2．ミニッツ（Project Documentを含む）

MINUTES OF MEETING
BETWEEN
THE JAPANESE PROJECT DESIGN TEAM
AND
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPA
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT FOR CAPACITY BUILDING
OF
THE ALEMGENA TRAINING AND TESTING CENTER OF ERA

The Japanese Project Design Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Junsaku KOIZUMI visited the Federal Democratic Republic of Ethiopia from September 20 to September 27, 2001, for the purpose of working out the details of the technical cooperation program concerning the Project for Capacity Building of the Alemgena Training and Testing Center of ERA (hereinafter referred to as "the Project") in the Federal Democratic Republic of Ethiopia.

During its stay in the Federal Democratic Republic of Ethiopia, the Team exchanged views and had a series of discussions with the Ethiopian authorities concerned.

As a result of the discussions, the Team and the Ethiopian authorities concerned agreed to summarize the matters referred to in the document attached hereto as a supplement to the Record of Discussions.

Addis Ababa, September 26, 2001

Mr. Junsaku KOIZUMI
Leader,
Project Design Team
Japan International Cooperation Agency
Japan

Mr. Tesfamichael Nahusenay
General Manager,
Ethiopian Roads Authority (ERA)
The Federal Democratic Republic of
Ethiopia

THE ATTACHED DOCUMENT

I. LIST OF PARTICIPANTS

The discussions between the Team and Ethiopian authorities concerned were held in Addis Ababa with participants in Annex I.

II. MASTER PLAN AND PROJECT DOCUMENTS

Both the Team and Ethiopian side agreed the Master Plan in Annex I of the Record of Discussion. The Team explained also that a Project Document as shown in **Appendix I** together with a Project Design Matrix (See **Annex 10 of the Project Document**) is commonly used in Japanese technical cooperation in order to manage and implement projects efficiently and effectively. It will also be used as a reference for monitoring and evaluating the Project.

As a result of the discussions, both sides agreed to apply the Project Document and the Project Design Matrix to the Project with the following understandings:

1. The Project Design Matrix is a logically designed matrix which defines the initial understanding of the framework of technical cooperation for the Project and indicates the logical steps toward the achievement of the Project purpose.

2. The Project Document together with the Project Design Matrix are to be flexibly revised according to the progress and achievements of the Project, upon agreement on the Joint Coordinating Committee.

III. INPUT TO THE PROJECT BY THE JAPANESE SIDE

1. Dispatch of Japanese Experts

Both the Team and Ethiopian side confirmed that the official request form, namely the A-1 form, to assign Japanese long-term and short-term experts for the term of technical cooperation will be submitted by the Ethiopian side as soon as possible.

Dispatch of the following Japanese long-term experts is mentioned in Annex II of the Record of Discussion. (Dispatch plan is shown in Tentative Plan of Operation at **Annex 11 of the Project Document**)

(1) Chief advisor
(2) Coordinator
(3) Road construction equipment management and operation
(4) Road construction equipment mechanics
(5) Road construction and maintenance supervision of mechanized construction method

Short-term experts will be dispatched from time to time as the necessity arises for the effective implementation of the Project.

2. Provision of Machinery and Equipment

The detailed list of main equipment that is necessary to implement the Project is shown in the **Annex II.**

Both the Team and the Ethiopian sides confirmed that the official request form, namely the A-4 form, for provision of equipment will be submitted by the Ethiopian side **by end September 2001**.

The Equipment will be delivered by the Japanese side to the Ethiopian Side on C.I.F at the Alemgena Training and Testing Center.

3. Training of Ethiopian Counterpart in Japan

Both the Team and the Ethiopian side confirmed that the relevant request forms, namely the A-2&A-3 forms, for the technical training of the Ethiopian counterpart personnel in Japan for this year will be submitted by the Ethiopian side as soon as possible after signing of R/D.

IV. INPUT TO THE PROJECT BY ETHIOPIAN SIDE

1. Assignment of Personnel

(1) With reference to Item 6 (1), Article III of the Record of Discussions, the Ethiopian side agreed that an appropriate number of full-time counterpart personnel as well as administrative personnel would be assigned to the Project.

(2) With reference to Item 6 (4), Article III of the Record of Discussion, the Ethiopians side explained difficulties in provisions for the item at its own cost. Both the Team and Ethiopian side discussed it and agreed to change and add phrases as follows.

"Means of transport and travel allowances as per Ethiopian Roads Authority's standard for the Japanese experts for official travel inside the Federal Democratic Republic of Ethiopia within the budget available for the Ethiopian side."

(3) With reference to Item 6 (5), Article III of the Record of Discussion, the Ethiopians side explained difficulties in provisions for the item at its own cost. Both the Team and Ethiopian side discussed it and agreed to change and add phrases as follows.

"Suitable furnished accommodation for the Japanese experts and their families, if requested by them, within the budget available for the Ethiopian side."

(4) With reference to Item 7 (3), Article III of the Record of Discussion, the Ethiopian side requested to clarify it, and the Team explained by referring to the Item 2(1), below mentioned, Article IV of the Minutes of Meeting. Both the Team and Ethiopian side understood it.

(5) With reference to Article VI of the Record of Discussion, the Ethiopian side requested to clarify it. The Team explained it and both the Team and Ethiopian side agreed it.

(6) With reference to Item 3 of Annex IV of the Record of Discussion, the Ethiopian side requested to clarify it. Both the Team and Ethiopian side agreed to add a phrase as follows.

"use all available means to facilitate medical and other necessary assistance to the Japanese experts and their families, equivalent to that of the Ethiopian civil servants and if requested by them."

(7) With reference to Item 6 of Annex IV of the Record of Discussion, the Ethiopian side requested to clarify it. Both the Team and Ethiopian side agreed to add the following sentence.

"The equipment and machinery will be personal belongs such as personal use computers, personal use of tools for technical transfer, personal engineering books and materials, but not limited, and so on."

2. Allocation of Budget

(1) The Ethiopian side will allocate the necessary annual budget throughout the Project for running costs. These include salaries and allowances for the Ethiopian counterpart and support service staff, fuels, oils and lubricant, stationary and office supplies, janitorial supplies, medical supplies, contractual services such as water supply, electric light and communication, and maintenance materials and supplies. By doing this Ethiopian side will also bear the operating costs of constructing roads at on-the-job training site near Alemgena.

The Project Manager will establish financial and account management system to prepare a balance sheet and a cash flow sheet of the Alemgena Training and Testing Center in collaboration of the Japanese experts. The balance sheet and the cash flow sheet will be presented and approved at the Joint Coordinating Committee.

(2) The Ethiopian side agreed that it will take necessary measures, in coordination with the relevant authorities, for the passage through customs of the equipment provided by the Government of Japan without delay. Ethiopian Roads Authority will be

responsible for the proper documentation and clearance of the delivered equipment at the port of entry or any other relevant places, as well as be responsible for the proper administration of the equipment provided for use while ensuring appropriate utilization and maintenance for the implementation of the Project.

V. TRAINING COURSES

The both sides confirmed the Plan of the Tentative Training Courses as shown in **Annex 9 of the Project Document.**

VI. TENTATIVE SCHEDULE OF IMPLEMENTATION

A Tentative Schedule of Implementation is shown in **Annex 7 of the Project Document.** The Tentative Schedule of Implementation is subject to change within the scope of the Record of Discussions, when necessity arises, in the course of project implementation.

VII. PLAN OF OPERATION

A Plan of Operation has been tentatively formulated according to the Record of Discussions. The Tentative Plan of Operation for the whole period of the Project is shown in **Annex 11 of the Project Document.** The Annual Plan of Operation is to be drafted by both the Ethiopian counterparts and the Japanese experts, and is to be submitted to the Joint Coordinating Committee. The activities are subject to change within the scope of the Record of Discussions, if necessity arises, in the course of Project implementation.

VIII. ADMINISTRATION OF THE PROJECT

1. With reference to Article IV of the Record of Discussions, both the Team and the Ethiopian side agreed that under the overall responsibility of the Project Director, coordination of administration and implementation of the Project would be carried out by consultation of both the Ethiopian side and the Japanese side.

2. Both sides will establish a Joint Coordinating Committee (JCC) for the effective and successful implementation of the Project. JCC will be held at least once a year or whenever the necessity arises. The Tentative Organization Chart of the Project is given in **Annex 16 of the Project Document.**

3. With reference to Item 2 of Annex VII of the Record of Discussion, the Ethiopian side requested to clarify the members of representatives of ERA, and both the Team and Ethiopian side agreed it as follows.

" (1) Chairperson: GM of ERA or his delegate among out of the following member of ERA

(2) Member of ERA

- Deputy General Manager, Human Resource and Financial Department
- Deputy General Manager, Operation Department
- Deputy General Manager, Engineering and Regulation Department
- Technical Advisor to the General Manager
- Manager, Human Resource Development Division
- Manager, Planning and Programming Division
- Chief, Alemgana Training and Testing Branch
- Chief, Manpower Planning and Training Coordination Branch
- Chief, Organization and Methods Branch"

3. An Executing Committee will be established under the Joint Coordinating Committee at the Alemgena Training &Testing Center with Alemgena Training and Testing Branch Chief, the experts and the counterparts, and additional members if necessary, and held monthly and whenever necessity arises in order to facilitate smooth implementation of the Project.

LIST OF ANNEX

Annex I

Ethiopia Side	
Ethiopian Roads Authority (hereinafter referred to as "ERA")	
Tesfamichael Nahusenay	General Manager
Gelaso Bore	Deputy General Manager, Human Resource and Financial Department
Tibebu Eshete	Deputy General Manager, Engineering & Regulation Department
Semaegzier Berhane	Deputy General Manager, Engineering & Regulation Department
Fekade Haile	Technical Advisor to the G.M.
Zaid Wolde Gebriel	Manager, Planning & Programming Division
Aremu Kebebe	Manager, Human Resource Division
Tsegaye W/Gebriel	Chief, Manpower Planning and Training Coordination Branch
Bacha Gemeda	Chief, Organization & Methods Branch
ERA Training and Testing Center Alemgena (hereinafter referred to as "Alemgena TTC")	
Hailu Chekun	Head of Alemgena TTC
Japanese Side	
The Team	
Junsaku Koizumi	Leader: Special Technical Advisor, JICA
Hiroshi Matsuura	Training Planning: Director for Promotion of Construction Mechanization, Construction Planning Division, Policy Bureau, Ministry of Land, Infrastructure and Transport (MLIT)
Akira Watanabe	Road Construction Machinery: Chief, Construction Machinery Equipment of Road Division, Kinki Regional Development Bureau, MLIT
Satoshi Amano	Cooperation Planning: Staff, 2nd Technical Cooperation Division, Social Development Cooperation Dept, JICA
Toshinori Toda	Analysis of Project Efficiency: General Manager, International Division, Construction Project Consultants, Inc. (CPC)
JICA Office in Addis Ababa	
Yoshinori EBATA	Resident Representative
Yujirou YABE	Assistant Resident Representative
Yeshitila Amare	Head of Technical Cooperation Division

Annex II Equipment List

Annex II

Major Equipment List

Type	Specification	Q'ty	Availability (Refer to Footnote)	Procurement (Japan or Ethiopia)
Bulldozer	20t 200PS	1	P	Japan
	(Cat. :D7G)	1	U	Ethiopia
Motor Grader	Blade Length 3.7m	2	P	Japan
	(KOMATSU:GD611A)	1	U	Ethiopia
Wheel Loader	Bucket Capacity: 1.8~2.5m3	1	P	Japan
	Bucket Capacity: 2.7~3.1m3	1	P	Japan
Excavator (Wheel Type)	Bucket Capacity: 0.3~0.4m3	1	P	Japan
Excavator Crawler Type)	Bucket Capacity: 0.7~0.8m3	1	P	Japan
Vibration Roller	(BOMAG: BW161)	1	U	Ethiopia
Tire Roller	Operating Weight: 8~10t	1	P	Japan
Dump Truck	Payload: 9~10t	1	P	Japan
	(Nissan: CW450)	2	U	Ethiopia
Water Tanker	Tank Capacity: 10000lit	1	P	Japan
	(Nissan: Tank Capacity : 30000lit)	1	U	Ethiopia
Asphalt Distributor	Tank Capacity: 6000lit	1	P	Japan
Tip Spreader	For 10t Truck	1	P	Japan
Crane Truck	Max. Load: 20~25t	1	P	Japan
Car	4 Wheel Drive	2	P	Japan
Spare parts	Lumps sum	1	P	Japan
Repare machines & Tools	Lumps sum	1	P	Japan
Testing machines and Tools	Lumps sum	1	P	Japan
Training and Teaching Aids	Lumps sum	1	P	Japan
(NOTE) P: To be procured U: Existing and to be used. R: Existing but not to be used.				

