading operation Practice of loading operation	Understand loading operation Practical training in loading operation	Understand loading, and can do it	100L/person
Basic knowledge on construction work Bench cutting operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mitiku Ato. Beyene	Text book, Scale model Excavator	Bench cutting operation Practice of bench cutting operation	Understand bench cutting operation Practical training in bench cutting operation	Understand bench cutting, and can do it	100L/person
Maintenance	2.0	5.0 (1.0)	Class room TPU site	Ato. Wogayehu Ato. Kebede Ato. Mitiku Ato. Beyene	Text book, Video Excavator	Outline of maintenance Method of maintenance Practice of maintenance	Understand necessity of maintenance Be able to do the maintenance(Daily, Monthly,...) Practical training in maintenance	Understand significance of maintenance, and can do it	Total 800L/person
Operation report	1.0		Class room	Ato. Wogayehu	Text book	Outline of operation report Method of operation report	Understand necessity of operation report Be able to write the operation report	Understand significance of operation report, and can do it	
Machine cost and cycle time	3.0		Class room	Ato. Wogayehu	Text book	Machine cost Cycle time	Understand a basic matter about cost Understand a basic matter about cycle time	Be able to make an effective construction equipment operative plan	
Safety operation	2.0		Class room	Ato. Wogayehu	Text book, Video	Safety operating Causes of accidents	Understand safe construction equipment operation Understand a cause of accident	Be able to do safe construction equipment operation without accident	

Lesson Plan : Motor Grader

Subject	Lecture	Practice	Venue	Instructor	Training Material	Sub-subject	Contents of training	Training Goal	Remark
General idea of construction machinery	2.0	(h/person)	Class room	Ato. Wogayehu	Text book	History of construction equipment Classification of construction equipment	Know the history of construction equipment Know a kind of general construction equipment	Get right knowledge about construction equipment	
Outline of construction equipment and construction mechanization	2.0		Class room	Ato. Wogayehu	Text book	Characteristic of construction equipment Selection of construction equipment	Understand a characteristic of construction equipment Be able to choose construction equipment accord with site condition	Understand a characteristic of construction equipment	
Basic knowledge of civil engineering	2.5		Class room	Ato. Wogayehu	Text book	Fundamentals of soil and rock	Understand a characteristic and a property of soil and rock	Get necessary basic engineering works knowledge as an operator	
Construction materials and pavement	1.5		Class room	Ato. Wogayehu	Text book	Fundamentals of cement concrete and pavement	Understand a characteristic and a property of concrete pavement and asphalt pavement	Get necessary basic road knowledge as an operator	
Fundamentals of engineering	3.0		Class room	Ato. Wogayehu	Text book	Mechanical engineering Electrical engineering Machine element	Understand a basic matter of the dynamics and physics Understand a basic matter of the electrical engineering Understand a basic matter of the machine element	Get necessary basic engineering knowledge as an operator	
Basic knowledge of machine structure Engine	2.5		Class room	Ato. Wogayehu	Text book, Video	Outline of engine Intake and exhaust system Fuel system Lubricant system Cooling system Electric system	Understand an outline and a kind of engine Understand each system of engine	Get necessary basic engine knowledge as an operator	
Basic knowledge of machine structure Power train	1.5		Class room	Ato. Wogayehu	Text book	Outline of power train Clutch system Transmission Differential	Understand an outline and a kind of power train Understand each system of power train	Get necessary basic power train knowledge as an operator	
Basic knowledge of machine structure Undercarriage	1.5		Class room	Ato. Wogayehu	Text book	Outline of undercarriage Steering system	Understand an outline and a kind of undercarriage Understand each system of undercarriage	Get necessary basic undercarriage knowledge as an operator	
Basic knowledge of machine structure Hydraulic system	2.5		Class room	Ato. Wogayehu	Text book	Outline of hydraulic system Pump Cylinder Motor Valve	Understand an outline and a kind of hydraulic system Understand each system of hydraulic system	Get necessary basic hydraulic system knowledge as an operator	
Basic knowledge of machine structure Fuel, lubricant and tire	2.0		Class room	Ato. Wogayehu	Text book, Video	Lubricant Fuel Tire	Understand a basic matter about lubricant Understand a basic matter about fuel Understand a basic matter about tire	Get necessary basic lubricant, fuel and tire knowledge as an operator	
Tools	0.5 1.0		Class room Workshop	Ato. Wogayehu	Text book Exercise	Tool	Understand a kind of tools and the direction for uses	Get necessary basic tool knowledge as an operator and can treat it properly	
General idea of Motor Grader	2.0		Class room	Ato. Wogayehu	Text book, Scale model, Video	Outline of motor grader	Understand an outline and a kind of motor grader	Get right knowledge about motor grader	
Structure and function of Motor Grader	4.0		Class room	Ato. Wogayehu	Text book, Scale model	Structure and function	Understand a structure and function of motor grader	Get right knowledge about structure and function of motor grader	
Basic knowledge on construction work Basic operation	4.0	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	How to operate Basic operation Practice of basic operation	Understand a basic matter from riding to moving of construction equipment Understand basic how to move construction equipment Practical training in basic operation	Be able to do effective construction equipment operation	(8.4L) 47L/person
Basic knowledge on construction work Leveling operation	0.5	100.0 (20.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Leveling operation Practice of leveling operation	Understand leveling operation Practical training in leveling operation	Understand leveling, and can do it	188L/person
Basic knowledge on construction work Ditching operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Ditching operation Practice of ditching operation	Understand ditching operation Practical training in ditching operation	Understand ditching, and can do it	47L/person
Basic knowledge on construction work Bank cutting operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Bank cutting operation Practice of bank cutting operation	Understand bank cutting operation Practical training in bank cutting operation	Understand bank cutting, and can do it	47L/person
Basic knowledge on construction work Mixing operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Mixing operation Practice of mixing operation	Understand mixing operation Practical training in mixing operation	Understand mixing, and can do it	47L/person
Basic knowledge on construction work Spreading operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Spreading operation Practice of spreading operation	Understand spreading operation Practical training in spreading operation	Understand spreading, and can do it	47L/person
Basic knowledge on construction work Slope cutting operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Slope cutting operation Practice of slope cutting operation	Understand slope cutting operation Practical training in slope cutting operation	Understand slope cutting, and can do it	47L/person
Basic knowledge on construction work Scarifying operation	0.5	25.0 (5.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Scale model Motor Grader	Scarifying operation Practice of scarifying operation	Understand scarifying operation Practical training in scarifying operation	Understand scarifying, and can do it	47L/person
Maintenance	2.0	5.0 (1.0)	Class room TPU site	Ato. Wogayehu Ato. Mihiref Ato. Mengistau	Text book, Video Motor Grader	Outline of maintenance Method of maintenance Practice of maintenance	Understand necessity of maintenance Be able to do the maintenance(Daily, Monthly,...) Practical training in maintenance	Understand significance of maintenance, and can do it	Total 517L/person
Operation report	1.0		Class room	Ato. Wogayehu	Text book	Outline of operation report Method of operation report	Understand necessity of operation report Be able to write the operation report	Understand significance of operation report, and can do it	
Machine cost and cycle time	3.0		Class room	Ato. Wogayehu	Text book	Machine cost Cycle time	Understand a basic matter about cost Understand a basic matter about cycle time	Be able to make an effective construction equipment operative plan	
Safety operation	2.0		Class room	Ato. Wogayehu	Text book, Video	Safety operating Causes of accidents	Understand safe construction equipment operation Understand a cause of accident	Be able to do safe construction equipment operation without accident	