Tentative List of Equipment (Equipment for Maintenance, Laboratory and Training)

No.	Description	Main Specifications	Q'ty
	1. WORKSHOP EQUIPMENT		
	1-1 CHASSIS WORKSHOP		
1	Sling Chain Kit with Cart		1
2	Sling Wire Rope Kit		1
3	Portable Hydraulic Jack	Capacity : 30 Ton	2
4	Portable Hydraulic Jack	Capacity : 50 Ton	1
5	Parts Rack	Dimensions: 1850x500x1800mm	2
6	Parts Wagon	with caster and 4 shelves	1
7	Tool Tray, with Handles	405x250mm	2
8	Tool Tray	600x450mm	2
9	Tray Hanger		2
10	Mechanic Tool Set	for Construction Machine	2
11	Tool Cabinet	Dimensions: 740x400x840mm	2
12	Hydraulic Garage Jack	Capacity : 10 Ton	2
13	Hydraulic Garage Jack	Capacity : 5 Ton	1
14	Portable Lubricator	Air Operated for hydraulic oil	1
15	Portable Lubricator	Air Operated for grease	1
16	Transmission Jack (standard)	Capacity: 1800kg	1
17	Brake Honing Head	16-38mm (dia.)	1
18	Transmission Jack (standard)	Capacity: 1,200kg	1
19	Differencial Gear Jack	Capacity: 600kg	1
20	Clutch Aligner	Bearing guide: 15-30mm (6pcs)	1
21	Transmission Bearing Puller	Used for truck	1
22	Wheel Bearing Puller for Truck	Capacity: 140-170mm	1
23	Rigid Rack	Capacity: 10 Ton	4
24	Mobile Work Bench (Wood Cover)	1,000x600x700mm	2
25	Engineers Vise	Jaw width: 127 mm	2
26	Portable Gantry Crane	NT-0701 : H 4052mm	1
	1-2 ENGINE WORKSHOP		
1	Hydraulic Shop Press	Capacity: 50 ton w/hydraulic hand pump	1
2	Work Bench with Cabinet and Locker	1800 x 800 x 700 mm	1
3	Machinists Vise, Swivel Type	Jaw width: 128mm	1
4	Bench Electric Grinder	Wheel size: 205 mm	1
5	Grinding Wheel (#36)	205 x 19 x 15.88 mm	2
6	Grinding Wheel (#60)	205 x 19 x 15.88 mm	2
7	Hand Truck	Load capacity: 300 kg	1
8	Bench Drill Press	Capacity: 13 mm	1
9	Straight Shank Twist Drill Set	1-13 mm	1
10	Drill Chuck & Handle	Capacity: 13 mm dia.	1
11	Drill Drift		1
12	Dril Press Vise	Jaw width: 110 mm	1
13	Engine Positioner, Electric Type	Service capacity: 3,000 kg	1
14	Bracket for Diesel Engine	For 200ps class diesel engine	1
15	Bracket for Diesel Engine	For 200ps class diesel engine	1
16	Cylinder Gauge (Bore Gauge)	Range: 35 - 80 mm	2
17	Cylinder Gauge (Bore Gauge)	Range: 50 - 150 mm	2
18	Outside Micrometer Caliper Set	Range: 0 - 150 mm (0.01mm)	1
19	Piston Feeler Gauge	0.05 - 0.38 mm (8 leaves)	2
20	Piston Ring Tool	83 - 135 mm	2
21	Piston Ring Compressor	Capacity: 50 - 125 mm	2
22	Piston Heater (Bearing Heater)	Power: AC 1ph, 3 kW	1
23	Connecting Rod Aligner	Connecting rod bearing: 30 - 75 mm	1
24	Tool Cabinet	Dimensions: 740x400x840mm	1
25	Mechanic Tool Set	For Construction Wquipment	7
26	Cylinder Head Hydraulic Test Stand	Pump: 5-10kg/cm2	1
27	Dial Indicator	Range: 0-5 mm	2
28	Magnetic Base (Standard type)	Holding Power:800N	2
29	Parts Washer	Heater: 6 kW, Motor: 0.75kW	1
30	Valve Spring Tools	Length: 390 mm	1
31	Connecting Rod Aligner	Connecting rod bearing dia. : 80-120mm	1
32	Diesel Compression Gauge	Gauge: 70kg/cm2	1
33	Cylinder Liner Puller	Cap. : 82-150mm	1
34	Piston Ring Compressor	Capacity: 75-175mm	1
35	Mobile Floor Crane	Capacity: 1 ton	1
36	Diesel Fuel Pump Injection Tester	Pump applcatins : 8	1
	1-3 HYDRAULIC SYSTEM WORKSHOP		
1	Mechanic Tool Set	For Construction Machine	4
2	Tool Cabinet	Dimensions: 740x400x840mm	4
3	Hydraulic Test Gauge Set		4

No.	Description	Main Specifications	Q'ty
	1-4 TRANSMISSION WORKSHOP		
1	Engine Positioner	Service capacity. : 2000kg	1
2	Bracket for Torque Flow	For construction equipment	1
3	Bracket for Direct		1
4	Bracket for Torque Converter	For construction equipment	1
5	Bracket for Torque Flow	For construction equipment	1
6	Bracket for Control Valve	For construction equipment	1
7	Bracket for Steering Control	For construction equipment	1
8	Bracket for Hyd. Pump	For construction equipment	1
9	Mechanic Tool Set	For Construction Machine	2
10	Tool Cabinet	Dimensions: 740x400x840mm	1
11	Parts Rack	Dimensions: 1850x500x1800mm	1
12	Parts Wagon	Heavy duty type, 1500x800x1500 mm	1
13	Tool Tray, with Handles	415x250x90mm	2
14	Tool Tray, 600 x 450 x 150 mm	600x450x150mm	2
15	Tray Hanger	900x350x1290mm	1
16	Work Bench	LxWxH : 1800x750x740	1
17	Surface Plate	500x750x100mm	1
18	Air Hose Reel	Hose size: 9.0mm (I.D) x 10m	1
19	Air Blow Gun		1
20	Mobile Floor Crane	NT-0762: 1.5t~2 t	1
	1-5 UNDERCARRIAGE WORKSHOP		
1	Roller & Idler Press	Capacity: 100 ton	1
2	Sizing Disc	3 kinds/set	1
3	Bushing Assembly Tool	For 200ps class Bulldozer	1
4	Snap Ring Remover		1
5	Floating Seal Tester	Air pressure type	1
6	Volume Pump	Capacity : 15 liter	1
7	Lubricating Nozzle	3 kinds/set	1
8	Roller Hanger	For track rollers	1
9	Front Idler Hanger	For front idlers	1
10	Covevor Stand for Roller Line	3 Conveyors	1
	1-6 TIRE WORKSHOP		
1	Hydraulic Tire Removing Tool	Tire size:OR Tire 24.00-35.00	1
2	Thermopress	For passenger car to truck	1
3	Tire Pressure Gauge, Bar Type	Capacity: 11kg/cm2	2
4	Air Chuck	Overall length: 180mm	2
5	Air Chuck (Jumbo)	For Jumbo Valve	2
6	Tire Lever, L=760mm Forcing iron	For OR Tire	2
7	Tire Lever, L=760mm Swan neck iron	For OR Tire	2
8	Tire Lever, L=760mm Lock ring iron	For OR Tire	2
9	Tire Service Tool Set	Set contents of 14 pcs. Tire tools	2
10	Tire Bead Remover, length 1.6m	Length 1.6m	2
11	Tube Vulcanizer Set	Capacity: 500W	1
12	Cold Patch for Tube Repair	Patch size: 37mm dia.	2
13	Cold Patch for Tube Repair	Patch size: 45mm dia.	2
14	Cold Patch for Tube Repair	Patch size: 54mm dia.	2
15	Tool Locker	1100x450x800mm	1
16	Air Compressor	2.2kW, Single stage	1
	1-7 WELDING AND FABRICATION WORKSHOP		
1	AC Arc Welder	Secondary current range: 40-400A	2
2	Welding Shield	Hand holding type	2
3	Secondary Cord 10 m	Section 60mm2, Electrode ϕ3.2~8mm	1
4	Safety Holder	Capacity: 500 A	1
5	Earth Clip	Capacity: 500 A	1
6	Double-End Chipping Hammer	Capacity: 500 A	1
7	Leather Glove	Long type	1
8	Grounding Cable	10m	1
9	Gas Welder Set	Including welding, cutting torches, etc.	4
10	Tip for Cutting	50 pcs./set, capacity, 3-13mm	1
11	Tip for Welding	50 pcs./set, capacity, 3-13mm	1
12	Cast Iron Swage Block	Dimensions: 315x315x115mm	1
13	Screw Clamp (C Type)	100mm	2
14	Double-Face Sledge Hammer	Weight: 4.5kg (10LB)	1
15	Double-Face Sledge Hammer	Weight: 1.3kg (3LB)	1
16	Air Hose Reel	Hose size: 9.0mm (I.D) x 10m	1
17	Air Blow Gun	Overall Length 234mm	1
18	DC Arc Welder	Welding current range: 50~600A or 15~500A	1
19	Spot Welding Machine	Capability: Single sided:1.6m, Double sided:6	1
20	Portable Grinder	Power input: 570W	2
21	Electric Impact Drill	Power input: 380W	2
22	Welding&Cutting Outfit	RJ-1402	2
23	Bench Drill Press	Power input: 200W	1
24	Hand Lever Shear	SU-1805	1
25	Hand Bending Machine	SU-1818	1
26	Hand Riveter	Overall Length:330mm	1

No.	Description	Main Specifications	Q'ty
25	Open End Wrench, Double Head	32x36mm	2
26	Open End Wrench, Double Head	41x46mm	2
27	Open End Wrench, Double Head	46x50mm	2
28	Open End Wrench, Single Head	30mm	2
29	Open End Wrench, Single Head	32mm	2
30	Open End Wrench, Single Head	35mm	2
31	Open End Wrench, Single Head	36mm	2
32	Open End Wrench, Single Head	38mm	2
33	Open End Wrench, Single Head	41mm	2
34	Open End Wrench, Single Head	46mm	2
35	Open End Wrench, Single Head	50mm	2
36	Open End Wrench, Single Head	54mm	2
37	Open End Wrench, Single Head	55mm	2
38	Open End Wrench, Single Head	58mm	2
39	Open End Wrench, Single Head	60mm	2
40	Screw Plate Set	NF(SAE) size	1
41	Pipe Taps (1/8" - 1")		1
42	Pipe Die (1/8" - 1")		1
43	Bearing & Gear Puller Set	For Construction Machine	1
44	Air Impact Wrench (3/4" sq.)		1
45	Socket for Impact Wrench	(3/4"sq.) 22mm	1
46	Socket for Impact Wrench	(3/4"sq.) 24mm	1
47	Socket for Impact Wrench	(3/4"sq.) 26mm	1
48	Socket for Impact Wrench	(3/4"sq.) 27mm	1
49	Socket for Impact Wrench	(3/4"sq.) 30mm	1
50	Socket for Impact Wrench	(3/4"sq.) 32mm	1
51	Socket for Impact Wrench	(3/4"sq.) 35mm	1
52	Socket for Impact Wrench	(3/4"sq.) 36mm	1
53	Electric Drill	Drilling capacity: 13mm dia.	1
54	Electric Drill	Drilling capacity: 25mm dia.	1
55	Straight Shank Twist Drill Set	1-13 mm, 0.5 mm	1
56	Morse Taper Shank Twist Drill	14-25 mm	1
57	Electric Hand Grinder	Grinding wheel: Max. 32 mm dia.	2
58	Disc Sander	Capacity: 100 mm dia.	1
59	Chain Block	Capacity: 1 ton	1
60	Puller (short travel)	Capacity : 50 ton	1
61	Puller (short travel)	Capacity : 30 ton	1
62	Oil Filter Wrench	Band type	1
63	Adjustable Wrench, GiantType	Opening: 69.6-120.6mm	1
64	Adjustable Wrench, Giant Type	Opening: 38.1-76.2mm	1
65	Stud Remover	13mm dia.	1
66	Handle Adapter 1/4"(F)x3/8"(M)		1
67	Handle Adapter 3/8"(F)x1/4"(M)		1
68	Bolt Cliper	Cutting cap. 7mm dia.	1
69	Bolt Cliper	Cutting cap. 18mm dia.	1
	2. ROAD MAINTENANCE COURSE		
	2-1 ROAD MAINTENANCE EQUIPMENT		
1	Vibration Compactor	MDR-9D 8.5ps 950kg	1
2	Concrete Cuter	MCD-1UB 10~12"	1
3	Asphalt Sprayer	AS-6 30L/min. 3.5ps	1
4	Asphalt Kettle	AK-2 200L	1
5	Cutting Blade	Asphalt/Concrete	1
7	Core Picking Machine	TA-342 ϕ100mm with 5Edges	1
	2-2 SOIL TESTING EQUIPMENT		
1	Motorizes Liquid Limit Set	TS-117	1
2	Electric Scale	HP-20k The amount of balance:21kg. Minimum indication.:0.1g	1
3	Soil Analysis Sieves Set	TS-114b	1
4	Consolidation Test Apparatus	TS-422-3a	1
5	Direct Shear Test Apparatus	TS-132	1
6	Triaxial Test Apparatus	TS-55i	1
7	Permeability Test Apparatus	TS-110c	1
8	Shrinkage Limit Apparatus	TS-159	1
9	Mechanical Analysis (Hydrometer)	TS-115, G-11, G-12, TS-173, TS-114b	1
10	Flakiness (Aggregate) Apparatus	TC-260	1

No.	Description	Main Specifications	Q'ty
	1-8 ELECTRICAL SYSTEM WORKSHOP		
1	Starter Generator Test Bench	Motor: 3.7kw	1
2	Circuit Tester	Sensitivity:40μA, 20kΩ/V DC, 8kΩ/V AC	2
3	Armature Tester	No-load: 3.5A, Load: 1.4A	2
4	Regulator Tester	Ampere: -6 - 0 60 A	2
5	Insulation Tester	Capacity (DC): 500V/1000 m Ohm	2
6	Motor Puller Set	Including bearing	2
7	Work Bench	LxWxH : 1800x750x740	1
8	Engineers Vise	Jaw Width: 127 mm	2
9	Tool Cabinet	3 draers and 1 shelf	2
10	Electric Soldering Iron, 200W	200W	5
11	Electric Soldering Iron 100 W	100W	5
12	Thread Type Solder with Flux	1kg, 1.0mm dia.	10
13	Thread Type Solder with Flux	1kg/can, 1.0mm dia.	10
14	Electric Cord Reel	Cord Length: 30 m	2
15	Solderless Terminal Kit		2
16	Head Light Tester	Max. scale: 40.000 Candela	1
	1-9 BATTERY ROOM		
1	Hand Truck	Dimensions: 900x600mm(LXW)	2
2	Silicon Quick Charger	AC Input: 3PH, 6.5Kva	2
3	Battery Tester	Applicable:12V/18-200Ah	2
4	Battery Filler, 4 liter	4 liter	2
5	Battry Syringe	Size:275×75mm, Mass: 100g	4
6	Combination Wrench, 30mm	30mm	3
7	Battery Charging Cable,50A	50 A	2
8	Booster Cable, Capacity 200A	Capacity: 200A	5
9	Battery Hydrometer Set		3
10	Parts Rack		1
11	Water Purifier	Normal flow rate: 25 liter/h	1
12	Booster Cable	Capacity: 100A	4
13	Polyethylene Funnel,175mm dia.	175mm dia.	4
14	Polyethylene Measure, 2 liter	2 liter	4
15	Battery Caddy	Output voltage:12&24	2
	1-10 CLEANING AREA		
1	Hot Water High Pressure Washer	Water Discharge:1600 Lit./h	1
2	Steam Cleaner	Water Consumption: 800 Lit./h	1
3	Water Hose Reel	Hose Length: 10 m	1
	1-11 PAINTING		
1	Air Compressor	Motor Output: 1.5 Kw(3-Phase)	1
2	Spray Gun, Suction Type	Nozzle dia.: 1.3mm	3
3	Suction Type Container,1000cc	1,000cc	1
4	Air Hose (Rubber)	Size: 6mm dia. x 2Bx10M	1
5	Spray Mask	Mass:200g	1
	1-12 COMPRESSOR		
1	Air Compressor	Motor capacity: 0.75kW, Single-stage, air cooled, pressure switch type	2
	1-13 FORK LIFT AND PORTABLE SUBRICA		
1	Portable Greasing Unit	Including air pump, nozzle, hose reel and etc	1
2	Diesel Engine Forklift	Capacity: 2 ton	1
	1-14 TOOL ROOM		
1	Torque Multiplier	Power Ratio : 1 : 16	1
2	Torque Wrench	100-1200 kgf.cm	2
3	Torque Wrench	600-3200 kgf.cm	2
4	Torque Wrench	1000-7000 kgf.cm	2
5	Torque Wrench	1000-8500 kgf.cm	2
6	Vernier Caliper	200mm	2
7	Vernier Caliper	300mm	2
8	Dial Indicator	0-50-0/0.01mm, 0-10mm	1
9	Magnetic Base (Standard type)	Holding Power:800N	1
10	Firm Joint Caliper For Inside	Range: 0-150mm	1
11	Firm Joint Caliper For Inside	Range: 0-300mm	1
12	Firm Joint Caliper For Outside	Range: 0-150mm	1
13	Firm Joint Caliper For Outside	Range: 0-300mm	1
14	Compression Gauge for Gasoline	Graduation (Max.): 25 kg/cm2	1
15	Diesel Timing and Tacho	Measuring range: 120 - 9990 rpm	1
16	Diesel Engine Vacuum Tester	Max. Scale: 1000 mm/Aq	1
17	Dye Penetrant Metal Crack	Detector set	2
18	Thermometer	-20 - 0 - 200℃	1
19	Hand Tachometer	Measuring Range: 0-1000/10000rpm	1
20	D.C. Volt Ampere Meter	DCV: 0to20/50V, DCA: -6to+60A	1
21	Hydrauric Test Gauge Set	25,60,400,600 (Each 1 Pc)	1
22	Double Offset Box Wrench (15°)	32x36mm	2
23	Double Offset Box Wrench (45°)	35x41mm	2
24	Open End Wrench, Double Head	27x30mm	2

No.	Description	Main Specifications	Q'ty
	2-3 ASPHALT TESTING EQUIPMENT		
1	Refrigerated Ductility Machine	TA-327	1
2	Softening Point Apparatus	TA-365	1
3	Asphalt Mixer	TA-381 30kg	1
4	Centrifuge Extractor	TA-319	1
5	Marshall Apparatus	TA-311	1
6	Asphalt Compaction Machine	TA-352	1
7	Asphalt Curing Water Bath	TA-303c	1
8	Automatic Asphalt Penetrometer	TA-375	1
9	Flash Test Apparatus (Taglibu or Cleverland)	TA-301a	1
10	Kinematic Viscosity	FX-218	1
11	Distillation Apparatus	TA-378	1
	2-4 AGGREGATE TESTING EQUIPMENT		
1	Los Angeles Testing Machine	TC-520	1
2	Sample Splitter	TG-107 5、10、15、25mm	1
3	Ro-Tap Sieves Shaker	TG-105	1
4	Coarse Aggregate Specific Gravity Test Set	TC-204AD	1
5	Electronic Scale	3100kg to 0.01g HF-3000	1
6	Aggregate Test Sieve Set	TC-205	2
	2-5 CONCRETE TESTING EQUIPMENT		
1	Compression Testing Machine	TC-611a 1000KN	1
2	Forced Stirring Mixer	TC-550a	1
3	Portable Concrete Mixer	TC-537	1
4	Cylinder Mold	10dia ×20cm TC-207c	3
5	Cylinder Mold	10dia ×30cm TC-207d	3
6	Schmidt Test Hammer	TC-215	1
7	Cement Fineness Apparatus (Such as Turbidimeter)	TC-521	1
8	Cement Setting Apparatus (Gillmore test) or (Vicat test)	TC-522	1
	2-6 SITE TESTING EQUIPMENT		
1	Sand Density Apparatus	TS-120	2
2	Field Density Apparatus	150mm dia TS-177a	1
3	Field Density Apparatus	250mm dia TS-177b	1
4	Filed Density Core Cutter	TS-414	2
	2-7 COMMON EQUIPMENT		
1	Total Station		1
2	Level	SDL30	1
3	Staff	3m	2
4	Staff	5m	2
5	Tape	30m	2
6	Tape	50m	2
7	Pole		2
	3. EDUCATIONAL EQUIPMENT		
	3-1 COMPONENT		
1	Starter Motor	PT Type	1
2	Alternator	Power: 12 kW	1
3	Generator Unit	Capacity: 50 kW	1
4	Voltage Regulator 10 amp	For 30A	1
5	Torque Converter		1
6	Transmission		1
7	Hydraulic Pump Ass'y		1
8	Hydraulic Control Valve		1
9	Steering Control Valve		1
10	Hydraulic Motor		1
11	Hydraulic Cylinder		1
	3-2 AUDIO VISUAL EQUIPMENT		
1	Video Tape Recorder	PAL	2
2	Television	21 inch	2
3	LCD Procjector		1
4	Over Head Projector		1
	3-3 VIDEO CASSET TAPE		
1	Diesel Engine Series		1
2	Diesel Engine Series		1
3	Diesel Engine Series		1
4	Disassembly and Assembly		1
5	Demostration Hints for		1
6	Safety for the Operation of		1
7	Trouble Shooting of Electrical		1

Project Document

Project Type Technical Cooperation

of

The Project

for

Capacity Building

of

The Alemgena Training and Testing Center ERA

The Federal Democratic Republic of Ethiopia

September 2001

Japan Intentional
Cooperation Agency
(JICA)

Ethiopian Roads Authority
(ERA)

Preliminary Evaluation Table (Project-type Technical Cooperation) (as of 21 September, 2001)

1. Project Title

The Project for Capacity Building of the Alemgena Training and Testing Center of ERA

2. Necessity and Appropriateness of Cooperation from Japan

(1) **[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. It is 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 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 Ethiopian Roads Authority (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 (hereafter referred to as "AT&TC"), as a part of the RSDP, and urgently increase the necessary manpower. (See Table 1)

Table 1: Required Manpower for Mechanized Construction Method in Road Construction and Maintenance

(Person/Year)

Ethiopian Fiscal Year (July to June)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY Average
Equipment Operators*	6,231	6,968	7,035	5,762	5,829	6,365
Equipment Mechanics**	1,246	1,394	1,407	1,152	1,168	1,273
Supervisors***	279	312	315	258	261	285

Source: JICA review on ERA Road Sector Reform Training Master Plan, 1998, taking into account ERA RSDP II (July 2002~June 2007) 1st Ed., May 2001Implementation Program.

(2) **[Training Needs of Equipment Operators*]** AT&TC 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. (See Table 2)

Table 2: Present Number of Construction Equipment Operators in Ethiopia (Person)

Operator's Titles	(High level) ◄ V	IV	III	II	I	(Low level) ► Helper	Total
ERA	28	284	219	653	240	523	1,947
RRA	60	168	280	392	56	672	1,628
Total (Public)	88	452	499	1,045	296	1,195	3,575
Domestic Company	31	85	142	199	29	342	828
Foreign Company	24	241	186	553	203	446	1,653
Total (Private)	55	326	328	752	232	788	2,481
Grand Total	143	778	827	1,797	528	1,983	6,056

Source: JICA Study (April 2001)

Note: According to ERA rules, there are five operator qualifications (I to V). Level V equipment operators can operate all types of road construction equipment. In general, after a two-year helper's experience one can obtain Level I, and approximately 8 more years is

required to reach Level V successively. The targets of this project are equipment operator helpers to Level IV equipment operators.

(3) **[Training Needs of Equipment Mechanics**|&|Training Needs of Supervisors***]** 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, AT&TC plans to update and enhance the current training course. Also, as a policy of the Ethiopian government, road construction and maintenance will switch from a "direct management construction" (see note) to a "contracted construction" (see note), so supervisors will be required mainly for contract management. At least 3 supervisors per each construction site will qualify for the training, which will be an upgrade and enhancement of the current course.

(Note) "Direct management construction" is performed by ERA using its own equipment and personnel. "Contracted construction" is construction which ERA contracts out to a private construction company.

(4) **[Present State of AT&TC]** Established in 1956 AT&TC 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 updating 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. The present results of training at AT&TC are shown below. (Table 3)

Table 3: Number of graduates of AT&TC (extract of courses relevant to said project)

(person)

Ethiopia Fiscal Year	FY 1998 (a)	FY 1999 (b)	FY 2000 (c)	FY Average
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: (a) JICA Study (April 2001); (b) & (c) ERA Training Plan 2000/2001.

(5) **[Necessity and Appropriateness of Technical Cooperation]** This project aims to develop human resources required for road construction by renewing training equipment and machinery, and by technical transfer to its trainers of MCM management methods, with a focus on operation and maintenance of the latest equipment and contract management of road construction and maintenance works, and further transfer from re-trained trainers to their trainees. Since Japan is clearly advanced in the construction machinery technology field and the road construction and maintenance field, Japan can transfer the necessary technology by dispatching experts or conducting training for counterparts in Japan on the latest technology.

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.

4. Principal Items of Project

(1) Target : The Alemgena Training and Testing Center of ERA
(2) Implementation Period: Four years beginning from April 2002 (scheduled)

(3) Activities are to
(a) collect training needs (road conditions, needs, skill levels of C/P, instructors, trainees, the private and ERA); (b) establish management know-how; (c) conduct monitoring and evaluation; (d) organize a system to formulate curriculum; (e) prepare teaching materials; (f) train instructors; (g) renew training equipment; and (h) maintain equipment properly

(4) Input
-Dispatch of long-term experts
(a) Chief advisor (4 years).
(b) Coordinator (4 years).
(c) Road construction equipment management and operation expert (2 years).
(d) Road construction equipment mechanics expert (4 years).
(e) Road construction and maintenance supervision of MCM expert (2 years).
-Dispatch of short-term experts: road maintenance, training material development etc., and as required.
-Counterparts training in Japan: approximately 3 persons per year for road maintenance, equipment mechanics etc.
-Provision of equipment:
Road construction equipment and spare parts, training machinery and testing machines, tools, civil work testing machines and tools, and teaching aides etc.

(5) Organizational Structure for Implementation
ERA, the responsible agency as well as the counterpart agency of the Japanese expert team, will assign a Project Director from the level of top management, who will chair the Joint Coordinating Committee (JCC). The head of ERA's Alemgena Training and Testing Branch (ALTBB) will act as the Project Manager and assign the necessary counterpart and instructional staff upon approval by the General Manager of ERA. The Project Manager will chair monthly the Project Executing Committees (EC) at AT&TC. On the Japan side, the International Division for Infrastructure, Construction Planning Division, etc. of the Ministry of Land, Infrastructure and Transport are the cooperating bodies.

5. Project Purpose

The Project purpose is to enable the Alemgena Training and Testing Center of ERA (AT&TC) to provide the target group (operators, mechanics, and supervisors) with proper training of MCM.

Table 4: Number of graduates during project

(person)

Year		2002	2003	2004	2005	2006
Project period	4 years	Project Duration				
Number of graduates	Annual number 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

A comparison of the present results of training at AT&TC (Table 3) and the projected increase when the project goal is achieved (Table 4) shows that the annual number of graduates can be expected to increase approximately three times.

6. External Factors and Risks

As road construction work progresses owing to the RSDP implemented by IDA and other agencies, ERA must carry out its privatization measures and domestic construction industry development policies to facilitate the participation of graduates to road construction and maintenance works. Also, in order to continue answering to the shortage of engineers necessary for the RSDP, AT&TC must secure a sufficient training budget even after project completion so that it can continue with its training activities. Finally, in order to raise training efficiency, trainees need to have received basic education that will enable them to fully comprehend training material.

7. Evaluation of Future Plans

(1) The indices of results to be adopted for evaluation will be the numbers of operators, mechanics, and supervisors who have trained at and received a certification from AT&TC.

(2) Timing of evaluation
Evaluations will be made at interim stages of the project and at project completion.

Contents

A. Background

[Road Sector and Human Resource Development Needs]

(Road Sector)

1. 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. Note) (See Annex 1" Ethiopia Data Profile") (See annex 2 Ethiopia Roads Status)

Note) Ethiopia Interim Poverty Reduction Strategy Paper 2000/01- 2002/03, November 2000

2. 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 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. (See Annex 3 "RSDP(II)")

(Sector Needs)

3. 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. Note) The shortage particularly of **equipment operators***, **equipment mechanics**** and **supervisors*****, who will oversee the construction work, is a serious problem. (See Table1 and Appendix 1 "Estimate of Required Manpower for Mechanized Construction Method in Road Construction ad Maintenance")

Table 1: Required Manpower for Mechanized Construction Method in Road Construction and Maintenance

(Person/Year)

Ethiopian Fiscal Year (July to June)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY Average
Equipment Operators*	6,231	6,968	7,035	5,762	5,829	6,365
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Supervisors***	279	312	315	258	261	285

Source: JICA review on ERA Road Sector Reform Training Master Plan, 1998, taking into account ERA RSDP II (July 2002~June 2007) 1st Ed., May 2001Implementation Program.

Note) There are about 3,900 operators, but only 143 are Class V operators who can operate all equipment. Only 838 equipment mechanics for equipment maintenance and 84 supervisors for contract management exist in ERA. (ERA Staffing Plan 1998)

4. In response to sector needs, the Ethiopian Roads Authority (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 (hereafter referred to as "AT&TC"), as a part of the RSDP, and urgently increase the necessary manpower.

(Relevant JICA Studies)

5. In this context, the Ethiopian Government made a request to the Japanese Government in August 1995 for an assistance of Project-type Technical Cooperation. In June1996, the Japan International Cooperation Agency (JICA), entrusted by the Japanese Government,

made a basic study in order to judge the feasibility of the project-type technical cooperation. However, the team's further preparation of the project was suspended by security problems due to border conflict between Ethiopia and Eritrea. As security improved in January 2000 except in specific areas, a preliminary study team was dispatched in March 2000. Yet again in March 2000, civil war re-occurred between the two countries, and all new projects had to stop. In December 2000, both governments signed a peace agreement. This enabled a project preparatory study (I) to collect the latest information on road sectors. In July 2001, JICA dispatched a project preparatory study team (II) to discuss the project framework and concluded a minutes for agreement with ERA.