Lesson Plan : Dump Truck

Subject	Lecture	Practice	Venue	Instructor	Training Material	Sub-subject	Contents of training	Training Goal	Remark
General idea of construction machinery	2.0	(h/person)	Class room	Ato. Wogayehu	Text book	History of construction equipment Classification of construction equipment	Know the history of construction equipment Know a kind of general construction equipment	Get right knowledge about construction equipment	
Outline of construction equipment and construction mechanization	2.0		Class room	Ato. Wogayehu	Text book	Characteristic of construction equipment Selection of construction equipment	Understand a characteristic of construction equipment Be able to choose construction equipment accord with site condition	Understand a characteristic of construction equipment	
Basic knowledge of civil engineering	2.5		Class room	Ato. Wogayehu	Text book	Fundamentals of soil and rock	Understand a characteristic and a property of soil and rock	Get necessary basic engineering works knowledge as an operator	
Construction materials and pavement	1.5		Class room	Ato. Wogayehu	Text book	Fundamentals of cement concrete and pavement	Understand a characteristic and a property of concrete pavement and asphalt pavement	Get necessary basic road knowledge as an operator	
Fundamentals of engineering	3.0		Class room	Ato. Wogayehu	Text book	Mechanical engineering Electrical engineering Machine element	Understand a basic matter of the dynamics and physics Understand a basic matter of the electrical engineering Understand a basic matter of the machine element	Get necessary basic engineering knowledge as an operator	
Basic knowledge of machine structure Engine	2.5		Class room	Ato. Wogayehu	Text book, Video	Outline of engine Intake and exhaust system Fuel system Lubricant system Cooling system Electric system	Understand an outline and a kind of engine Understand each system of engine	Get necessary basic engine knowledge as an operator	
Basic knowledge of machine structure Power train	1.5		Class room	Ato. Wogayehu	Text book	Outline of power train Clutch system Transmission Differential	Understand an outline and a kind of power train Understand each system of power train	Get necessary basic power train knowledge as an operator	
Basic knowledge of machine structure Undercarriage	1.5		Class room	Ato. Wogayehu	Text book	Outline of undercarriage Steering system	Understand an outline and a kind of undercarriage Understand each system of undercarriage	Get necessary basic undercarriage knowledge as an operator	
Basic knowledge of machine structure Hydraulic system	2.5		Class room	Ato. Wogayehu	Text book	Outline of hydraulic system Pump Cylinder Motor Valve	Understand an outline and a kind of hydraulic system Understand each system of hydraulic system	Get necessary basic hydraulic system knowledge as an operator	
Basic knowledge of machine structure Fuel, lubricant and tire	2.0		Class room	Ato. Wogayehu	Text book, Video	Lubricant Fuel Tire	Understand a basic matter about lubricant Understand a basic matter about fuel Understand a basic matter about tire	Get necessary basic lubricant, fuel and tire knowledge as an operator	
Tools	0.5		Class room	Ato. Wogayehu	Text book	Tool	Understand a kind of tools and the direction for uses	Get necessary basic tool knowledge as an operator and can treat it properly	
	1.0		Workshop	Ato. Wogayehu	Exercise				
General idea of Dump Truck	2.0		Class room	Ato. Wogayehu	Text book, Scale model, Video	Outline of dump truck	Understand an outline and a kind of dump truck	Get right knowledge about dump truck	
Structure and function of Dump Truck	4.0		Class room	Ato. Wogayehu	Text book, Scale model	Structure and function	Understand a structure and function of dump truck	Get right knowledge about structure and function of dump truck	
Basic knowledge on construction work Basic operation	4.0	10.0 (1.0)	Class room TPU site	Ato. Wogayehu Ato. Abera Ato. Bekela Ato. Kedir	Text book, Scale model Dump Truck	How to operate Basic operation Practice of basic operation	Understand a basic matter from riding to moving of construction equipment Understand basic how to move construction equipment Practical training in basic operation	Be able to do effective construction equipment operation	(13L/h) 13L/person
Basic knowledge on construction work Driving operation	0.5	20.0 (2.0)	Class room TPU site	Ato. Wogayehu Ato. Abera Ato. Bekela Ato. Kedir	Text book, Scale model Dump Truck	Driving operation Practice of driving operation	Understand driving operation Practical training in driving operation	Understand driving, and can do it	28L/person
Basic knowledge on construction work Loading and dumping operation	0.5	40.0 (4.0)	Class room TPU site	Ato. Wogayehu Ato. Abera Ato. Bekela Ato. Kedir	Text book, Scale model Dump Truck	Loading and dumping operation Practice of loading and dumping operation	Understand loading and dumping operation Practical training in loading and dumping operation	Understand loading and dumping, and can do it	52L/person
Maintenance	2.0	5.0 (0.5)	Class room TPU site	Ato. Wogayehu Ato. Abera Ato. Bekela Ato. Kedir	Text book, Video Dump Truck	Outline of maintenance Method of maintenance Practice of maintenance	Understand necessity of maintenance Be able to do the maintenance(Daily, Monthly, ...) Practical training in maintenance	Understand significance of maintenance, and can do it	Total 81L/person
Operation report	1.0		Class room	Ato. Wogayehu	Text book	Outline of operation report Method of operation report	Understand necessity of operation report Be able to write the operation report	Understand significance of operation report, and can do it	
Machine cost and cycle time	3.0		Class room	Ato. Wogayehu	Text book	Machine cost Cycle time	Understand a basic matter about cost Understand a basic matter about cycle time	Be able to make an effective construction equipment operative plan	
Safety operation	2.0		Class room	Ato. Wogayehu	Text book, Video	Safety operating Causes of accidents	Understand safe construction equipment operation Understand a cause of accident	Be able to do safe construction equipment operation without accident	

III Road Construction Equipment Mechanics Course

- 1. Summary of Project Operation Schedule**
- 2. Curriculum**
- 3. Syllabus**

SUMMARY OF PROJECT OPERATION SCHEDULE (MECHANICS)

1/28/2003

Outputs Activities	2002												2003												2004						
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR							
1. Training management is more effective																															
1-1 Collect training needs (road conditions, needs, skill levels of C/Ps, instructors, the private and ERA staff) using TNA			←-----																												
Baseline survey			←-----																												
1-3 Conduct monitoring and evaluation																															
2. Efficient training course program is prepared																															
2-1 Organize a system to formulate curriculum																															
Training course designing and reviewing																															
Making of curriculum																															
2-2 Preparing teaching materials																															
Preparing lesson plan																															
Preparing teaching materials																															
3. Levels of the technical skills and teaching capacity of instructors are improved																															
3 Train instructors																															
Evaluation of instructors' levels				↔																											
Instructor training - Equip. maintenance																															
Instructor training - New course																															
Counterpart training in Japan																															
4. Training equipment and materials are properly arranged and managed																															
4 Maintain equipment properly																															
Reformation and expansion of workshop																															
Equipment installation																															
Dispatch of an engineer by JICA																															
Maintenance of training equipment etc.																															
5. A method of training needs analysis (TNA) for the public and private sector's business needs is developed and the training plan is prepared by the TNA																															
Conducting of training needs analysis																															
6. Training Course Opening																															
Technician course																															
Specialist course																															
Management course																															
Dispatch short term expert by JICA																															
Joint coordinating committee																															
Handover ceremony																															

CURRICULUM – EQUIPMENT MECHANICS

Trainees' Qualification	Course Target	Training Capacity (Person/One training course)	Training Period (Net hours)	Training Times per year	Number of Trainees per year (Output)	CURRENT		NEW						
						Current Course	Technician Course (3 Months)	Specialist Course (2 Months)	Management Course (3 Weeks)					
								* Graduates of High school (10th grade) * Graduates of Technical/Vocational school * Equivalents to Mechanic Junior, I, II, in ERA's job description	* Graduates of "Technical Course" in ATTC * Equivalents to Mechanic III, IV in ERA's job description	* Equivalents to Mechanic formen in ERA's job description				
								To be able to understand the basic structures and functions of the automobiles' components, and be able to maintain construction machineries properly.	To be able to understand the structures and functions of construction machineries' components, and be able to perform the trouble-shooting and the preventive maintenance.	To be able to manage the workshop properly and effectively, and be able to design the maintenance planning and testing method				
									24	12	10			
									3 months	2 months	3 weeks			
									360hr (L:180 P:180)	240hr (L:120 P:120)	90hr (L:50 P:30)			
									3	3	3			
									72	36	30			
									L P	L P	L P			
1	Fundamentals (Basic)	General Idea of Construction Machinery Safety in the shop Points to kept in mind when Operation Hand tools & Shop Equipment Measuring Tools Fasteners							1.5 0 1.5 0 1 0 2 3 2 3 2 3					
2	Engine (Automotive)	Engine Fundamentals Uses of Engine Types of Engine Construction of Engine Valves and Valve Trains Engine measurements and performance Automotive Engine Fuel Automotive Fuel system Automotive Exhaust system Automotive Carburetors Gasoline Fuel Injection system Diesel Fuel Injection system Engine Lubrication system Engine Cooling system Conventional Ignition system							8 3 12 12 24 24 9 9		3 3 9 9 6 6			
3	Power Train (Automotive)	Clutch Transmission Final Drive Line Rear Axle & Differential							6 3 12 9 3 3 10 6		1.5 1.5 3 3 1.5 1.5 3 3			
4	Chassis (Automotive)	Brake system Air Brake system Steering system Automotive Suspension Tires & Wheels							10 9 6 6 6 6 3 3 6 3		3 3 3 3 1.5 1.5 1.5 1.5			
5	Structure & Function (Construction Equipment)	Fuel system - D7G Air Inlet & Exhaust system - D7G Lubrication system - D7G Cooling system - D7G Basic Engine - D7G Power Train - D7G Torque Converter - D7G Plywheel Clutch - D7G Transmission - D7G Steering Clutches, Brakes & Final Drives - D7G Undercarriage - D7G Hydraulic system - D7G Fuel system - GD611 Air Inlet & Exhaust system - GD611 Lubrication system - GD611 Cooling system - GD611 Basic Engine - GD611 Power Train - GD611 Steering system - GD611 Brake system - GD611 Hydraulic system - GD611 Work Equipment - GD611 Fuel system - 938G Air Inlet & Exhaust system - 938G Lubrication system - 938G Cooling system - 938G Basic Engine - 938G Torque Converter - 938G Transmission - 938G Differential - 938G Hydraulic system - 938G Fuel system - 320C Air Inlet & Exhaust system - 320C Lubrication system - 320C Cooling system - 320C Basic Engine - 320C Hydraulic system - 320C Tool Control system - 320C							6 6 9 6 2 3 3 3 1.5 1.5 3 3 1.5 1.5 3 3 1.5 1.5 3 3 1.5 1.5 3 3 7.5 7.5		3 3 4.5 4.5 1.5 1.5 3 3 4.5 4.5 3 3 1.5 1.5 3 3 1.5 1.5 7.5 7.5			
6	Hydraulics (Construction Equipment)	Introduction Generation of Oil Hydraulic Power Utilization of Oil Hydraulic Power Transmission of Oil Hydraulic Power Control of Oil Hydraulic Power Application of Oil Hydraulic Power							2 0 4 0 4 6		3 3 6 6 6 6			
7	Maintenance (Construction Equipment)	Daily Maintenance Operation Report Maintenance Manual Periodical Maintenance Work - D7G Periodical Maintenance Work - GD611 Periodical Maintenance Work - 938G Periodical Maintenance Work - 320C Periodical Maintenance Work - TS200 Preventive Maintenance							1 0 1 0 1 0 3 3 3 3 3 3 3 3 1 0			1 0 1 0 1 0 1.5 0		
8	Operation (Construction Equipment)	Bulldozer Wheel Loader Hydraulic Excavator Motor Grader Roller							0 6 0 6 0 6 0 6 0 6					
9	Testing & Adjusting Trouble Shooting & Preventive Maintenance (Construction Equipment)	Engine - D7G Power Train - D7G Hydraulic system - D7G Engine - GD611 Power Train - GD611 Hydraulic system - GD611 Engine - 938G Power Train - 938G Hydraulic system - 938G Engine - 320C Hydraulic system - 320C Electrical system - 320C Electronic system - 320C Tool Control system - 320C								2 2 2 3 2 3 2 0 2 3 2 3 1 0 1 1.5 1 1.5 1 0 2 2		3 4.5 3 3 3 4.5 3 0 3 3 3 3 1.5 0 1.5 3 1.5 3 1.5 0 3 3		
10	Others (Construction Equipment)	Lubricant Tires for OR Vehicle Air Compressor							3 3		3 3 1.5 1.5			
11	Management (Construction Equipment)	Safety management in shop Workshop management Parts management Machine Cost & Cycle time										6 0 9 0 6 0 3 0		
12	Evaluation Test	Evaluation Test							3 3	3 3	3 3			