In brief, JICA made the following four studies. (See Annex 4 "List of JICA Study Members")

(1)	June 1996	Basic Study Team
(2)	March 2000	Preliminary Study Team
(3)	April 2001	Preparatory Team (I)
(4)	July 2001	Preparatory Team (II)

[Road Sector Issues to be addressed by the Project and Related Japanese Aid Project]

(The Project and the Road Sector Issues)

6. The project aims to solve the shortage of manpower of mechanized construction method such as equipment operators, equipment mechanics, and supervisors through the project-type technical cooperation from Japan, which will contribute to a project component of Human Resource Development of RSDP. In addition, as the direct management method (force account) of road construction and maintenance works will be shifted to a contracted construction method, an institutional reform of ERA is needed. Accordingly, the project will also strengthen institutional buildings. The project concept illustrates how the project plays a key role in the road sector and contributes to the road sector through the experiences of related Japanese aid projects. (See Annex 5 "Project Concept")

(Japanese Aids for Road Sector)

7. Since 1992, Japan has provided several grant aids for the road sector. The major projects are as follows: "Improvement of local roads maintenance equipment (Phase I) (1992 & 1993)"; "Improvement of urban road maintenance equipment in Addis Ababa (1994)"; "Trunk road improvement project (Phase I) Addis Ababa - Goha Tsion: Phase I)(1998～2001)"; and "technical assistance in bridge management of ERA" (1998～2001). (See Annex 6 "Major Related Japanese Aid Projects")

[ERA Training Plan]

(Equipment Operator Training)

8. AT&TC 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. (See Table 2)

Table 2: Present Number of Construction Equipment Operators in Ethiopia

(Person)

Equipment operator's Titles	(High level) ◄				► (Low level)		
	V*	IV*	III*	II*	I*	Helper	Total
ERA	28	284	219	653	240	523	1,947
RRA	60	168	280	392	56	672	1,628
Total (Public)	88	452	499	1,045	296	1,195	3,575
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Source: JICA Study (April 2001)
Note) * : According to ERA rules, there are five equipment operator qualifications (I to V). Level V equipment operators can operate all types of road construction equipment. In general, after a two-year helper's experience one can obtain Level I, and approximately 8 more years are required to reach Level V successively. The targets of this project are equipment operator helpers to Level IV equipment operators.

9. Training equipment for the project will include the following six types of equipment; dump truck, bulldozer, excavator, motor grader, loader, and roller. As these equipment are generally used for road construction and maintenance, operators will be trained to use them. (See Annex 13 "Major Equipment List" that shows operation of each equipment)

(Equipment Mechanic Training)

10. 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, AT&TC plans to update and enhance the current training course.

11. The required number of equipment mechanics was estimated on the basis of AT&TC experiences in on-the job training of road construction and confirmed at the RSDP advisory office in ERA. The requirement varies largely according to type of the construction site; whether they need big earthworks in the mountainous areas, or they need many crushing stones for pavement etc. The contractors' management policy on mechanization of construction also largely affects the numbers of equipment as well as equipment operators and mechanics.

As mechanized constructions will increase, the project will survey the changes in the training needs of the above operators and mechanics through periodical monitoring and the Joint Coordinating Committee (JCC), in which representatives of private companies are included. (See para.43)

(Supervisor Training)

12. Also, as a policy of the Ethiopian government, road construction and maintenance will switch from a "direct management construction (force account)" (see Note) to a "contracted construction" (see Note), so supervisors will be required mainly for contract management. At least 3 supervisors per each construction site will be qualified for the training, which will be an upgrade and enhancement of the current course.

Note) "Direct management construction (force account)" is performed by ERA using its own equipment and personnel. "Contract-out" is construction, which ERA contracts out to a private construction company.

B. Project Strategy

[Project Analysis]

(Target Group)

13. Target group consists of equipment operators, equipment mechanics, and supervisors who are engaged in mechanized construction in roads construction and maintenance.

(Problem Analysis in AT&TC)

14. The preparation study team organized a workshop of JICA Project Cycle Management (PCM) at AT&TC in March 2000, and conducted a problem analysis for training capacity of the AT&TC.

    Established in 1956 in cooperation with USAID, AT&TC has since engaged in the training of ERA staff and staff of other organizations to be engineers and technicians who can carry out road construction and maintenance using present facilities and equipment. However, it is facing problems in updating 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. The present results of training at AT&TC are shown below. (Table 3)

Table 3: Number of graduates of AT&TC

(Person)

Ethiopia Fiscal Year	FY 1998 (a)	FY 1999 (b)	FY 2000 (c)	FY Average
Training course Note) 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: (a) JICA Study (April 2001); (b) & (c) ERA Training Plan 2000/2001.
Note) Courses relevant to the Project have been extracted

(AT&TC's Capability for Project Implementation)

15. AT&TC is the sole vocational training center for MCM in the country and has trained ERA staff and the other road agencies for about 40 years with ERA budgets. Although quite old, the present facility will be used for the project. The present instructors give training for courses. In preparation of the project, AT&TC constructed an office for the Japanese experts and a dormitory that can accommodate 200 trainees. ERA and AT&TC promise to prepare additional buildings for training needs, provision of counterparts, and sufficient budget for the project. AT&TC is capable of implementing the project. (See "Minutes of Preparatory Team (II))

(Problem Solution by the Project)

16. This project aims to develop human resources required for road construction by renewing training equipment and machinery, and by technical transfer to its trainers of MCM management methods, with a focus on operation and maintenance of the latest equipment and contract management of road construction and maintenance works, and further transfer from re-trained trainers to their trainees. Since Japan is clearly advanced in the

Japan can transfer the necessary technology by dispatching experts or giving training to counterparts in Japan about the latest technology. (See Appendix 2 "Project Output")

[Project Approach]

(Relevancy)

17. The Project aims at road sub-sector development that Ethiopian Government gives the priority for the poverty reduction strategy plan. Human development of this sector is one of the aid principals of Japanese Government to Ethiopia. (Para.1, 2 and 6)

RSDP(II) has objectives of rural access improvement and employment increase. To achieve them, the Ethiopian Government has prepared a plan of Domestic Construction Industry Development (DCID) that targets mechanized contractors and labor based contractors. The former will carry out main road improvement while the latter will be major actors for rural access construction. The Project will solve technical mismatch for the labor market by training, increase employment opportunities for skilled workers, expedite mechanization in construction, and finally develop construction industry.

As the DCID is the major factor in the Project relevancy, prompt monitoring and proper advice are required in respect of human development and training. Japanese experts will do this tasks together with ERA General Manger assigned as a counterpart of Chief Advisor of experts (Para. 40) and JCC members including representatives of MEDAC and the private sectors. (Para. 47) Note)

Note) A short termed expert will study, advise, and review implementing program pf DCID and a training plan from a point of mechanization in construction. His recommendations will be made taking into consideration of historical learning and experience in Japanese construction industry policy and development for restoration and reconstruction of infrastructures after the Second World War.

(Effectiveness)

18. Important prerequisites and assumptions to achieve the efficiency are privatization and DCID. (Para. 48) They will affect an institutional status of AT&TC and the training plan. As the details have not been concluded, the Project will be implemented with a flexible and phasing approach as mentioned below.

① Training needs survey (TNA) will be built in project activities to response changes in policy and labor market, and accordingly the training plan will be revised.

② The Project will enhance AT&TC training capability by four phases: rehabilitation, renewal introduction, trial, and extension.

・(Rehabilitation) The first year inputs will replace and rehabilitate obsolete equipment and machinery of AT&TC in order to recover the present training course to the present training potential. In this phase, the training needs survey will be conducted to prepare a new training plan to start in the second year.

・(Renewal introduction) In the second year, experts and counterparts will prepare renewal trail introduction and implement the new training plan based on results of the training needs survey, job descriptions, training specification. An additional inputs plan will be considered if the new training plan requires.

・(Trial) In the third year, AT&TC will keep carrying out the new training plan. The training plan will be revised according to the training performance and the results.

・(Extension) In the fourth year, the experts will inspect how counterparts carry out the revised training plan that will have been used in the second and third years. If necessary, they will give advice how to modify and enhance the training plan.

(Efficiency)

19. In order to increase the number of graduates, the Project will introduce a special training to raise new local instructors who will be able to train the equipment operators of class I & II at their provinces, and also organize the provincial training courses by dispatching instructors to the provinces when the AT&TC training close. These measures will enable the trainee' candidates staying at the distant areas to receive the training at the nearest provincial capital, and will reduce not only his burden but also increase the project outputs and save training cost per trainee.

In addition, the Project will conduct tracing survey (for example, wage increase by the training, shifting to the private sector etc.) to collect basic data for financial and economic cost-effect or cost-benefit analysis.

(Impact)

20. As the Project will impact environment because of the mechanized construction method (MCM), the training plan will include environment assessment and mitigation measures of road construction.

In addition, the Project will take social impact of employment into consideration. It is necessary to take the preventive measures that mechanized construction will not reduce employment opportunity for workers who would have been employed in labor based method (LBM). So the Project will plan to provide special curriculums of road planning, contract preparation, and construction and supervision in the supervisor course in order to adjust LBM in the MCM. Training outlines are proposed below.

① Policy: Roads and work items will be classified by two construction methods either MCM or LBM. (for example, MCM: high standard highways and roads, large earth work, quality required-compaction work for sub grade, sub base and base courses of road pavement etc.; LBM: low traffic rural roads, vegetation on the slope, small concrete structure with simple machines etc.)

② Preparation and planning: Road plan and method selection will be made through technical feasibility, financial and economic cost benefit analysis by comparing between MCM and LBM. In particular, constraints of construction period, specific construction works, numbers of employment, and regional economic benefits to the affected areas must be taken into consideration.

③ Design and construction: Design will be prepared by reviewing regional characteristic and balance of MCM and LBM. An Optimally combined method will be mentioned in the tender documents. In particular, to apply LBM as long as possible, general conditions and the specifications should describe instructions to use LBM for the suitable works.

In the environment curriculum, PCM workshop will be included to insure participatory planning in the road planning. (Para.35)

(Sustainability)

21. As AT&TC will continue the training after the Project, financial, management and institutional enhancement with ERA's commitment will be required. For enhancing financial management, the Project will introduce an activity of assisting in preparing a financial statement and a balance sheet, taking AT&TC to be a financial entity.(Para. 43) In this preparation, depreciation concept and economic life of equipment will be introduced in order to prepare a renewal plan of equipment. JCC will audit the account and the financial statement. This activity will contribute to enhance financial management in preparing for review of future institute status of AT&TA as independent profit system or privatization.

The present ERA qualification requires about 10 year experiences to pass Equipment Operator V who can operate all kinds of equipment.(Para.8) When the Project will plan to train "multi-operators" (Class V) in a short period to meet the private sector's needs, a review of job specification and qualification of ERA is required.

In addition, the ERA qualification is an exclusive title, but not a legal license. Therefore, at the private construction site, anybody can operate all equipment by the equipment owner's risk. Note) In future it will be necessary to review ERA qualification for state license. A long termed expert will execute these tasks.

Note) Actually, most of the private companies have employed title hold operators and they request to AT&TC to test the candidates.

C. Principal Items of Project

[Outline]

(Title of the Project)

22. The Project for Capacity Building of the Alemgena Training and Testing Center of ERA.

(Implementation Period)

23. The duration of the Project will be four years. The Project is expected to start in April 2002 and end in March 2006. (See Annex 7" Tentative Schedule of Implementation")

(Project Site)

24. The Project site is at AT&TC, which is located in the suburbs, 20km of southwest of Addis Ababa. (See Annex 8 " Existing Camp")

(Selection of Trainees)

25. Selection of trainees will be made according to the current ERA criteria, which will be reviewed to meet the training needs.

(Certificate)

26. A certificate will be awarded to the successful trainee who could pass the examination of both theory and practice with the results of 60% or more.

(Training Expenses)

27. The Federal Government or Regional Governments will provide training expenses for ERA and RRA staffs. However, the private trainees will pay the expenses by themselves.

(Training Courses)

28. Training plan is proposed to introduce the three major courses. (See Annex 9 "Tentative Planned Training Courses")

(1) Road construction equipment management and operation
(2) Road construction equipment mechanics
(3) Road construction and maintenance supervision of MCM

(The Target Certified Trainees)

29. A comparison of the results of past training at AT&TC (Table 3) and the projected increase as a result of this project (Table 4) shows that the annual number of graduates can be expected to increase approximately three times. (See note)

Table 4: Number of project graduates

(person)

Year		2002	2003	2004	2005	2006
Project period	4 years		Project Duration			
Number of graduates	Annual number of graduates	Cumulative number of graduates By the Project				
	523	*159 a)*	523	1,046	1,569	1,700
Equipment operators*	315		315	630	945	1,024
Dump truck	(90)		(90)	(180)	(270)	(294)
Bulldozer	(45)		(45)	(90)	(135)	(146)
Excavator	(45)		(45)	(90)	(135)	(146)
Motor Grader	(45)		(45)	(90)	(135)	(146)
Loader	(45)		(45)	(90)	(135)	(146)
Roller	(45)		(45)	(90)	(135)	(146)
Equipment Mechanic**	136	*54 a)*	136	272	408	442
Beginning course	(48)		(48)	(96)	(144)	(156)
Advanced course	(48)		(48)	(96)	(144)	(156)
Management course	(40)		(40)	(80)	(120)	(130)
Supervisor***	72	*53 a)*	72	144	216	234

Note) *a) italic figures* are expected numbers of the graduates without the Project.

The above graduates will cover the required numbers of equipment operators (6,300), equipment mechanics (1,270), and supervisors (280) in RSDP by 20%, 40%, and 80%, respectively.

[Ultimate Goal]

30. 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, road maintenance can continuously be assured. Furthermore, increased employment opportunities in the road construction field can be expected.

[Overall Goal] (See 10 "Project Design Matrix: PDM")

(Overall Goal)

31. The overall goal of the Project is that Ethiopian human capacity of road construction and maintenance is strengthened for its quality and quantity in terms of mechanized construction method (MCM). The verifiable indicators are to promote or change occupation titles of the graduates and to fulfill the skilled labor requirement.

(Project Purpose)

32. The Project purpose is that AT&TC enables to provide the target group (equipment operators, equipment mechanics, and supervisors) with proper training of MCM. The verifiable indicators are issue of certificates for 1,020 equipment operators, 440 equipment mechanics, and 230 supervisors by 2006.

[Outputs]

33. The Project Outputs are as follows.

(1) Training management becomes effective
(2) Efficient training course program is prepared

(3) Levels of the technical skills and teaching capacity of instructors are improved
(4) Training equipment and materials are properly arranged and managed
(5) A method of training-needs analysis is developed and the training plan is prepared through the training needs analysis.

[Activities]

34. The detailed project activities are mentioned in Annex 10 "Project Design Matrix: PDM" and Annex 11 " Tentative Plan of Operation".

[Project Components]

(Inputs to be done by the Government of Japan.)

Japanese Experts

35. (1) Chief advisor (4 years)
(2) Coordinator (4 years)
(3) Road construction equipment management and operation expert (2 years)
(4) Road construction equipment mechanics expert (4 years)
(5) Road construction and maintenance supervision of MCM expert (2 years)

Short-term experts will be dispatched from time to time as the necessity arises for the effective implementation of the Project. (Approximately 3 persons per year: training needs analysis expert etc)

(See Experts Dispatch Schedule at Annex 7 " Tentative Schedule of Implementation" and their TOR at Annex 12 "TOR (Draft)".

36. The terms of Japanese experts will be in accordance with regulations of JICA. Ethiopia will prepare a request form for Japanese experts promptly and submit it immediately to Japan.

Counterpart Training in Japan

37. Counterpart training in Japan will be provided during the Project period (about 3 trainees per year for road construction equipment management and operation, road construction equipment mechanics etc.). Trainees will be decided both by the Japanese experts and ERA from nominated counterparts and instructors within AT&TC.

Provision of Equipment

38. The necessary equipment for the effective implementation of the Project will be provided by JICA within the budget to be allocated for the Project. (The proposed list of major machinery and equipment is shown in the Tentative List of Annex 13)

(Inputs to be done by the Government of Ethiopia)

Counterparts

39. ERA will provide the counterparts and instructors for the project implementation as shown in the List of Counterparts and Administration Staff of Annex 14. The counterparts and the instructors will not be changed during the project period as far as possible.

Supporting Staff

40. The supporting staff will be provided: (1) two secretaries, (2) two drivers, (3) other staffs to be required for the training requirement. (Annex 14)

Financial Input

41. Financial and Budgetary Arrangement: The Ethiopian side will allocate the necessary annual budget for running costs throughout the Project. These include salaries and allowances for the Ethiopian counterpart and support service staff, fuels, oils and lubricant, stationary and office supplies, janitorial supplies, medical supplies, contractual services such as water supply, electric light and communication, and maintenance materials and supplies. Adding to them, this Ethiopian side will also bear the operating costs of constructing roads at on-the-job training site near Alemgena.

42. Financial Management System: The Project Manager will establish financial and account management system to prepare a balance sheet and a cash flow sheet of AT&TC in collaboration with the Japanese experts. The balance sheet and the cash flow sheet will be presented and approved at the Joint Coordinating Committee (para.43)

Land, Buildings, and Facilities

43. Ethiopian side will prepare necessary buildings and facilities for the implementation of the Project. Ethiopian side will also provide offices and other necessary facilities for the Japanese experts in the Project site. AT&TC will also provide training and administration facilities for Japanese experts: (a) training spaces in the AT&TC and on-the-job training site; and (b) an office having the adequate size to be partitioned into three rooms and (c) a meeting room at the proper location.

44. Before the project starts in April 2002, ERA will prepare an office for experts and a facility for training machinery to be provided from Japan.

Taxes and Duties

45. In accordance with laws and regulations in force, the Ethiopian side will take necessary measures to meet customs duties, internal taxes, and any other charges imposed in the Federal Democratic Republic of Ethiopia on equipment, machinery, and other materials brought into Ethiopia for the purpose of the Project.

[The Project Administration]

(Ethiopian Government Organization)

46. Organization charts of ERA, Human Resource Development Division, and Alemgena Training and Testing Branch (AT&TC) are shown in Annex. (See Annex 15 "(1)Ethiopian Roads Authority, (2)Human Resource Development Division, and (3)Alemgena Training and Testing Branch (AT&TC))

(Project Administration)

47. ERA, the implementing agency and a counterpart agency of the Japanese experts team, will assign "the Project Director" who will chair the Joint Coordinating Committee (JCC). (See note 1) Head of ERA's Alemgena Testing and Training Branch (ALTTB) will act as "the Project Manager" and assign the necessary counterparts and instructors upon approval by the General Manager of ERA. The Project Manager will chair monthly Executive

Committees (EC) at ALAT&TC. (See note 2). On the Japan side, the International Division for Infrastructure, Construction Planning Division, etc. of the Ministry of Land, Infrastructure and Transport are the cooperating bodies. (See Annex 16" A Tentative Organization Chart of the Project")

Note1)

Both sides will establish a Joint Coordinating Committee (JCC) note1) for the effective and successful implementation of the Project. JCC will be held at least once a year or whenever the necessity arises. The functions of JCC are: (a) to formulate annual work plan of the Project; (b) to review the progress of the annual work plan; (c) to review and exchange opinions on major issues that may arise during the implementation of the Project; and (d) to discuss any other issues pertinent to smooth implementation of the Project. Members of JCC comprises the Ministry of Economic Development & Cooperation (MEDAC), ERA, Chief of AT&TC, Counterparts, representatives of the private sector who are private road companies, equipment dealers, roads users etc., and representatives of JICA (Ethiopia office) and Experts.

Note2)

An Executing Committee (EC) will be established under JCC at AT&TC with ALTTB Chief, the experts and the counterparts, and additional members if necessary, and held monthly and whenever necessity arises in order to facilitate smooth implementation of the Project.

D. Project Important Assumption and Risk

[Project Important Assumption and Risk]

48. The important assumption and risks are mentioned as follows. (See Annex 10"PDM")

(1) As road construction work progresses owing to the RSDP implemented by IDA and other agencies, ERA must carry out its privatization measures and domestic construction industry development policies to facilitate the participation of graduates to road construction and maintenance works.

(2) Also, in order to continue answering to the shortage of engineers necessary for the RSDP, AT&TC must secure a sufficient training budget even after project completion so that it can continue with its training activities.

(3) Finally, in order to raise training efficiency, trainees need to have received basic education that will enable them to fully comprehend training material.

[Monitoring and Evaluation]

49. Several staged monitoring and evaluations will be carried out during the project.

(1) The indices of results to be adopted for evaluation will be the numbers of equipment operators, equipment mechanics, and supervisors who have been trained at and received a certification from AT&TC. (See Annex 10 "PDM")

(2) Monitoring and evaluations will be made at interim stages of the project and at project completion. (See Annex 7 " Tentative schedule of Implementation")

E. Socio-Economic Justifications

50. Socio-economic justifications of the project are summarized as follows.

(1) The improvement of the roads is one of the topmost priority issues for economic development in Ethiopia. (See para 1 & 2)

(2) Human resource development in the Road sector is an urgent matter of RSDP. Engineers and technicians for mechanized construction method (MCM) are lacking. (See para. 3)

(3) AT&TC is the country's sole vocational training institute for MCM, and has provided training for about 40 years. AT&TC will be able to implement the project without substantial institutional reform or organization building. ERA promises the provision of additional training facilities and budgets. (See para. 15)

(4) By strengthening the training capacity of AT&TC under the project (See para. 16), the numbers of graduates, who will acquire the latest knowledge of operation, management, and maintenance of new road construction equipment, and of road construction and maintenance management, will increase approximately three times. (See para. 25)

51. The project justification is made by Table 5 below. The Project is ranked "positive".

Table 5 The Project Justification

Criteria	Assessment Criteria	Assessment	Para.
Relevance	Proper ODA project	Yes	1
	Japan aid policies	Yes	5
	Country's development needs	Yes	3
	Participatory planning	Yes	14
	Japanese technology advantages	Yes	16
Effectiveness	Logical planning	Yes (PDM)	32~34
	Level of purpose	Yes	32
	No killer or difficult assumptions	Likely	18/48
Efficiency	Proper input and output	Tracing survey	19
	Cost benefit ratio	Baseline survey	34
Impact	Overall goals	Likely	17
	Impact assessment	Considered	17
	Environmental measures	Required	17
Sustainability	Institute capability	Likely	15
	Financial capacity	Likely	15
	Social, cultural, and technical acceptance	Likely	14
Total Justification		Positive	

Annex 1. Ethiopian Data Profile

THE WORLD BANK GROUP

A World Free of Poverty

HOME

Ethiopia Data Profile

Click on the indicator to view a definition	1995	1998	1999
People			
Population, total	56.5 million	61.3 million	62.8 million
Population density (people per sq km)	56.5	61.3	62.8
Population growth (annual %)	2.9	2.5	2.4
Life expectancy at birth, total (years)	44.1	..	42.4
Fertility rate, total (births per woman)	6.5	..	6.3
Mortality rate, infant (per 1,000 live births)	111.8	..	103.7
Mortality rate, under-5 (per 1,000 live births)	..	..	180.0
Malnutrition prevalence (% of children under 5)	..	..	..
Urban population (% of total)	15.4	16.7	17.2
Population density, rural (people per sq km)	485.5	512.8	..
Illiteracy rate, adult male (% of males 15+)	60.3	57.9	57.2
Illiteracy rate, adult female (% of females 15+)	73.8	69.5	68.2
School enrollment, primary (% net)	27.9	..	..
School enrollment, secondary (% net)	..	..	..
School enrollment, primary, female (% net)	21.4	..	..
School enrollment, secondary, female (% net)	..	..	..
Environment			
Surface area (sq km)	1.1 million	1.1 million	1.1 million
Forest area (sq. km)	..	..	..
Annual deforestation (% of change)	..	..	..
Freshwater resources per capita (cubic meters)	..	..	..
CO2 emissions, industrial (metric tons per capita)	0.1	..	..
Improved water source, urban (% of urban population with access)	..	..	..
Improved sanitation facilities, urban (% of urban population with access)	..	..	..
Commercial energy use (kg of oil equivalent per capita)	281.4	284.5	..
Electric power consumption per capita (kwh)	21.7	22.2	..
Economy			
GDP at market prices (current US$)	5.8 billion	6.6 billion	6.4 billion
GDP growth (annual %)	6.1	-1.4	6.2
GNI, Atlas method (current US$)	6.0 billion	6.2 billion	6.5 billion
GNI per capita, Atlas method (current US$)	110.0	100.0	100.0
Inflation, GDP deflator (annual %)	..	..	..
Agriculture, value added (% of GDP)	52.3	52.3	52.3
Industry, value added (% of GDP)	11.1	11.1	11.1
Services, etc., value added (% of GDP)	36.5	36.5	36.5
Exports of goods and services (% of GDP)	13.6	15.8	13.9
Imports of goods and services (% of GDP)	22.1	27.7	29.2
Gross capital formation (% of GDP)	16.4	17.2	18.1
Current revenue, excluding grants (% of GDP)	..	..	..
Overall budget deficit, including grants (% of GDP)	..	..	..
Money and quasi money growth (annual %)	9.0	-2.8	6.8
Technology and Infrastructure			
Telephone mainlines (per 1,000 people)	2.4	2.7	3.1
Telephone average cost of local call (US$ per three minutes)	0.0	0.0	0.0
Personal computers (per 1,000 people)	..	0.6	0.7
Internet hosts (per 10,000 people)	0.0	0.0	0.0
Roads, paved (%)	15.5	14.0	13.3
Aircraft departures	..	..	..
Trade and finance			
Trade in goods (% of PPP GDP)	4.9	5.5	5.5
Trade in goods as a share of goods GDP (%)	..	..	..
High-technology exports (% of manufactured exports)	0.3	..	..
Net barter terms of trade (1995=100)	100.0	89.1	..
Foreign direct investment, net inflows in reporting country (WDI, current US$)	32.0 million	178.0 million	90.0 million
Present value of debt (current US$)	..	..	3.5 billion
Total debt service (TDS, current US$)	154.1 million	119.0 million	158.7 million
Short-term debt outstanding (DOD, current US$)	460.7 million	626.0 million	96.3 million
Aid per capita (current US$)	15.6	10.6	10.1

Source: ***World Development Indicators database, July 2000***

Annex 2 Classified road network (2000) and condition of road network (2000)

Table 1 CLASSIFIED ROAD NETWORK (2000)
(In km)

Class of Road	Paved	Unpaved	Total
Federal Roads 1)	3,824	12,267	16,091
Regional Roads 2)	-	13,480	13,480
Total	3,824	25,747	29,571

Source: ERA, Road Sector Development Program II July 2002 -June 2007, first draft, May 2001

Note: 1) Federal roads (FR) are managed by ERA. Work of FR is being carried out by a mechanized construction method

2) Regional roads (RR) belong to RRA management. Work of RR is made by a labor-based method.