L: Lecture
P: Practice

SYLLABUS – Mechanic – Technician Course

Subject	Hours		Sub-Subject	Contents of Training	Training Goal
	Lecture	Practice			
	Total	Total			
	180	180			
General Idea of Construction Machinery	1.5	0	History & Tendency of MC Work	機械化施工の歴史と最近の傾向	<p>Will be able to discuss the history and recent tendency of the heavy construction machineries.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. Understand the actual mechanization of construction industry started recently, and the introduction of construction machinery was in the latter half of 1940's. 2. Discuss the recent tendency of construction machinery; <ul style="list-style-type: none"> Larger scale and smaller scale machinery Improvement of traffic ability Improvement of comfortableness of cabin Improvement of safety Automation Improvement of counter-measures against noise and vibration
			Classification & Use of Construction Machinery	建設機械の種類と用途	<p>Will be able to understand the kinds and applications of the heavy construction machineries.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. Discuss the kinds of many heavy construction machineries, and describe their purposes of usage. 2. Understand the application of many heavy construction machineries by watching VTR. 3. Understand the kinds and applications of the machineries which they handle in this workshop.
Safety in the Shop	1.5	0	Shopwork and Safety	Shop内の安全について	<p>Will be able to identify and list shop hazards due to various causes such as faulty working habits, working conditions, equipment defect and incorrect use of hand tools.</p> <p>By the end of this session, the trainees will be able to</p> <ol style="list-style-type: none"> 1. Identify types of fire extinguishers and the classification of fires. <ul style="list-style-type: none"> Powder, CO2, Foam, Water 2. Discuss shop safety. 3. Discuss shop layout. 4. Discuss fire prevention in the shop. 5. List the safety rules.
			Shop Hazards to Watch out for	安全についてのDiscussion	
			Fire Prevention	消火器の種類と使用法、設置場所	
			Safety Rules	一般安全ルール	
Points to kept in mind when Operation	1	0	Good Operator Causes of accidents General precaution for operation Safety hint	建設機械操作上の諸注意 事故の原因 機械操作における一般注意事項 機械操作における安全の具体例	<p>Will be able to observe the safety during the operation of the heavy construction machineries.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. Discuss the safety rules when operating the heavy construction machineries. 2. Describe the major causes of the accidents. 3. Discuss the concrete examples of the dangers during operation.

Technician

Hand Tools & Shop Equipment	2	3	Hand Tools	ハンドツールの種類、使用方法及び、一般注意事項	Will be able to describe and list the basic hand tools and power tools used in the automotive shop. By the end of this session, the trainees will be able to 1. Explain the difference among the open end wrench, the box wrench and the combination wrench. 2. Explain the purpose of power tools which are operated by electric, pneumatic and hydraulic. 3. Demonstrate the correct way how to use power tools. 4. List the cutting tools used in the automotive shop. Chisels, Hacksaws, Files, Drills, Tap and Die 5. Describe the various kinds of screw driver.
			Power Tools & Shop Equipment	パワーツールの種類、使用方法及び、一般注意事項	
Measuring Tools	2	3	Measuring Tools	計測器具の種類、使用方法及び、一般注意事項	Will be able to describe the basic automotive-shop measuring tools and demonstrate how to use them. Thickness gauge Micrometer Dial indicator Vernier calliper Small-hole gauge By the end of this session, the trainees will be able to 1. Measure components with different types of measuring tools. 2. Discuss the basic difference between the metric system and the US system.
Fasteners	2	3	Fasteners	締め具の種類、使用方法及び、一般注意事項	Will be able to describe the various types of Fasteners that hold the automobile parts together such as; Bolts and Nuts Washers Snap ring Cotter pin Screw etc. By the end of this session, the trainees will be able to 1. List and explain the four ways that screw threads are described. 2. Explain how bolt heads are marked to indicate their strength. 3. Discuss six types of screw and bolt heads and the tools used with them. 4. Discuss snap rings and their uses. 5. Explain the purpose of keys and splines.
Engine Fundamentals	8	3	Atoms & Combustion	内燃機関シリンダ内の燃焼について	Will be able to describe atoms, chemical reactions combustions and the two rule -increase of pressure with increasing temperature and increase of temperature with increasing pressure -and explaining how they work in the engine. By the end of this session, the trainees will be able to; 1. Explain what happens during combustion. 2. Discuss combustion of fuel in the engine. 3. Discuss expansion of solids and fluids with heat. 4. Explain why combustion is not ideal, or complete in the engine.
Uses of Engine			Internal Combustion Engines Engine Construction, fundamentals Engine Operation Valve Action	内燃機関 エンジンの基礎構造 エンジンの基本作動原理 バルブの作動	Will be able to describe Internal combustion engine and explain the basic difference between spark ignition and diesel (compression ignition) engine and its operation.

			Technician フライホイールとその機能	By the end of this session, the trainees will be able to; 1. Describe the two kinds of piston engine. 2. Describe how the crank shaft and connection rod change rotary motion to reciprocating motion. 3. Discuss the four piston strokes of a spark ignition engine and what happens in the engine during each stroke. 4. Describe the four piston strokes of a compression-ignition engine and what happens in the engine during each stroke. 5. Explain how pushrod valve train works. 6. Discuss the flywheel and its function.
Types of Engine		Types of Engine	エンジンの種類 (さまざまな分類)	Will be able to list the various ways in which engine are classified and explain what each classification means. By the end of this session, the trainees will be able to explain engine classified according to; 1. Number of cylinder 2. Arrangement of cylinder 3. Arrangement of valves 4. Type of cooling 5. Number of strokes per cycle (two or four) 6. Type of fuel used 7. Method of ignition 8. Firing order 9. Reciprocating or rotary
Construction of Engine	12	12	Cylinder Block Cylinder Head Exhaust & Intake Mnifold Crankshaft Engine Bearings Engine Mounts Connecting Rod Pistons & Piston Rings	シリンダブロックの構造と機能 シリンダヘッドの構造と機能 給排気マニフォールドの構造と機能 クランクシャフトの構造と機能 エンジンベアリングの構造と機能 エンジンマウントの構造と機能 コネクティングロッドの構造と機能 ピストン、及びピストンリングの構造と機能
				Will be able to identify and name the parts of disassemble engine and discuss their contractions purpose and operation. By the end of this session, the trainees will be able to; 1. Discuss cylinder block & cylinder head and how they are made. 2. Explain the purpose and function of intake and exhaust manifolds, vibration dampers and flywheels. 3. Discuss crankshaft ans how it is made. 4. Describe engine bearings, their function and how they are lubricated. 5. Discuss the construction, purpose, operation and lubrication of the connecting rods. 6. Discuss the construction, purpose, operation and lubrication of the pistons and piston rings. 7. Explain the purpose of piston-expansion control and how it is achieved.
Valves and Valve Trains			Types of Valve Trains Driving the Camshaft Valves Valve Cooling Valve Seat Rocker Arms Valve Stem Oil Seals Valve Lifting Valve Timing	バルブトレインの種類 カムシャフトの作動 バルブ バルブの冷却 バルブシート ロッカーアーム バルブステムのオイルシール バルブの作動 バルブタイミング
				Will be able to discuss the purpose, construction and operation of engine valves. By the end of this session, the trainees will be able to; 1. Explain what valve timing means and how valves are timed for optimum economy and performance. 2. Describe the advantages, construction and operation of over head-camshaft engine. 3. Explain the purpose of hydraulic valve lifters and how they work. 4. Identify and name the parts in the valve trains and explain what they are for.
Engine measurements and performance			Terminology of Engine Power Friction Volumetric Efficiency	エンジン性能と関連用語 摩擦 容積効率
				Will be able to define bore, stroke, piston displacement, compression, and volumetric efficiency.

			Technician	
		Engine Efficiency	エンジンの機械効率、熱効率	By the end of this session, the trainees will be able to: 1. Define work, energy, power and torque, and explain how they are measured and their importance to engine performance. 2. Define friction and list and explain the three kinds of friction. 3. Discuss the relation between brake horse power, indicated horse power and friction horse power.
Automotive Engine Fuel	24 24	Gasoline Diesel Engine Fuel	ガソリン ディーゼル燃料	Will be able to discuss the combustion and special characteristics of diesel & gasoline engine fuel and the purpose of the additives used in the fuel. By the end of this session, the trainees will be able to: 1. Explain volatility and octane ratings and why they are important in gasoline. 2. Explain volatility, viscosity and cetane number of diesel fuel. 3. Describe knocking, detonation and preignition and explain what causes them and how they can be prevented.
Automotive Fuel system		Air Cleaner Fuel pump Main Line Filter, Fuel Tank & Lines Factors Affecting the Fuel System	エアクリーナ 燃料ポンプ 燃料フィルタ、タンク、ラインズ 燃料システムに影響を及ぼす要因	Will be able to identify and explain the operation and construction of the various fuel system components on the machinery. By the end of this session, the trainees will be able to: 1. List and describe the purpose, construction and operation of all components in the carburetted fuel system except the carburettor. 2. Explain the basic difference between the carburetted fuel system and the fuel injection system. 3. Explain the purpose and operation of the mechanical & electrical operated fuel pump.
Automotive Exhaust system		Muffler Supercharger & Turbocharger	マフラ スーパーチャージャとターボチャージャ	Will be able to explain the purpose and operation of turbocharger and supercharger. By the end of this session, the trainees will be able to: 1. Describe the purpose and construction of muffler. 2. Explain the purpose of catalytic converter. 3. Explain the difference between turbocharger and supercharger.
Automotive Carburettors		Introduction of Carburettors Types of Carburettors Float System (Circuit) Primary Low-Speed Circuit Main Metering System (High-Speed Circuit) Power System Acceleration - Pump System Choke System Carburettor Auxiliary Units Side Draft SU Carburettor Trouble Shooting of Fuel System	キャブレータ キャブレータの種類 フロートシステム プライマリロースピードサーキット メインメータリングシステム パワーシステム ポンプシステム チョークシステム キャブレータオーグジリアリユニット サイドドラフトSUキャブレータ 燃料システムのトラブルシューティング	Will be able to explain and describe the operation & the difference between a fixed venture and variable venture carburettor. By the end of this session, the trainees will be able to: 1. List and describe the operation of the six systems in a fixed venture carburettor. 2. Explain how a variable venture carburettor works. 3. Identify the various visible carburettor components. 4. Examine disassembled carburettor and identify the major parts.
Gasoline Fuel Injection system		Comparison between EFI and Carburettor Types of EFI System EFI Components (Port Injection) - L-EFI	EFIとキャブレータの比較 EFIシステムの種類 EFIコンポーネント	Will be able to explain and describe the operation & the function of electronic fuel injection system.