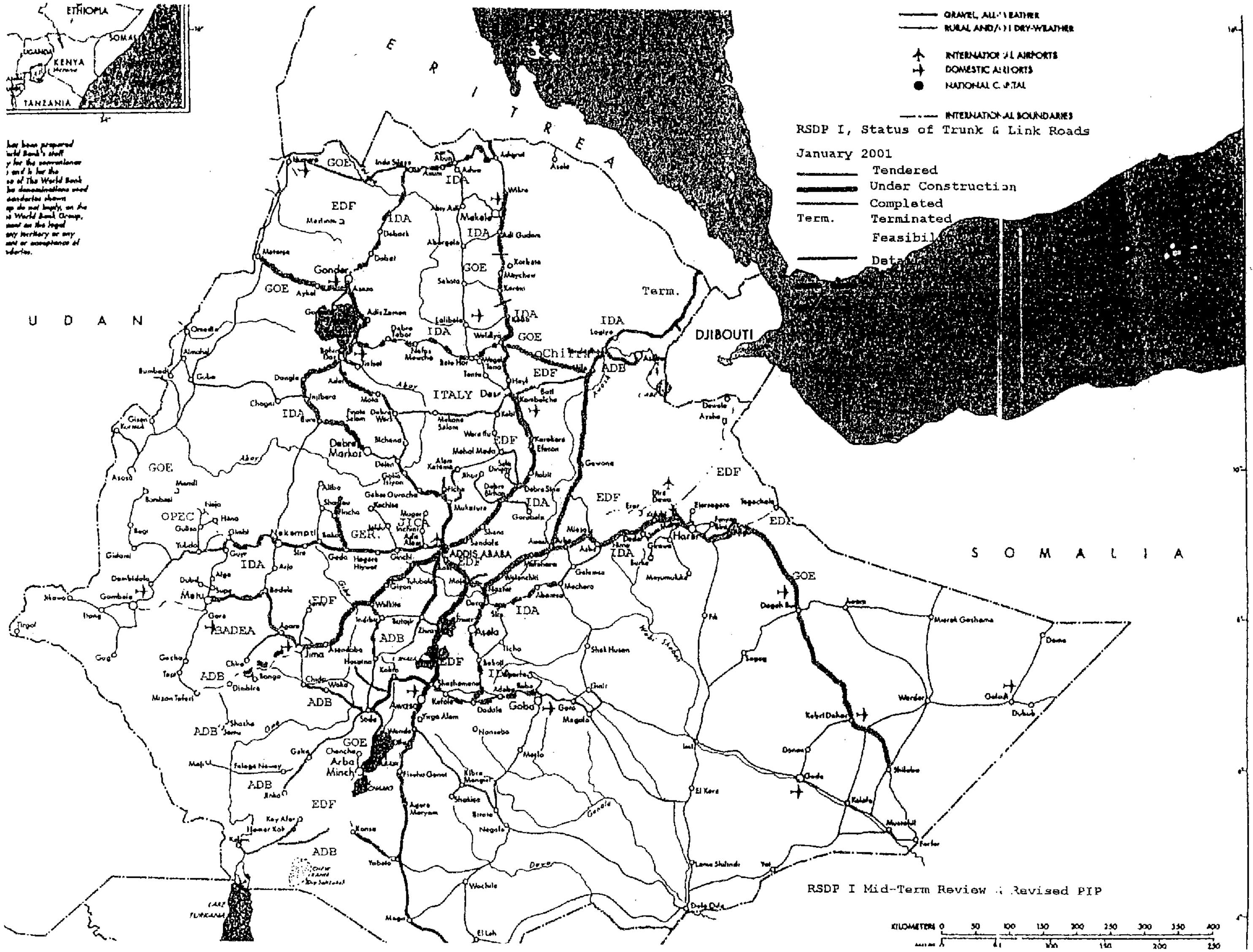
3) Community roads (CR) of 38,494km will be improved by the project of Ethiopia Rural Travel and Transport (ERTT) of RSDP II. CR consists of footpaths and minor roads used mainly by rural pedestrian, animal driven wagons etc., but not by vehicle traffic. Work of CR is made by a labor-based method

Table 2 VEHICLE RUNNING CONDITIONS OF ROAD NETWORK (2000)
(Percent)

Road Type	Good		Fair		Poor	
	1995	1999	1995	1999	1995	1999
Federal Roads	14	25	36	38	50	37
Regional Roads	25	25	15	25	60	50
Average	*18*	*25*	*29*	*32*	*53*	*43*

Source: ERA, Road Sector Development Program II July 2002–June 2007, first draft, May 2001

Note: Vehicle running conditions show how a vehicle runs on the roads surfaces that have several levels of roughness against traveling costs and time. The roads include all types; asphalt paved roads, gavel roads, and earth roads.


RSDP I, Status of Trunk & Link Roads
January 2001
Tendered
Under Construction
Completed
Term. Terminated
GRAVEL, ALL-WEATHER
INTERNATIONAL BOUNDARIES
ETHIOPIA
KENYA
TANZANIA
E R I T R E A
DJIBOUTI
S O M A L I A
ADDIS ABABA
Gondar
Dese
Debre Markos
Nekemt
Jima
Arba Minch
Harar
Goba
Awasa
GOE
EDF
IDA
ADB
ITALY
OPEC
JICA
GER.
BADEA
Term.
RSDP I Mid-Term Review Revised PIP
KILOMETERS 0 50 100 150 200 250 300 350 400

Annex 3

RSDP(II)

Road Sector Development Program(II) (July 1997-June 2007)

Table 1 RSDP Fedearl Roads Component (ERA)
(Mechanized Construction Method)

(Km)

	RSDP (I)	RSDP (II)	Total
Federal Roads			
Rehabilitation of trunk roads1)	1,555	894	2,449
Upgrading of trunk roads 2)	870	2,400	3,270
Construction of trunk roads 3)	0	668	668
Link Roads 4)			
Upgrading 2)	25	1,315	1,340
Construction 3)	876	1,648	2,524
Heavy Maintenance 5)	866	2,849	3,715
Total	**4,192**	**9,774**	**13,966**

Source) ERA, ROAD SECTOR DEVELOPMENT PROGRAM II (JULY 2002 – JUNE 2007) *First Draft, MAY 2001*

Note) Federal roads will be improved by Mechanized Construction Method (MCM)

Table 2 RSDP(II) Implementation Schedule (Km/an)

Ethiopian Fiscal Year	Acc.	2000	2001	2002	2003	2004	2005	2006	Total
Federal Roads									
Rehabilitation of trunk roads1)	678	363	514	298	255	206	93	42	2,449
Upgrading of trunk roads 2)	306	212	352	407	537	612	402	442	3,270
Construction of trunk roads 3)	0	0	0	0	128	200	146	194	668
Link Roads 4)									
Upgrading 2)	0	0	25	55	253	435	291	282	1,341
Construction 3)	597	153	126	120	514	555	237	222	2,524
Heavy Maintenance 5)	240	105	521	972	728	452	316	380	3,714
Federal Roads Total Lenght	**1,821**	833	1,538	1,852	2,415	2,460	1,485	1,562	13,966

Source) ERA, ROAD SECTOR DEVELOPMENT PROGRAM II (JULY 2002 - JUNE 2007) *First Draft, MAY 2001*

Note) Accumulative length is as in March 2001.

NOTE

1) Rehabilitation means the work that restates the damaged sectons of road, but not upgrade the design standard.
2) Upgrading means the work by upgrading design standard to meet the traffic increase and/or by improving road alignments to prevent the traffic accidents.
3) Construction is to build new roads.
4) Link roads are the roads connecting each radial road for a ring road network,
5) Heavy maintenance is the work to repair the damages on road shoulders, pavement and so on.

Annex 4 List of JICA Study Members

1. Basic Study Team (June 1996)

(1) Mr. Toshiro Horibei :Team Leader/ Road Planning
Senior Advisor on Civil Engineering,
Institute for International Cooperation (IIC), Japan International Cooperation Agency (JICA)

(2) Mr. Michio Suda: Construction Equipment
Manager,
Equipment Section, Road Division, Shikoku Regional Construction Department,
Ministry of Construction

(3) Mr. Takao Matsui: Coordination Planning
Second Technical Cooperation Division, Social Development Cooperation Department,
JICA

(4) Mr.Toshio Sakasita: Road and Development
Director,
Highways and Transport Division, Consulting Department,
Pacific Consultants International Inc.

2. Preparation Study Team (March 2000)

(1) Mr. Kenji Shimizu: Team Leader/Road Planning
Senior Advisor on Civil Engineering
ICI, JICA

(2) Mr. Kazuo Watanabe: Construction Machinery
Executive Managing Director,
Japan Construction Mechanization Association

(3) Mr. Shigeki Yamamoto: Road Maintenance
Deputy Head
Hayasima Operation Office, Honshu-Shikoku Bridge Authority

(4) Mr. Kenichi Takeuchi: Cooperation Plan
Technical Advisor,
Second Technical Cooperation Division, Social Development Corporation Department, JICA

(5) Mr. Hideo Sakamoto: Participatory Planning
Senior Consultant, PADECO. Co. Ltd.

3. Preparatory Study I (March 2001)

(1) Mr. Toshio Kimura: Training Needs Analysis
Fukuyama Consultant Inc.

4. Preparatory Study II (July 2001)

(1) Mr. Hiroshi Yoneda: Leader
Director,
Planning Division, Social Development Cooperation Department, JICA

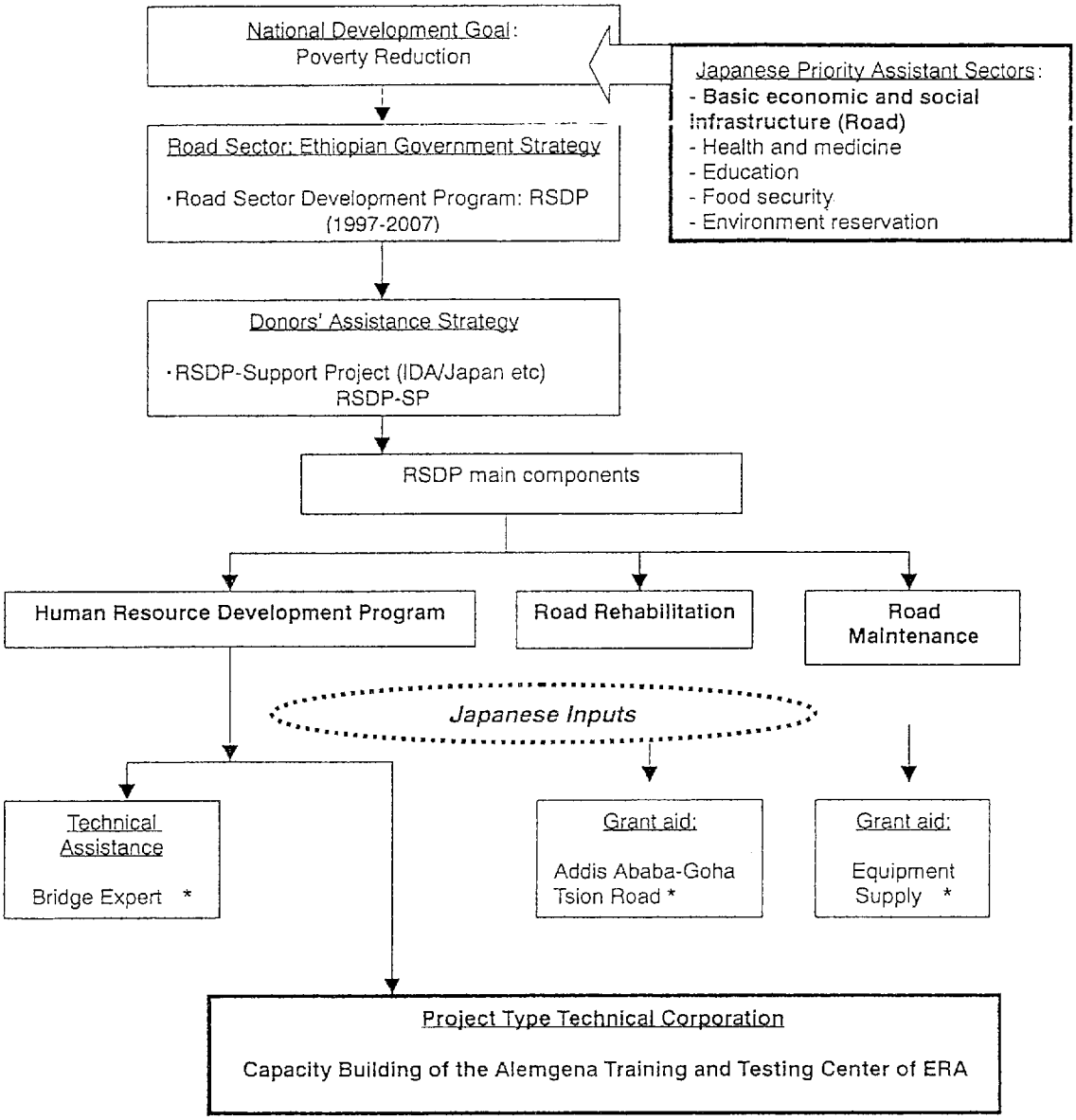
(2) Mr. Masashi Nomura: Training Plan
Chief Researcher,
First Research Department, Construction Information Research Institute,
Japan Construction Information Center (JACIC)

(3) Mr. Satoshi Amano: Cooperation Planning
Second Technical Cooperation Division, Social Development Cooperation Department, JICA

(4) Mr. Futoshi Horikoshi:Equipment Planning
Technical Support Division, Technical Coopeartion Management Department,
Japan International Coopeartion System (JICS)

(5) Mr. Toshinori Toda: Analysis of Project Efficiency
General Manager,
Overseas Division, Construction Project Consultant, Inc.