		Technician		
		Throttle Body Injection	スロットルボディインジェクション	<p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> 1. Define injection valve, function of ECU and sensors (signal). 2. Explain the two main types of electronic fuel injection system. 3. Locate the components of gasoline fuel injection system on various cars. 4. describe the construction and operation of throttle body and port injection system. 5. Diagnose trouble in various gasoline fuel injection system.
Diesel Fuel Injection system		Diesel Fuel Injection Distributor-type Injection Pump Governors for Fuel Injection Pumps Injection Nozzles & Injection Lines Diesel Combustion Chamber	ディーゼル燃料インジェクション 分配型噴射ポンプ 燃料噴射ポンプのガバナ 噴射ノズルとライン ディーゼル燃焼室	<p>Will be able to describe the four basic types of fuel injection pump used on automotive diesel engine.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> 1. Explain the difference in operation between diesel (compression ignition) and gasoline (spark ignition) engine. 2. Locate the components of diesel engine fuel injection system on cars and explain how each component works. 3. Explain how to replace and time a fuel injection pump. 4. Diagnose and service various automotive diesel engine fuel injection system.
Engine lubrication system	9 9	Purpose & Properties of Lubricating Oil Oil Pump Types of Lubricating System Accessories of Lubrication System Crankcase Ventilation (Emission Control)	潤滑油の目的と特性 オイルポンプ 潤滑システムの種類 潤滑システムの補助装置 クランクケースのベンチレーション (エミッションコントロール)	<p>Will be able to explain the operation of the engine lubricating system.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> 1. Describe six jobs performed by the engine oil. 2. Discuss the properties of good lubricating oil and the reasons for the additives that are put into it. 3. Explain the service ratings of lubricating oil. 4. Discuss possible troubles in the lubricating system and their causes and corrections. 5. Change the engine oil and oil filter. 6. Service the engine oil pan and oil pump.
Engine Cooling system		Coolants Coolant Flow Water Jackets Radiators Water Pumps Fans Thermostats Radiator Caps Draining the System Air Cooling System (Direct Cooling) Trouble Shooting of Cooling System	クーラント(冷却水) クーラントの流れ ウォータージャケット ラジエータ ウォータポンプ 冷却ファン サーマスタット ラジエータキャップ ドレーン 空冷システム クーリングシステムのトラブルシューティング	<p>Will be able to describe the operation of the two types of engine cooling system.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> 1. Explain the operation of the water pump. 2. Define variable speed fan. 3. Discuss the flow of coolant through the two types of automotive radiators. 4. Explain the operation of the thermostat. 5. Explain the use of two valves used in the radiator pressure cap.
Conventional Ignition system		Function of the Ignition System Ignition Coils Construction & Operation Ignition Distributor Timing Advance Operation of Condenser Operation of Spark Plug	点火システムの機能 点火コイルの構造と作動 ディストリビュータ 進角装置 コンデンサの作動 スパークプラグの作動	<p>Will be able to explain the operation of the contact point ignition system.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> 1. Locate and identify the components of the contact-point ignition system on various vehicles. 2. Explain the construction and operation of centrifugal- and vacuum-advance

Series Resistor of Ignition Coil

Technician

点火コイルと抵抗器

mechanisms.

3. Use the shop testers to check ignition system operation and components.
4. Check and adjust ignition timing.
5. Adjust or replace contact points.
6. Remove and install ignition distributors.

Clutch	6	3	Engine Clutch Types of Clutches Function of Clutch Clutch Trouble Diagnosis Wet Type Clutch	クラッチ クラッチの種類 クラッチの機能 クラッチのトラブル診断 湿式クラッチ	By the end of this session, the trainees will be able to; 1. Explain the purpose of the clutch. 2. Describe the construction & operation of clutches. 3. List four types of clutch linkage. 4. Describe the operation of hydraulic clutch linkage. 5. Describe air over hydraulic clutch linkage. 6. Explain the clutch trouble diagnosis procedure. 7. Service the linkage. 8. Remove & Replace a clutch.
Transmission	12	9	Operation & Construction Constant Mesh Type Transmission Trans Axis, Over Drive, FWD Planetary Gear System Gear Lubricants Transmission Trouble Diagnosis	トランスミッションの作動と構造 常時噛み合い式トランスミッション オーバードライブ、FWDその他装置 遊星歯車装置 ギア用ルブリカント トランスミッションのトラブル診断	By the end of this session, the trainees will be able to; 1. Discuss the purpose and operation of typical manual transmissions. 2. Describe how shifting is accomplished. 3. Describe the type of gear used in transmission. 4. Explain the purpose of over drive. 5. Discuss the transmission trouble diagnosis procedure. 6. Identify the proper type of lubricant that are added to the transmission.
Final Drive Line	3	3	Types of Drive Line & Arrangements Types of Universal joints Types of Slip Joints	ドライブラインの種類 ユニバーサルジョイントの種類 スリップジョイントの種類	By the end of this session, the trainees will be able to; 1. Discuss the purpose of drive and propellar shaft. 2. List three common types of universal joint. 3. List two types of constant velocity drive shaft joints. 4. Discuss the tow common types od bracing. 5. List four types of drive arrangements.
Rear Axle & Differential	10	6	Rear Axle Types of Axles Differential Types of Differentials	リヤアクスル アクスルの種類 ディファレンシャル ディファレンシャルの種類	By the end of this session, the trainees will be able to; 1. Describe the purpose & operation of differential. 2. List six types of differential. 3. List two types of axle housing. 4. Discuss the purpose of drive axle. 5. Explain the types of axle shaft.
Brake system	10	9	Friction of Brake Drum Brake Master Cylinder Wheel Brake Mechanism Disk Brake Power Brake Parking Brake Brake Trouble Diagnosis Brake Testing & Servicing	ブレーキの摩擦 ドラムブレーキ マスターシリンダ ホイールブレーキのメカニズム ディスクブレーキ パワーブレーキ パーキングブレーキ ブレーキのトラブル診断 ブレーキのテストと修理	Will be able to understand the mechanism of the brake system and diagnose the basic troubles. By the end of this session, the trainees will be able to; 1. List the kinds and functions of the brake system. 2. Describe the construction and function of the components of the wheel brake system. 3. Describe the construction and function of the components of the disc brake system. 4. Describe the construction and function of the components of the parking brake system. 5. Explain the construction and operation of the master cylinder. 6. Discuss the typical troubles and trouble shooting of the brake system.

			Technician		
Compressed Air or Pneumatic Brake system	6	6	Air Compressor Foot Valve Relay Valve Quick Release Valve Air Governor Pneumatic parking Brake Combi Brake (Maxi Brake) Bosch Compressed Air Pressure Regulator Air Compressor Charging & Unloading Mechanism Exhaust Brake	エアコンプレッサ フートバルブ リレーバルブ クイックリリースバルブ エアガバナ ニューマチックパーキングブレーキ コンビブレーキ エアプレッシャレギュレータ エアコンプレッサメカニズム 排気ブレーキ	Will be able to understand the air operation in the brake system, and describe the functions of related components. By the end of this session, the trainees will be able to: 1. Describe the mechanism and operation of the air compressor. 2. Describe the function and operation of the foot valve, relay valve and quick release valve. 3. Explain the function and operation of the air governor. 4. Discuss the mechanism and operation of the pneumatic parking brake. 5. Discuss the mechanism and operation of the combi-brake 6. Explain the function and operation of the air pressure regulator. 7. Describe the mechanism and operation of the exhaust brake.
Steering system	6	6	Purpose and Operation of Steering Front End Geometry Types of Steering Power Steering Pump Steering, Suspension Service & Trouble Diagnosis	ステアリングの目的と作動 フロントエンドの機構 ステアリングの種類 パワーステアリングポンプ ステアリングとサスペンションのトラブル診	Will be able to understand the basic construction and operation of the steering mechanism. By the end of this session, the trainees will be able to: 1. Describe the kinds and functions of the steering mechanisms. 2. Describe the construction and function of the front end. 3. Describe the construction and operation of the steering mechanism. 4. Explain the troubles and trouble shooting of the steering mechanism and the suspension.
Automotive Suspension	3	3	Purpose & Operation of Spring Types of Spring Rear End Torque Shock Absorber Pneumatic Suspension	スプリングの目的と作動 スプリングの種類 リアエンド ショックアブソーバ ニューマチックサスペンション	Will be able to understand the construction and function of the suspension and shock absorber. By the end of this session, the trainees will be able to: 1. List the kinds and functions of the springs. 2. Describe the construction and function of the rear end. 3. Describe the construction and characteristics of the shock absorber. 4. Describe the construction and characteristics of the pneumatic suspension.
Tire & Wheels	6	3	Purpose of Tires Tire Construction Types of Tires & Tubes Types of Tire Wear	タイヤの目的 タイヤの構造 タイヤとチューブの種類 タイヤ磨耗の種類	Will be able to understand the construction of the tire, and according to the kinds of tires, will be able to describe their purpose and characteristics. By the end of this session, the trainees will be able to: 1. Explain the construction of the tire, and its function. 2. Describe the kinds of tires and tubes, and their characteristics. 3. Explain the tire wear patterns, and their reasons.
Fuel system - D7G	6	6	Fuel Flow Fuel Injection Pump Fuel Injection Nozzle Fuel Transfer Pump Oil Flow for Fuel Pump & Governor Governor	燃料の流れ 燃料噴射ポンプ 燃料噴射ノズル 燃料トランスファーポンプ 燃料ポンプ及びガバナの潤滑 ガバナ	Will be able to identify each component in the fuel system of D7G, and explain its function. By the end of this session, the trainees will be able to: 1. Explain the fuel flow in the fuel system, and name and explain its function of each component.