Annex 5. Project Concept

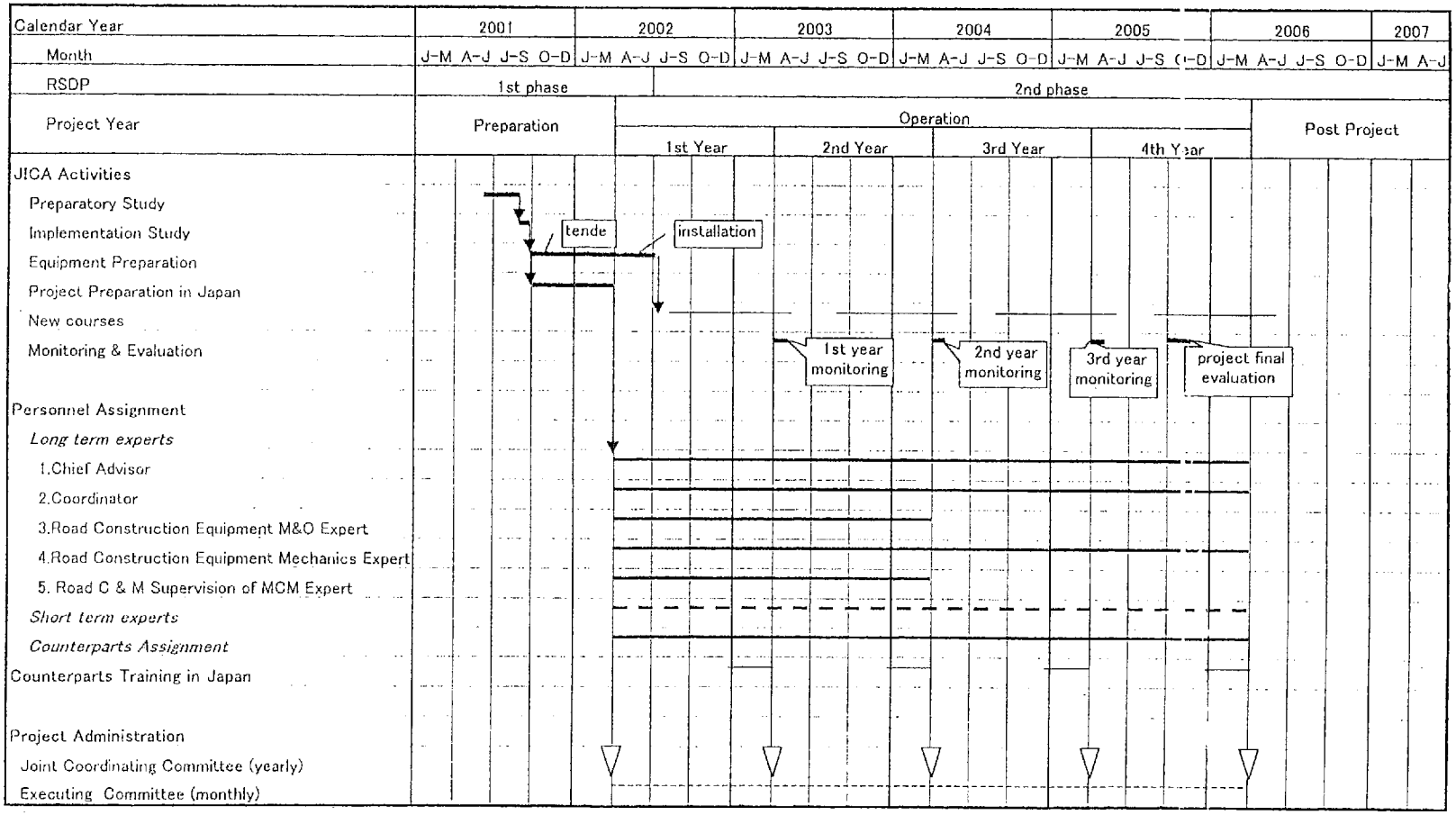


Note) * Contents of the projects are shown at Annex 6

Annex 6 Major Related Japanese Aid Projects

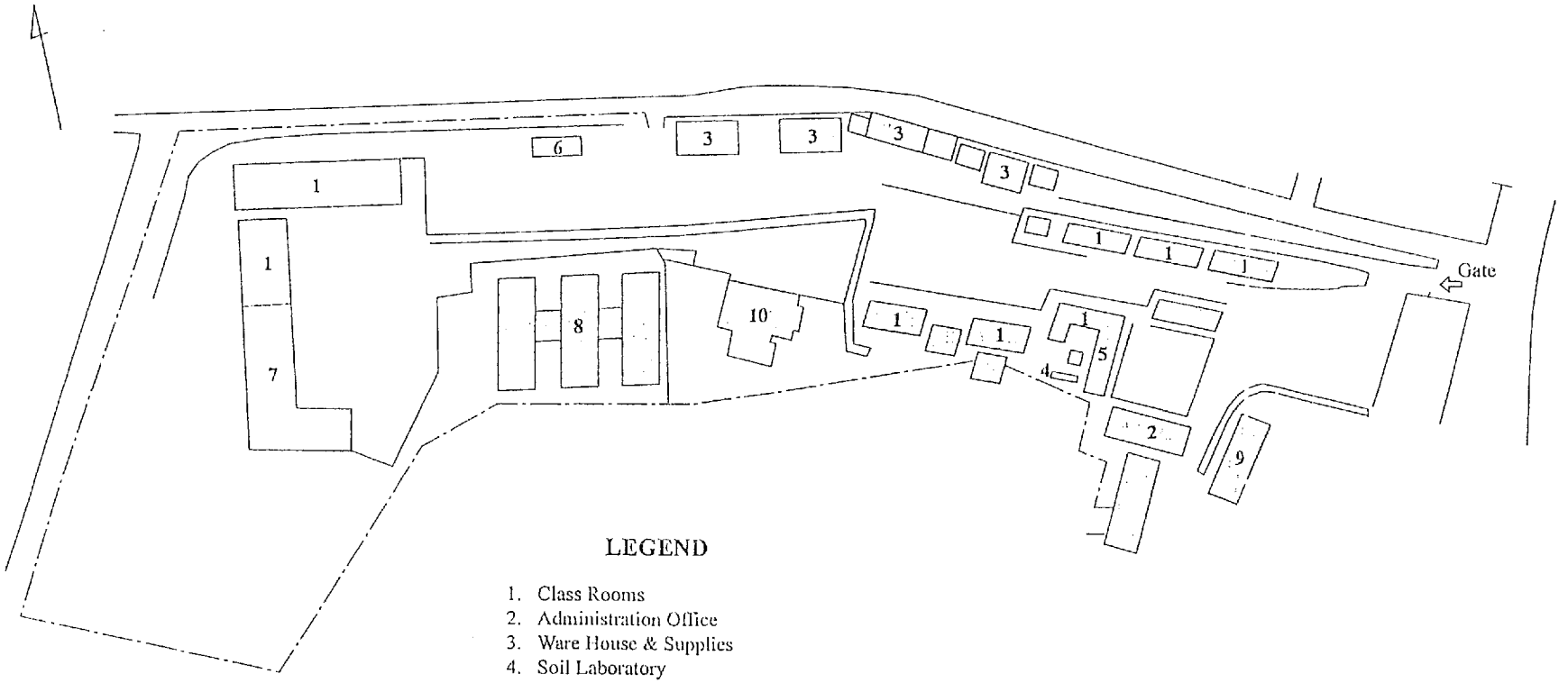
Year	Project Title	Type	Amount (billion Yen)	Project Description
1992	Improvement of local roads maintenance equipment (Phase I)	Equipment	0.5	Provision of road maintenance equipment to Shishamane and Diredawa regional offices of Ethiopia Road Authority(ERA).
1993	- Ditto - (Phase II))	Equipment	0.706	- ditto -
1994	Improvement of urban road maintenance equipment in Addis Ababa	Equipment	0.978	Provision of road maintenance equipment to Addis Ababa a road Authority (ARA)
1998 ~ 2001	Trunk road improvement project (Phase I)	Civil Work	5.427	Rehabilitation of road between Addis Ababa and Kamusi (91.5km) in the section of Addis Ababa and Goha Tsion (182.5km).
1998 ~ 2001	Technical assistance in bridge management of ERA	Expert		Bridge management, bridge inventory, bridge maintenance.

Annex 7 Tentative Schedule of Implementation (TSI)



M&O : management and operation
C&M : construction & maintenance
MCM : Machinarized Construction Method

Annex 8



LEGEND

1. Class Rooms
2. Administration Office
3. Ware House & Supplies
4. Soil Laboratory
5. Library
6. Fuel Station
7. Garage
8. New Dormitory with a capacity of 200 trainees for entry
9. Office for JICA Experts
10. Dining Hall

Existing Campus

ERA TRAINING & TESTING CENTER
DRAIN. & TRACED BY:
DATE OCT.16/1995 SCALE 1:1250

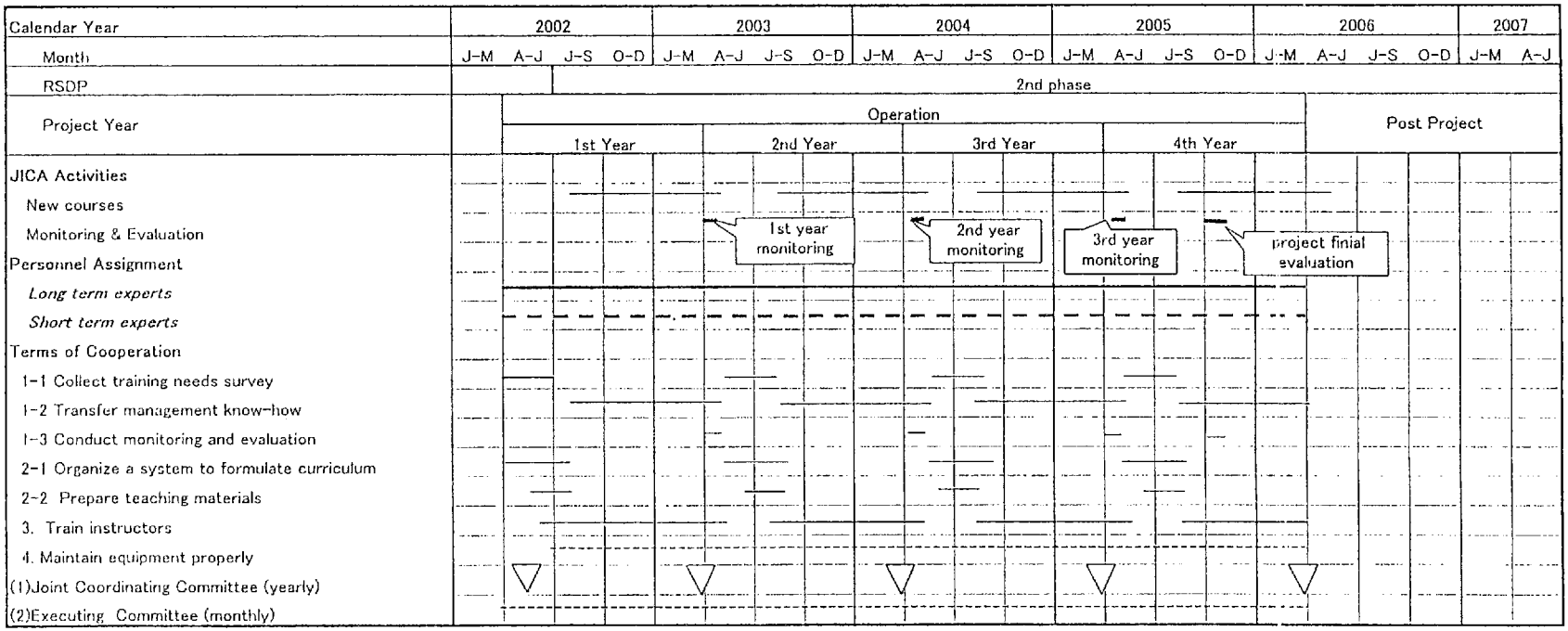
Annex 9: Tentative Planned Training Courses

	Name of courses		Road construction equipment Management and Operation Course	Road construction equipment Mechanics Course			Road Construct and Maintenance Supervision of MCM Course
				Technician course	Specialist course	Manager course	
			To be improved	To be improved	To be improved	To be improved	To be improved
1	Target of training		In order to learn an appropriate operation and execution technique ①accurate and efficient operation for bulldozer, excavator, grader, loader, roller, dump truck. ②daily maintenance ③efficient and safety mechanized execution method	In order to learn the ability to find out the cause of trouble and to make an appropriate maintenance ①structure and function of equipment ②periodic maintenance, basic over haul, assemble ③in site maintenance, adjustment, urgent maintenance	In order to learn the total maintenance technology ①heavy maintenance and rebuild ②preventive maintenance, prediction for cause of trouble	In order to learn an effective management for equipment ①most appropriate maintenance planning, maintenance work planning ②parts management, prediction cause of trouble ③testing method, maintenance standard, maintenance cost analysis	In order to learn an efficient road construction and maintenance ①general technology of road structure and execution ②execution planning, quality control, quantity control, testing method, supervising method ③cost, estimate and analysis management ④contract management
2	Training capacity		35persons	24persons	12persons	10persons	24persons
3	Training period (approximate months)		3weeks per machine (6months for all machines)	20weeks (5months equiv.)	8weeks (2months equiv.)	3week (0.75months equiv.)	12weeks (3months equiv.)
4	Training times per year		9times	2times	4times	4times	3times
5	Number of trainees per year		315persons	48persons	48persons	40persons	72persons
6	Course composition	Lecture	1weeks	7weeks	3weeks	1week	8weeks
		Practice	2weeks	13weeks	5weeks	2week	4weeks
		total	3weeks	20weeks	8weeks	3week	12weeks
7	Entry		ERA criteria (to be discussed)	ERA criteria (to be discussed)	ERA criteria (to be discussed)	ERA criteria (to be discussed)	ERA criteria (to be discussed)
8	Number of chief instructor		1	1			1
9	Number of instructor		14	12			11

Annex 10: Project Design Matrix (PDM)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Importan: Assumption
Overall Goal: ·Road sector's human capacity of road construction and maintenance is strengthened for its quality and quantity in terms of mechanized construction method (MCM).	· promote or change occupation titles of the graduates ·fulfil the skilled labor requirement.	·ERA's employment records ·interview of the superiors ·firm's employment records ·interview of the employer	
Project purpose: Alemugena Training and Testing Center (AT&TC) enables to provide the target group (equipment operators, equipment mechanics, and supervisors) with proper training of mechanized construction method (MCM).	(for 4 years in 2006) 1,020 certificates of equipment operators 440 certificates of equipment mechanics 230 certificates of supervisors	·certificate	1. Domestic Construction Industry Development is progressed. 2. The graduates join road construction and maintenance works. 3. AT&TC continues the training and testing after the project.
Outputs: 1. Training management is more effective. 2. Efficient training course program is prepared. 3. Levels of the technical skills and teaching capacity of instructors are improved 4. Training equipment and materials are properly arranged and managed. 5. A method of training needs analysis (TNA) for the public and private sectors' business needs is developed and the training plan is prepared by the TNA.	1. Necessary teaching materials are prepared. 2. Improved curricula are designed. 3-1. Instructors attain required technical and teaching levels. 3-2. Trainees attain the sufficient levels of skills and demonstrate good performance. 4-1.Provided equipment is used efficiently for the improved training. 4-2. Instructors enable to use the training equipment properly. 5-1. Requirement of training in AT&TC are increased. 5-2 Job specifications (JOS) required for business needs are reviewed by TNA periodically. 5-3 The present training specifications and the training plan are reviewed and revised by JOS promptly.	1.Evaluation by trainees, AT&TC manager, and JICA experts 2.Evaluation by trainees, AT&TC manager, and JICA experts 3-1. Evaluation by trainees, AT&TC manager and JICA experts. 3-2.Test of AT&TC 4-1 Evaluation by instructors, AT&TC manager, and JICA experts 4-2 Operation records of equipment 5-1. Request numbers and registration record 5-2 Evaluation by the Joint coordinating committee (ERA, AT&TC, the private sector, JICA experts) 5-3 Evaluation by the executing committee (AT&TC, Inspectors, JICA experts)	
Activities: 1-1 Collect training needs (road conditions, needs, skill levels of C/Ps, instructors, trainees, the private and ERA staff) using TNA. 1-2 Establish management know-how 1-3 Conduct monitoring and evaluation 2-1 Organize a system to formulate curriculum 2-2 Prepare teaching materials 3. Train instructors 4. Maintain equipment properly	Inputs: <u>Japanese side</u> - Experts: (Long-termed experts) Chief advisor (4 years) Coordinator (4 years) Expert of road construction equipment management and operation (2 years) Expert of road construction equipment mechanics (4 years) Expert of road construction and maintenance supervision of MCM (2 years) (Short- termed experts) (to be requested) -Equipment: Road construction equipment, training machines and tools, and teaching aid materials -Counterpart training in Japan (to be requested)	<u>Ethiopian sides</u> -Counterparts: Project manager (Head of AT&TC) Counterparts personnel (Chief instructors) Administrative and supporting staff -Facilities All the facilities required for the project implementation including offices and facilities for Japanese experts - Running expenses All the project expenses except those mentioned in the "Japanese side) -Tax and any government charges for the input form the Japanese side	1. AT&TC has sufficient facilities. 2. Trainees achieved level of basic education 3. AT&TC has enough training budgets 4. AT&TC recognizes policies of the privatization of road construction. **Pre-condition** 1. ERA continue the adoption of MCM in road construction and maintenance. 2. Road sector budget and Road fund is maintained. 3. RSDP is progressed. 4. ERA progresses to introduce contract-out in road construction and maintenance.