		Technician		
	Fuel Ratio Control		燃料レシオコントロール	<ol style="list-style-type: none"> Describe how the fuel amount is metered in the fuel injection pump. Describe the operation of the valve in the fuel injection nozzle. Explain how the fuel is pressurized in the fuel transfer pump. Discuss the operation of the D7G governor and how it controls the amount of fuel. Explain the function of the governor servo. Explain the purpose of the dashpot. Discuss the purpose of the fuel ratio control.
Air Inlet & Exhaust system - D7G	Turbocharger & Aftercooler Turbocharger Cylinder Head & Valves Valve Mechanism		ターボチャージャー及びアフタクーラ ターボチャージャー シリンダヘッド及びバルブ バルブ機構	<p>Will be able to identify each component in the air intake and exhaust system, and explain its function.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> Describe the purpose and function of the aftercooler. Describe the purpose and function of the turbocharger. Explain the lubrication flow for the turbocharger. Explain the operation of the valve mechanism.
Lubrication system - D7G	System Oil Flow		系統内のオイルの流れ	<p>Will be able to understand the flow of the oil in the lubrication system, and identify major components and explain their purposes.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> Discuss the oil flow which is transferred to lots of components through lots of lubrication passes. Explain the purpose of the oil cooler bypass valve and the oil filter bypass valve. Explain the oil flow when the engine oil is still cold, and its reason.
Cooling system - D7G	Coolant Flow Cooling System Components		系統内の冷却水の流れ 冷却系統の構成品	<p>Will be able to understand the flow of the water in the cooling system, and identify major components and explain their purposes.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> Discuss the water flow in the cooling system. Explain the purpose of the water temperature regulator. Explain the water flow when the engine coolant water is still cold, and its reason.
Basic Engine - D7G	Cylinder Block & Liners Pistons, Rings & Connecting Rods Crankshaft Vibration damper		シリンダブロックとライナ ピストン、リング及びコネクティングロッド クランクシャフト バイブレーションダンパ	<p>Will be able to understand the basic components of the D7G engine, and make a comparison with those of the automobile engines.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> Discuss the offset of installation of piston pin toward the piston, and the installation is of the full-float type. Discuss the construction and function of the piston rings, and the D7G engine is equipped with the keystone type oil rings. Discuss the direction of installation of the piston pin bearings, and its reason. Explain the purpose and construction of the vibration damper..
Power Train - D7G	9 6 General Information Hydraulic System, Power Shift Hydraulic pump Magnetic screen Oil filter Transmission oil cooler		概説 油圧システム(パワーシフト) 油圧ポンプ マグネチックスクリーン オイルフィルタ トランスミッションオイルクーラ	<p>Will be able to understand the basic components of the D7G power trains, and describe their purposes and functions.</p> <p>By the end of this session, the trainees will be able to:</p> <ol style="list-style-type: none"> Discuss the oil flow in the system, and identify the related components. Describe the purposes and functions of the components in the hydraulic

			Technician	
			Hydraulic System, Direct Drive	油圧システム(ダイレクトドライブ) control system. 3. Explain the difference between the powershift system and the direct drive system.
Torque Converter - D7G			Torque Divider (Power Shift) Torque Converter Lubrication of Torque Divider Flywheel Clutch (Direct Drive)	トルクディバイダの作動原理 トルクコンバータの作動原理 トルクディバイダの潤滑 フライホイールクラッチ Will be able to understand the constructions of the torque divider and the torque converter of the D7G, and describe their purposes and functions.
Flywheel Clutch - D7G				By the end of this session, the trainees will be able to: 1. Discuss the operational principle of the torque divider. 2. Describe the operational principle of the planetary gear system. 3. Discuss the operational principle of the torque converter. 4. Explain the difference between the torque divider and the torque converter. 5. Explain the lubrication of the torque divider. 6. Explain the difference between the powershift system and the direct drive system.
Transmission - D7G			Transmission Hydraulic Controls (Power Shift) Transmission (Power Shift) Gearshift & Interlock Mechanism (Direct Drive) Transmission (Direct Drive)	トランスミッションの油圧コントロール トランスミッション(パワーシフト) ギヤシフト及びインターロック機構(ダイレクトドライブ) トランスミッション(ダイレクトドライブ) Will be able to understand the constructions of the transmission of the D7G, and describe its operation.
				By the end of this session, the trainees will be able to: 1. Discuss the oil flow and its operation in the hydraulic control system. 2. Describe the purposes and function of the modulation valve and the pressure differential valve. 3. Explain the function of the torque converter outlet relief valve. 4. Explain the operation of the hydraulically actuated clutch of the planetary gear system in the power shift transmission. 5. Discuss how the gear shifts are completed in the power shift transmission. 6. Explain the difference between the powershift system and the direct drive system.
Steering Clutches, Brakes & Final Drives - D7G			Steering Clutches, Brake & Final Drives Hydraulic Control Valve for Steering Clutches Brake Relief Valve for Brake Cooling & Lubrication	ステアリングクラッチ、ブレーキ及びファイナルドライブ ステアリングクラッチの油圧コントロールバルブ ブレーキ ブレーキ冷却、潤滑用リリーフバルブ Will be able to understand the constructions of the steering clutch, brake and final drive of the D7G, and describe its operation.
				By the end of this session, the trainees will be able to: 1. Describe the construction and function of the steering clutch and brake. 2. Describe the hydraulically actuated operation of engagement and release of the steering clutch and brake. 3. Explain the function of the brake cooling and lubricating relief valve.
Undercarriage - D7G	2	3	Track Roller Frames Track Carrier Rollers Track Rollers Front Idlers Recoil Springs & Mechanisms for Track Adjustment	トラックローラフレーム トラックキャリアローラ トラックローラ フロントアイドラ リコイルスプリングと トラックアジャスタの構造 Will be able to understand the construction and function of each undercarriage components of the D7G.
				By the end of this session, the trainees will be able to: 1. Describe the construction and function of each undercarriage component. 2. Describe the duo cone floating seals which seal the lubricant in rollers and idlers.

			Technician		
		Track	トラック		
				<p>3. Explain the purpose of the low position and high position of the front idler.</p> <p>4. Explain the construction of the track adjuster, and adjust the track tension.</p> <p>5. Discuss the sealed and lubricated track, and its wear life.</p> <p>6. Discuss the way to joint the track (Split link, Master link and shoe).</p>	
Hydraulic system -D7G	3	3	Control Valve for Blade Tilt Relief Valve for Tilt Circuit Control Valve for Blade Lift Relief Valve for Lift Circuit Quick-Drop Valve Pilot System Tilt Circuit Ripper Lift Circuit	ブレードチルトのコントロールバルブ チルト回路のリリーフバルブ ブレードリフトのコントロールバルブ リフト回路のリリーフバルブ クイックドロップバルブ パイロットシステム チルト回路 リッパリフト回路	<p>Will be able to identify the major components and describe their function in the D7G hydraulic control system. And also, understand the operation of each component hydraulically actuated.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. Discuss the hydraulic operation and function of the blade tilt circuit and control valve. 2. Discuss the hydraulic operation and function of the blade lift circuit and control valve. 3. Discuss the hydraulic operation and function of the ripper lift circuit and control valve. 4. Explain the purpose and operation of the Quick drop valve. 5. Discuss the ripper lower operation when the engine is dead.
Introduction of Oil Hydraulic Power	2	0	History of Hydraulics Hydrodynamics vs Hydrostatics Flow, Pressure & Force	油圧の歴史 流体力学と静水力学 流量、圧力、力	<p>Will be able to understand the basic principle related to hydrodynamics and hydrostatics.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. Describe the principle of Pascal. 2. Calculate the relationship between Flow, Pressure and Force.
Generation of Oil Hydraulic Power	4	0	Gear Pump Vane Pump Piston Pump Screw Pump	ギヤポンプ ベーンポンプ ピストンポンプ ねじポンプ	<p>Will be able to understand the construction and characteristics of the hydraulic oil pumps..</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. List the kinds of hydraulic oil pumps. 2. Describe the characteristics of each hydraulic oil pump.
Utilization of Oil Hydraulic Power	4	6	Hydraulic Cylinder Hydraulic Motor	油圧シリンダ 油圧モータ	<p>Will be able to understand the construction and characteristics of the hydraulic cylinder, hydraulic motor and other accessories.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. List the kinds of hydraulic cylinders. 2. Describe the construction and operation of hydraulic cylinders. 3. Describe the construction and operation of hydraulic motors.
Transmission of Oil Hydraulic Power			High Pressure Hose Metal Fitting	高圧ホース メタルフィッティング	<p>Will be able to understand the construction and characteristics of the hydraulic hose and metal fitting.</p> <p>By the end of this session, the trainees will be able to;</p> <ol style="list-style-type: none"> 1. List the kinds of hydraulic hoses. 2. Describe the construction and functions of metal fittings.
Control of Oil Hydraulic Power			Valve Classification Pressure Controls Flow Controls	バルブの種類 圧力制御 流量制御	<p>Will be able to understand the construction and functions of hydraulic control valves.</p>

				Technician	
		Directional Controls		方向制御	By the end of this session, the trainees will be able to: 1. List the kinds of basic hydraulic control valves. 2. Describe the construction and operation of the pressure control valve. 3. Describe the construction and operation of the flow control valve. 4. Describe the construction and operation of the Directional control valve.
Application of Oil Hydraulic Power		Graphical Symbol Elementary Hydraulic Circuit Hydraulic Circuit Diagram Terminology related to Flow, Pressure & Pump		グラフィカルシンボル 基本油圧回路 油圧回路図 油圧関連用語	Will be able to understand the graphical symbols and the elementary hydraulic circuit diagram. By the end of this session, the trainees will be able to: 1. Understand basic graphical symbols. 2. Understand the terminology related to flow, pressure and pump. 3. Explain the oil flow and its purpose of the elementary hydraulic circuit. 4. Discuss the oil flow and the operations of the valves and accessories according to the hydraulic circuit diagram.
Daily Maintenance	1 0	Essentials of Ordinary Maintenance Record of Running and Maintenance		日常、定期メンテナンスの基本 運転及びメンテナンスの記録	By the end of this session, the trainees will be able to: 1. Understand the proper contents of ordinary maintenance, and its importance. 2. Keep a record of running and maintenance information.
Operation Report	1 0	Use and Importance of Operation Report Contents and Types of Operation Reports		運転記録の利用、重要性 運転記録の内容、種類	By the end of this session, the trainees will be able to: 1. Understand the importance of operation report. 2. Keep a record of operational information.
Maintenance Manual	1 0	Contents of Maintenance Manual		メンテナンスマニュアルの内容	Will be able to describe and do the proper maintenance work of the heavy construction machineries.
Periodical Maintenance Work - D7G	3 3	Periodical Maintenance Work		定期メンテナンス作業	By the end of this session, the trainees will be able to: 1. Understand what are written in the Maintenance Manual. 2. Describe and do the proper maintenance work of the Bulldozer, Moter Grader, Wheel Loader, Hydraulic Excavator and Tira Roller according to the Maintenance Manual. 3. Understand the importance of preventive maintenance.
Periodical Maintenance Work - GD611	3 3	Periodical Maintenance Work		定期メンテナンス作業	
Periodical Maintenance Work - 938G	3 3	Periodical Maintenance Work		定期メンテナンス作業	
Periodical Maintenance Work - 320C	3 3	Periodical Maintenance Work		定期メンテナンス作業	
Periodical Maintenance Work - TS200	3 3	Periodical Maintenance Work		定期メンテナンス作業	
Preventive Maintenance	1 0	Some Reminders for Preventive Maintenance		予防整備のための助言	
Operation of Bulldozer	0 6	Operation of Bulldozer		運転操作	Will be able to operate the Bulldozer, Moter Grader, Wheel Loader, Hydraulic Excavator and Tire Roller properly according to the Operational Manual.
Operation of Wheel Loader	0 6	Operation of Wheel Loader		運転操作	
Operation of Hydraulic Excavator	0 6	Operation of Hydraulic Excavator		運転操作	
Operation of Moter Grader	0 6	Operation of Moter Grader		運転操作	
Operation of Roller	0 6	Operation of Roller		運転操作	
Lubricant	3 3	Introduction of Lubricants Engine Oil Classification & Identification of Engine Oil Gear Oil Classification & Identification of Gear Oil Grease		潤滑油について エンジンオイル エンジンオイルの分類 ギヤオイル ギヤオイルの分類 グリース	Will be able to describe the classification and characteristics of the lubricants. By the end of this session, the trainees will be able to: 1. Describe the classification and identification of the engine oil. 2. Describe the classification and identification of the gear oil. 3. Describe the classification and identification of the grease.
Evaluation Test	3 3				

IV Road Construction and Maintenance Supervision Course

1. Summary of Project Operation Schedule

2. Target Group

3. Curriculum

- 3-1 Construction/Maintenance Superintendent I
- 3-2 Construction/Maintenance Superintendent II
- 3-3 Associate Engineer IV
- 3-4 Associate Engineer V
- 3-5 Associate Engineer VI

4. Syllabus

- 4-1 Maintenance Superintendent I
- 4-2 Maintenance Superintendent II
- 4-3 Associate Engineer IV
- 4-4 Associate Engineer V
- 4-5 Associate Engineer VI

Target Group

- Construction / Maintenance Superintendent I
- Construction / Maintenance Superintendent II
- Associate Engineer IV
- Associate Engineer V
- Associate Engineer VI

Construction / Maintenance Superintendent I

	Present			Revised			Remarks
Target of training	Be able to operate at the site			ditto			
Training Capacity	Person/One training course			Person/One training course			
Training Period	Net Days			Net Days			
	Net Hours			Net Hours			
Training times per year	times/year			times/year			
Number of trainees per year (Output)	per year			7 per year			
Entry requirement	ERA's criteria			Diploma or more			
Textbook				In English and are handout			
Language for lecture				English,Amharic			
Course composition (Curriculum)	<i>Construction Inspection</i>		class	site	<i>Road Construction</i>		class site
	Earthwork Inspection				Asphalt road construction		32 20
	Inspection of Untreated Material				Gravel road construction		20 26
	Aggregate Construction Inspection				Structures construction		20
	Asphalt Plant Inspection				Material production		12 20
	Asphalt Concrete Roadway Inspection and Bituminous Treatment				<i>Road Maintenance</i>		
	Minor Drainage Structure Inspection				Asphalt road maintenance		40 12
	Major Drainage Structure Inspection				Gravel road maintenance		20 16
	Soils Testing				Structures maintenance		30 14
	Aggregate Testing				Material production		18
	Cement Testing				<i>Site Management</i>		
	Concrete Testing				Contract Management		9
	Bitumen Testing				Outline of Site Management		9 8
	Testing of Steel and Metals				Construction Method		53 32
	Testing of Miscellaneous Materials				Schedule control		5
	Nuclear Density gauge Operation				Inspection of works		18
	<i>Construction Work Methods</i>				Cost control		5
	Introduction to Construction				Safety control		9
	Construction Mathematics						
	Plan Reading & Specifications						
	Construction Equipment						
	Construction Surveying						
	Excavation						
	Embankment Construction						
	Minor Drainage Structure						
	Construction of Bridges						
	Subgrade Construction						
	Base Construction						
	Quarry Rock and Select Material Production						
	Crusher and Screening Plant Operation						
	Asphalt Plant Operation						
	Asphalt Plant Treatment						
	Asphalt Paving						
	Blasting						
	Roadway Signing and Marking						
	<i>Maintenance Work Methods</i>						
	Maintenance Mathematics						
	Work Site Safety						
	Bituminous Surface Repair						
	Shoulder Maintenance						
	Drainage Maintenance						
	Bridge Maintenance						
	Earth/Gravel Road Maintenance						
	Base Failure Repair						
	Saling Asphalt Surface						
	Sign/Marker Repair						
	Road Course & Material		52	104			360 148

Construction / Maintenance Superintendent II

	Present			Revised			Remarks
Target of training	Be able to operate at the site			ditto			
Training Capacity	Person/One training course			Person/One training course			
Training Period	Net Days			Net Days			
	Net Hours			Net Hours			
Training times per year	times/year			times/year			
Number of trainees per year (Output)	per year			7 per year			
Entry requirement	ERA's criteria			Diploma or more			
Textbook				In English and are handout			
Language for lecture				English,Amharic			
Course composition (Curriculum)	<i>Construction Inspection</i>		class	site	<i>Road Construction</i>		
	Earthwork Inspection				Asphalt road construction	26	14
	Inspection of Untreated Material				Gravel road construction	20	14
	Aggregate Construction Inspection				Structures construction	26	14
	Asphalt Plant Inspection				Material production	26	4
	Asphalt Concrete Roadway inspection and Bituminous Treatment				<i>Road Maintenance</i>		
	Minor Drainage Structure Inspection				Asphalt road maintenance	22	18
	Major Drainage Structure Inspection				Gravel road maintenance	16	4
	Soils Testing				Structures maintenance	16	12
	Aggregate Testing				Material production	34	22
	Cement Testing				<i>Site Management</i>		
	Concrete Testing				Contract Management	9	
	Bitumen Testing				Outline of Site Management	9	10
	Testing of Steel and Metals				Construction Method	57	40
	Testing of Miscellaneous Materials				Schedule control	4	
	Nuclear Density gauge Operation				Inspection of works	18	
	<i>Construction Work Methods</i>				Cost control	4	
	Introduction to Construction				Safety control	9	
	Construction Mathematics						
	Plan Reading & Specifications						
	Construction Equipment						
	Construction Surveying						
	Excavation						
	Embankment Construction						
	Minor Drainage Structure						
	Construction of Bridges						
	Subgrade Construction						
	Base Construction						
	Quarry Rock and Select Material Production						
	Crusher and Screening Plant Operation						
	Asphalt Plant Operation						
	Asphalt Plant Treatment						
	Asphalt Paving						
	Blasting						
	Roadway Signing and Marking						
	<i>Maintenance Work Methods</i>						
	Maintenance Mathematics						
	Work Site Safety						
	Bituminous Surface Repair						
	Shoulder Maintenance						
	Drainage Maintenance						
	Bridge Maintenance						
	Earth/Gravel Road Maintenance						
	Base Failure Repair						
	Salting Asphalt Surface						
	Sign/Marker Repair						
	Road Const. & Material		57	104		296	152

Associate Engineer IV

	Present	Revised	Remarks
Target of training	Be able to operate at the site	ditto	
Training Capacity	Person/One training course	Person/One training course	
Training Period	Net Days	Net Days	
	Net Hours	Net Hours	
Training times per year	times/year	times/year	
Number of trainees per year (Output)	per year	8 per year	
Entry requirement	ERA's criteria	Diploma or more	
Textbook		In English and arc handout	
Language for lecture		English Amharic	
Course composition (Curriculum)	<i>Construction Inspection</i>	<i>Highway Surveying</i>	
	class site	class site	
	Earthwork Inspection	Routing Surveying	33 42
	Inspection of Untreated Material	Construction Surveying	33 42
	Aggregate Construction Inspection	<i>Highway Drafting</i>	
	Asphalt Plant Inspection	Road Design	66 84
	Asphalt Concrete Roadway Inspection and Bituminous Treatment	<i>Construction Supervision</i>	
	Minor Drainage Structure Inspection	Road Maintenance /Construction	38 38
	Major Drainage Structure Inspection	<i>Highway Material Testing</i>	
	Soils Testing	Soil and Construction Materials	66 84
	Aggregate Testing	<i>Site Management</i>	
	Cement Testing	Contract Management	7
	Concrete Testing	Outline of Site Management	7 12
	Bitumen Testing	Construction Method	42 52
	Testing of Steel and Metals	Schedule control	4
	Testing of Miscellaneous Materials	inspection of works	14
	Nuclear Density gauge Operation	Cost control	4
	<i>Construction Work Methods</i>	Safety control	7
	Introduction to Construction		
	Construction Mathematics		
	Plan Reading & Specifications		
	Construction Equipment		
	Construction Surveying		
	Excavation		
	Embankment Construction		
	Minor Drainage Structure		
	Construction of Bridges		
	Subgrade Construction		
	Base Construction		
	Quarry Rock and Select Material Production		
	Crusher and Screening Plant Operation		
	Asphalt Plant Operation		
	Asphalt Plant Treatment		
	Asphalt Paving		
	Blasting		
	Roadway Signing and Marking		
	<i>Maintenance Work Methods</i>		
	Maintenance Mathematics		
	Work Site Safety		
	Bituminous Surface Repair		
	Shoulder Maintenance		
	Drainage Maintenance		
	Bridge Maintenance		
	Earth/Gravel Road Maintenance		
	Base Failure Repair		
	Salting Asphalt Surface		
	Sign/Marker Repair		
	Road Const. & Material		321 354
		52 104	

Associate Engineer V

	Present		Revised		Remarks	
Target of training	Be able to operate at the site		ditto			
Training Capacity	Person/One training course		Person/One training course			
Training Period	Net Days		Net Days			
	Net Hours		Net Hours			
Training times per year	times/year		times/year			
Number of trainees per year (Output)	per year		7 per year			
Entry requirement	ERA's criteria		Diploma or more			
Textbook			In English and are handout			
Language for lecture			English,Amharic			
Course composition (Curriculum)	<i>Construction Inspection</i>	class	site	<i>Highway Surveying</i>	class	site
	Earthwork Inspection			Routing Surveying	74	
	Inspection of Untreated Material			Construction Surveying	42	52
	Aggregate Construction Inspection			<i>Highway Drafting</i>		
	Asphalt Plant Inspection			Road Design	82	30
	Asphalt Concrete Roadway Inspection and Bituminous Treatment			<i>Construction Supervision</i>		
	Minor Drainage Structure Inspection			Road maintenance/Construction	70	42
	Major Drainage Structure Inspection			<i>Highway Material Testing</i>		
	Soils Testing			Material Inspection	28	28
	Aggregate Testing			<i>Site Management</i>		
	Cement Testing			Contract Management	6	
	Concrete Testing			Outline of Site Management	6	7
	Bitumen Testing			Construction Method	38	29
	Testing of Steel and Metals			Schedule control	3	
	Testing of Miscellaneous Materials			Inspection of works	14	
	Nuclear Density gauge Operation			Cost control	3	
	<i>Construction Work Methods</i>			Safety control	6	
	Introduction to Construction					
	Construction Mathematics					
	Plan Reading & Specifications					
	Construction Equipment					
	Construction Surveying					
	Excavation					
	Embankment Construction					
	Minor Drainage Structure					
	Construction of Bridges					
	Subgrade Construction					
	Base Construction					
	Quarry Rock and Select Material Production					
	Crusher and Screening Plant Operation					
	Asphalt Plant Operation					
	Asphalt Plant Treatment					
	Asphalt Paving					
	Blasting					
	Roadway Signing and Marking					
	<i>Maintenance Work Methods</i>					
	Maintenance Mathematics					
	Work Site Safety					
	Bituminous Surface Repair					
	Shoulder Maintenance					
	Drainage Maintenance					
	Bridge Maintenance					
	Earth/Gravel Road Maintenance					
	Base Failure Repair					
	Saline Asphalt Surface					
	Sign/Marker Repair					
	Road Const. & Material	52	104		372	188

Associate Engineer VI

	Present			Revised			Remarks
Target of training	Be able to operate at the site			ditto			
Training Capacity	Person/One training course			Person/One training course			
Training Period	Net Days			Net Days			
	Net Hours			Net Hours			
Training times per year	times/year			times/year			
Number of trainees per year (Output)	per year			8 per year			
Entry requirement	ERA's criteria			Diploma or more			
Textbook				In English and are handout			
Language for lecture				English, Amharic			
Course composition (Curriculum)	<i>Construction Inspection</i>	class	site	<i>Road Surveying and design</i>	class	site	
	Earthwork Inspection			Surveying supervision	60		
	Inspection of Untreated Material			Design supervision	52		
	Aggregate Construction Inspection			<i>Road Construction</i>			
	Asphalt Plant Inspection			Construction supervision	72	40	
	Asphalt Concrete Roadway Inspection and Bituminous Treatment			<i>Material Testing</i>			
	Minor Drainage Structure Inspection			Supervision of material investigation	68	44	
	Major Drainage Structure Inspection			<i>Site Management</i>			
	Soils Testing			<i>Contract Management</i>	6		
	Aggregate Testing			<i>Outline of Site Management</i>	6	6	
	Cement Testing			<i>Construction Method</i>	40	26	
	Concrete Testing			<i>Schedule control</i>	4		
	Bitumen Testing			<i>Inspection of works</i>	14		
	Testing of Steel and Metals			<i>Cost control</i>	4		
	Testing of Miscellaneous Materials			<i>Safety control</i>	6		
	Nuclear Density gauge: Operation						
	<i>Construction Work Methods</i>						
	Introduction to Construction						
	Construction Mathematics						
	Plan Reading & Specifications						
	Construction Equipment						
	Construction Surveying						
	Excavation						
	Embankment Construction						
	Minor Drainage Structure						
	Construction of Bridges						
	Subgrade Construction						
	Base Construction						
	Quarry Rock and Select Material Production						
	Crusher and Screening Plant Operation						
	Asphalt Plant Operation						
	Asphalt Plant Treatment						
	Asphalt Paving						
	Blasting						
	Roadway Signing and Marking						
	<i>Maintenance Work Methods</i>						
	Maintenance Mathematics						
	Work Site Safety						
	Bituminous Surface Repair						
	Shoulder Maintenance						
	Drainage Maintenance						
	Bridge Maintenance						
	Earth/Gravel Road Maintenance						
	Base Failure Repair						
	Saling Asphalt Surface						
	Sign/Marker Repair						
	Food Const & Material	52	104		332	116	

Syllabus

(Construction / Maintenance Superintendent I)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Road Construction</i>							
	Asphalt road construction	32	20	<ul style="list-style-type: none"> · Materials selection & testing · Surveying (alignment) of roads · Supervision & assignment of construction equipment · Preparation of work program 	<ul style="list-style-type: none"> · Introduce asphalt paving operation, equipment, mix, type, alignment, controls, and records. · Mechanisms of work programming and reporting 	<ul style="list-style-type: none"> · Obtain an activity operation supervisor in road construction 	Test
	Gravel road construction	20	26				
	Structures construction	20					
	Material production	12	20				
TOTAL		84	66				
<i>Road Maintenance</i>							
	Asphalt road maintenance	40	12	<ul style="list-style-type: none"> · Asphalt surface base, shoulders drainage repairs · Ditto but gravel road · Bridge maintenance · Coordination of the activities 	<ul style="list-style-type: none"> · Introduce the techniques of road maintenance & bridge. · How to coordinate and supervise maintenance works. · Transfer records and how to plan the execution of works 	<ul style="list-style-type: none"> · Obtain an activity operation supervisor 	Test
	Gravel road maintenance	20	16				
	Structures maintenance	30	14				
	Material production	18					
TOTAL		108	42				

(Construction / Maintenance Superintendent I)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Site Management</i>							
	Contract Management	9			Familiarize contract administration in the road sector	Obtain an activity operation supervisor in road construction	
	Outline of Site Management	9		Explanation of importance of Construction Management			
				3		Site visit	
	Construction Method	53		Explanation of Planning	Understanding about planning	Trainees can understand how to plan the earthwork schedule.	Test
				32	Explanation of how to enter the Checking sheet	Understanding how to enter the checking sheet.	Trainees can use checking sheet by myself
	Schedule control	5		Explanation of schedule control	Understanding about schedule control	Trainees can understand schedule control.	Test
	Inspection of works	18		Explanation of inspection of works	Understanding about inspection of works	Trainees can understand inspection of works	Test
	Cost control	5		Explanation of cost management	Understanding about cost control.	Trainees can understand cost control.	Test
	Safety control	9		Explanation of safety management	Understanding about safety management	Trainees can understand safety control.	Test
TOTAL		108	40				
Grand Total		300	148				

Syllabus

(Construction / Maintenance Superintendent II)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Road Construction</i>							
	Asphalt road construction	26	14	· Coordination & Supervision of Earthwork construction	· Introduce scheduling of material, labor and equipment	· To obtain a highly skilled sub-professional contraction supervisor.	Test Project assignment
	Gravel road construction	20	14	· Same but Asphalt overlay construction	· Introduce soil test results & alternate recommendations		
	Structures construction	26	14	· Same but material production	· How to check the correct interpretation of plans and profiles		
	Material production	26	4	· Same but structure construction	· How to manage material, labor and equipment an operation of a project		
TOTAL		98	46				

(Construction / Maintenance Superintendent II)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Road Maintenance</i>							
	Asphalt road maintenance	22	18	· Coordination and supervision of asphalt road maintenance	· Introduce to directing & planning & control of road maintenance · How to schedule labor, material and equipment utilization · Prioritization of works. · Introduction to management of equipment, material & labor on maintenance activities. · Introduction to safety of work site	skilled sub-professional contraction	Test Project assignment
	Gravel road maintenance	16	4	· Same but gravel road maintenance			
	Structures maintenance	16	12	· Same but drainage structures maintenance			
	Material production	34	22	· Same but material production for maintenance · Soil testing			
TOTAL		88	56				

(Construction / Maintenance Superintendent II)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Site Management</i>							
	Contract Management	9			Familiarize contract administration in the road sector	Obtain an activity operation supervisor in road construction	
	Outline of Site Management	9		Explanation of importance of Construction Management			
				10		Site visit	
	Construction Method	57		Explanation of Planning	Understanding about planning	Trainees can understand how to plan the eathwork schedule.	Test
				40	Explanation of how to enter the Checking sheet	Understanding how to enter the checking sheet.	Trainees can use checking sheet by myself
	Schedule control	4		Explanation of schedule control	Understanding about schedule control	Trainees can understand schedule control.	Test
	Inspection of works	18		Explanation of inspection of works	Understanding about inspection of works	Trainees can understand inspection of work	Test
	Cost control	4		Explanation of cost management	Understanding about cost control.	Trainees can understand cost control.	Test
	Safety control	9		Explanation of safety management	Understanding about safety management	Trainees can understand safety control.	Test
TOTAL		110	50				
Grand Total		296	152				

Syllabus (Associate Engineer IV)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Surveying</i>							
	Routing Surveying	33	42	<ul style="list-style-type: none"> · Route selection ● By photogrammetry ● By flagging & Reconnaissance · Traversing · Topographic survey · Horizontal Alignment · Vertical Alignment · Cross-sections · Drainage survey 	<ul style="list-style-type: none"> · Explain types of Surveying · Explaining hot to propose alternate route corridors · Horizontal curve · Vertical curve · X-Sections · Topography · Photogrammetry interpretation 	<ul style="list-style-type: none"> · Be able to select a route · Prepare surveying data · Coordinate works of party · Calculate necessary elements of curves 	<ul style="list-style-type: none"> Test (theoretical) Test (Practical) Project assignment
	Construction Surveying	33	42	<ul style="list-style-type: none"> · Prepare or Interpret designs drawings and plans (setting out) · Structural plans · Interpret field records ● Transit book ● Grade book ● Level book ● Cross-section ● Drainage 	<ul style="list-style-type: none"> · How to set out based on surveying data. · How to read hard copy (Plan profile x -section) · Staking 	<ul style="list-style-type: none"> · Be able to correctly perform setting out according to surveying data · Be able to sketch the hard copy · Using all instruments to state down on ground · To coordinate 	<ul style="list-style-type: none"> Test (theoretical) Test (practical) Projects assign
TOTAL		66	84				

(Associate Engineer IV)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Drafting</i>							
	Road Design	66	84	· Design a route and prepare a plan, profile and cross-section from surveying data manually or by use of CAD.	· Explain how to design a road (profile) based on road safety design standard	· Be able to select and design a route · Be able to produce a complete road design manually or computer aided	· Test (both practical & theoretical)
				· Photogrammetry	· Train CAD		
				· Plotting in generals (traverse, topography, profile, cross-section etc)	· How to aerial photos / Interpret		
TOTAL		66	84				
<i>Construction Supervision</i>							
	Road Maintenance /Construction	38	38	· Supervision / inspection of road construction	· Explain the major items of the road construction to be reconciled	· Site supervisor · Quality supervisor	· Test (both practical & theoretical)
				· Preparation of bill of quantity	· Method of quality work		
TOTAL		38	38				

(Associate Engineer IV)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Site Management</i>							
	Contract Management	7			Familiarize contract administration in the road sector	Obtain an activity operation supervisor in road construction	
	Outline of Site Management	7		Explanation of importance of Construction Management			
				12		Site visit	
	Construction Method	42		Explanation of Planning	Understanding about planning	Trainees can understand how to plan the earthwork schedule.	Test
				52	Explanation of how to enter the Checking sheet	Understanding how to enter the checking sheet.	Trainees can use checking sheet by myself
	Schedule control	4		Explanation of schedule control	Understanding about schedule control	Trainees can understand schedule control.	Test
	Inspection of works	14		Explanation of inspection of works	Understanding about inspection of works	Trainees can understand inspection of works	Test
	Cost control	4		Explanation of cost management	Understanding about cost control.	Trainees can understand cost control.	Test
	Safety control	7		Explanation of safety management	Understanding about safety management	Trainees can understand safety control.	Test
TOTAL		85	64				
Grand Total		321	354				

(Associate Engineer IV)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Material Testing</i>							
	Soil and Construction Materials	66	84	<ul style="list-style-type: none"> · Properties · Application · Testing · Writing specification · Inspection of works 	<ul style="list-style-type: none"> · Explain properties of soils · Explain applications of soils & materials · Explain uses of tests & conduct · Clarify how to write specifications 	<ul style="list-style-type: none"> · Familiarized with the property of soils · Same but applications · Plot necessary graphs of test results · Be able to carry out various types of tests · Supervise the works of subordinates 	<ul style="list-style-type: none"> · Test (both practical & theoretical)
TOTAL		66	84				

Syllabus (Associate Engineer V)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Surveying</i>							
	Routing Surveying	32		Coordination of route surveying (Design, control, alignment, etc)	<ul style="list-style-type: none"> ● Transit ● Level ● Total station works ● How to evaluate works of route surveying (data collection) 	Route surveying Coordination Supervision of surveying work	Test
		21		Supervise Surveying works (topography, traversing leveling, etc)			
		21		Summarize reports & data			
	Construction Surveying	42	52	Highway plans	<ul style="list-style-type: none"> Clarify how to realize works Make clear how to coordinate the works Exercise examples Execute model projects 	Be an assistant engineer in construction surveying To obtain a surveying coordinator in the field	Test
				Structural Plans			
				Field records (transit, level, grade, x-section books etc)			
				Surveying operation			
				Structure staking			
				Computations			
TOTAL		116	52				

(Associate Engineer V)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Drafting</i>							
	Road Design			· Coordination of road design works manually or by CAD	· Based on a standard specification perform design of a road. (Speed, lane width, shoulder, slopes, sight distance, etc)	Road design and drafting coordinator	Test
		30	30				
		22		· Supervision or inspection or road design works	· How to check the correctness of designs	Road design works inspector or supervisor	
		30		· Designs of curves super elevation, widening, etc			
TOTAL		82	30				
<i>Construction Supervision</i>							
	Road maintenance/Construction			· Supervision of works (Overview of earthwork operation, Asphalt, structure, etc.	· Checking road alignment, proper material usage	Supervision of works	· Test
		12					
		12	18	· Quantity surveying	· Quality control	Inspector of works	· Practical
		12	12	· Preparation of work programs	· Checking work progress	Assistant Engineer	· Assignment
		12	12	· Preparation or reports	· Taking measurements		
		22					
TOTAL		70	42				

(Associate Engineer V)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Site Management</i>							
	Contract Management	6			Familiarize contract administration in the road sector	Obtain an activity operation supervisor in road construction	
	Outline of Site Management	6		Explanation of importance of Construction Management			
				7		Site visit	
	Construction Method	38		Explanation of Planning	Understanding about planning	Trainees can understand how to plan the earthwork	Test
				29	Explanation of how to enter the Checking sheet	Understanding how to enter the checking sheet.	Trainees can use checking sheet by myself
	Schedule control	3		Explanation of schedule control	Understanding about schedule control	Trainees can understand schedule	Test
	Inspection of works	14		Explanation of inspection of works	Understanding about inspection of works	Trainees can understand	Test
	Cost control	3		Explanation of cost management	Understanding about cost control.	Trainees can understand cost	Test
	Safety control	6		Explanation of safety management	Understanding about safety management	Trainees can understand safety	Test
	TOTAL	76	36				
	Grand Total	372	188				

(Associate Engineer V)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Highway Material Testing</i>							
	Material Inspection	28	28	· Coordination of lab testing	· Analyze test results	· Lab supervisor	Test (both practical & theoretical)
				· Inspection of field construction works	· Reconcile test results with standards & give recommendations	· Material inspector	
				· Soil investigation on old or new roads	· Prepare reports and manuals on materials	· Assistant expert	
					· How to make a soil infestation		
TOTAL		28	28				

Syllabus

(Associate Engineer VI)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Road Surveying and design</i>							
	Surveying supervision	60		<ul style="list-style-type: none"> · Route surveying supervision · Construction surveying supervision 	<ul style="list-style-type: none"> ● How to coordinate and lead surveying works 	<ul style="list-style-type: none"> · To Obtain a road surveying & design group leader 	Test
	Design supervision	52		<ul style="list-style-type: none"> · Supervision of design of roads · Photogrammetry · CAD supervision 	<ul style="list-style-type: none"> ● How to coordinate and lead road design works 		
TOTAL		112	0				
<i>Road Construction</i>							
	Construction supervision	72	40	<ul style="list-style-type: none"> · Asphalt road contraction ● Planning ● Programming · Gravel road constriction ● Planning ● Programming 	<ul style="list-style-type: none"> · Explain techniques of planning and programming of a road construction · Ditto but for gravel road 	<ul style="list-style-type: none"> · To obtain a contraction supervisor 	Test
TOTAL		72	40				

(Associate Engineer VI)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Site Management</i>							
	Contract Management	6			Familiarize contract administration in the road sector	Obtain an activity operation supervisor in road construction	
	Outline of Site Management	6		Explanation of importance of Construction Management			
				6		Site visit	
	Construction Method	40		Explanation of Planning	Understanding about planning	Trainees can understand how to plan the eathwork schedule.	Test
				26	Explanation of how to enter the Checking sheet	Understanding how to enter the checking sheet.	Trainees can use checking sheet by myself
	Schedule control	4		Explanation of schedule control	Understanding about schedule control	Trainees can understand schedule control.	Test
	Inspection of works	14		Explanation of inspection of works	Understanding about inspection of works	Trainees can understand inspection of works	Test
	Cost control	4		Explanation of cost management	Understanding about cost control.	Trainees can understand cost control.	Test
	Safety control	6		Explanation of safety management	Understanding about safety management	Trainees can understand safety control.	Test
TOTAL		80	32				
Grand Total		332	116				

(Associate Engineer VI)

Item	Subject	Hours		Sub-subject	Contents of training	Training Goal	How to evaluate
		Lecture	Practice				
<i>Material Testing</i>							
	Supervision of material investigation	68	44	Exploration of materials	Train how to make a study on construction soils leading a group	Expert in soil investigation Inspector of works	Test
				Material Testing	How to provide re commendations on test results and lead material researches	To obtain lab expert	
TOTAL		68	44				

ANNEX VII JOINT COORDINATING COMMITTEE (JCC)

1. Functions

JCC will meet at least once a year or whenever the necessity arises in order to fulfill the following functions:

- (1) To formulate the annual work plan of the Project;
- (2) To review the progress of the annual work plan;
- (3) To review and exchange opinions on major issues that may arise during the implementation of the Project;
- (4) To discuss any other issue(s) pertinent to the smooth implementation of the Project.

2. Composition

(1) Chairperson: General Manager of the Ethiopian Roads Authority

(2) Members of the Ethiopian side:

Representative of;

- Ministry of Economic Development & Cooperation,
- Ethiopian Roads Authority,
- The private road construction companies, and equipment dealers,
- Other personnel to be designated by the chairperson, if necessary.

(3) Members of the Japanese side:

- Chief Advisor,
- Coordinator,
- Experts,
- Representative(s) of the JICA Ethiopia Office,
- Other personnel concerned, to be assigned by JICA, if necessary.

Note: Official(s) of the Embassy of Japan in the Federal Democratic Republic of Ethiopia may attend as observer(s)