Annex 11 Tentative Plan of Operation (PO)



Annex 12

Terms of Reference of Japanese Experts

Long-termed experts

(1) Chief Advisor

Assignment Period: 4 years

Major activities:

a) To provide advice about technical and management matters related the project
b) To assume responsibility for the project implementation
c) To prepare a schedule of implementation for the project management
d) To report a status and progress of the project technical assistance and management at the Joint Coordinating Committee
e) To arrange the public relations for advertisement of the project
f) To arrange monitoring of the Project in collaboration with Ethiopian counterparts
g) To monitor policy of road sector and to give advices in respect of human development and training.
h) To study progress of DCID together with other long termed experts and counterparts
i) To prepare a advisory report having recommendations on the DCID in respect of human development and training
j) To organize a seminar for the above report showing Japanese experiences in promotion of construction industry.
k) To prepare a training plan by reviewing the present training specifications based on the Job specifications (JOS) in collaboration with the experts (See TOR g) of Coordinator)

Counterparts: The Project Director, Chief of AT&TC and Assistant of ERA

(2) Coordinator

Assignment Period: 4 years

Major Activities:

a) To manage and coordinate the allocation budget for which is necessary to conduct the Project (if any)
b) To manage the equipment, facilities, and articles which are provided / purchased by Japanese side
c) To coordinate works for linkage between Ethiopian side and Japanese side
d) To conduct other necessary works for smooth implementation of the project
e) To assist in preparing a financial statement and a balance sheet
f) To collect training needs in collaboration with Ethiopian side
g) To analyze training needs and prepare job specifications (JOS) for the following three courses in collaboration with other long-term experts
h) To prepare TNA manual
i) To conduct tracing survey for the graduate
j) To develop cost-effect and cost-benefit analysis based on the above results a) with long termed experts and counterparts
k) To prepare a tracing survey manual.

(3) Road construction equipment management and operation

Assignment Period: 2 years

Major Activities:

a) To instruct the counterparts for preparation of the curricula and teaching materials of a course for road construction equipment management and operation
b) To instruct the counterparts for training instructors
c) To instruct proper maintenance management for equipment provided by Japanese side.

Counterpart: Equipment Training Section Head

(4) Road construction equipment mechanics

Assignment Period: 4 years

Major Activities:

a) To instruct the counterparts for preparation of the curricula and teaching materials of a course for road construction equipment mechanics
b) To instruct the counterparts for training instructors
c) To instruct the counterparts for proper maintenance management for equipment provided by Japanese side

Counterpart: Trades and Craft Training Head

(5) Road construction and maintenance supervision of MCM

Assignment Period: 2 years

Major Activities

a) To instruct the counterparts for preparation of the curricula and teaching materials of a course for road construction and maintenance supervision of MCM
b) To instruct the counterparts for training instructors
c) To instruct the counterparts for proper maintenance management for equipment provided by Japanese side
d) To prepare a training plan for environment assessment and mitigation measures in road construction in accordance with Ethiopian regulations together with other long termed experts and counterparts
e) To prepare a training plan for road planning, construction method planning, tender preparation for optimizing MCM and LBM together with other long termed experts and counterparts
f) To prepare a training plan of PCM in collaboration with the other long termed experts

Counterpart: Trades and Craft Training Head

Short-termed experts (when the Project requires)

(1) Field: Training Needs Analysis (TNA)
(2) Field: Environment and Construction Method Evaluation
(3) Field: Project Impact and Tracing Survey
(4) Field: Domestic Construction Industry Development Study

Annex 13

Major Equipment List

Type	Specification	Q'ty	Availability (Refer to Footnote)	Procurement (Japan or Ethiopia)
Bulldozer	20t 200PS	1	P	Japan
	(Cat. :D7G)	1	U	Ethiopia
Motor Grader	Blade Length 3.7m	2	P	Japan
	(KOMATSU:GD611A)	1	U	Ethiopia
Wheel Loader	Bucket Capacity: 1.8~2.5m3	1	P	Japan
	Bucket Capacity: 2.7~3.1m3	1	P	Japan
Excavator (Wheel Type)	Bucket Capacity: 0.3~0.4m3	1	P	Japan
Excavator Crawler Type)	Bucket Capacity: 0.7~0.8m3	1	P	Japan
Vibration Roller	(BOMAG: BW161)	1	U	Ethiopia
Tire Roller	Operating Weight: 8~10t	1	P	Japan
Dump Truck	Payload: 9~10t	1	P	Japan
	(Nissan: CW450)	2	U	Ethiopia
Water Tanker	Tank Capacity: 10000lit	1	P	Japan
	(Nissan: Tank Capacity : 30000lit)	1	U	Ethiopia
Asphalt Distributor	Tank Capacity: 6000lit	1	P	Japan
Tip Spreader	For 10t Truck	1	P	Japan
Crane Truck	Max. Load: 20~25t	1	P	Japan
Car	4 Wheel Drive	2	P	Japan
Spare parts	Lumps sum	1	P	Japan
Repare machines & Tools	Lumps sum	1	P	Japan
Testing machines and Tools	Lumps sum	1	P	Japan
Training and Teaching Aids	Lumps sum	1	P	Japan
(NOTE) P: To be procured U: Existing and to be used. R: Existing but not to be used.				

Annex 14: Counterparts and Administration Staff

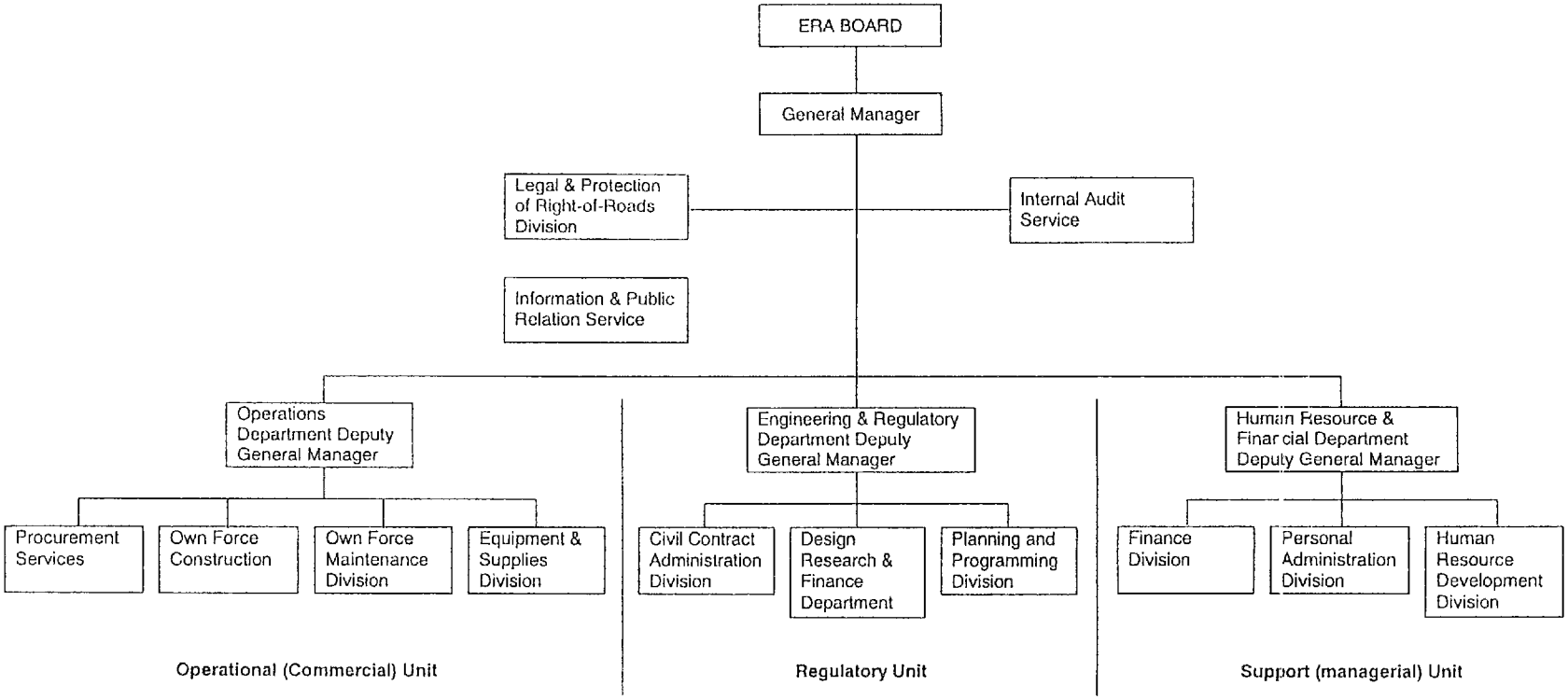
(1) Counterparts

Japanese Expert	Counterpart	Instructors
Chief Advisor	The Project Director Assistant of ERA (Manager of Human resource development Division) AT&TC Chief	
Road construction equipment management and operation expert	Equipment Training Section Head	14
Road construction equipment mechanics expert	Trades and Crafts Training Head	12
Road construction and maintenance supervision of MCM expert	Engineering Section Head	11

(2) Supporting Staff

Secretary	2
Drivers	2
Others	to meet requirement

Annex 15 (1)



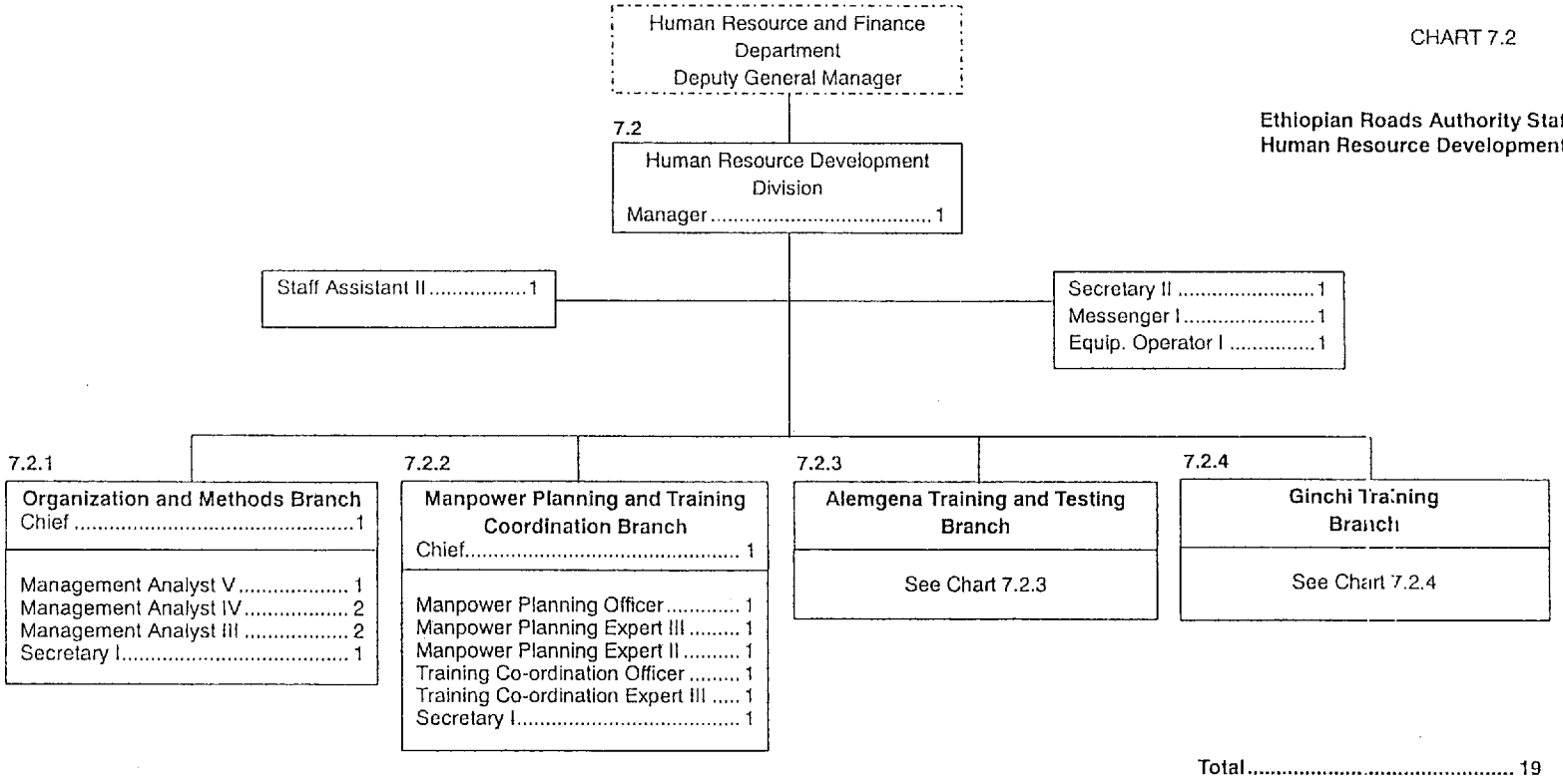
Source: ERA Staffing Plan, ERA, June 1988

ERA's Orgagnization

Annex 15 (2)

CHART 7.2

Ethiopian Roads Authority Staffing Plan
Human Resource Development Division

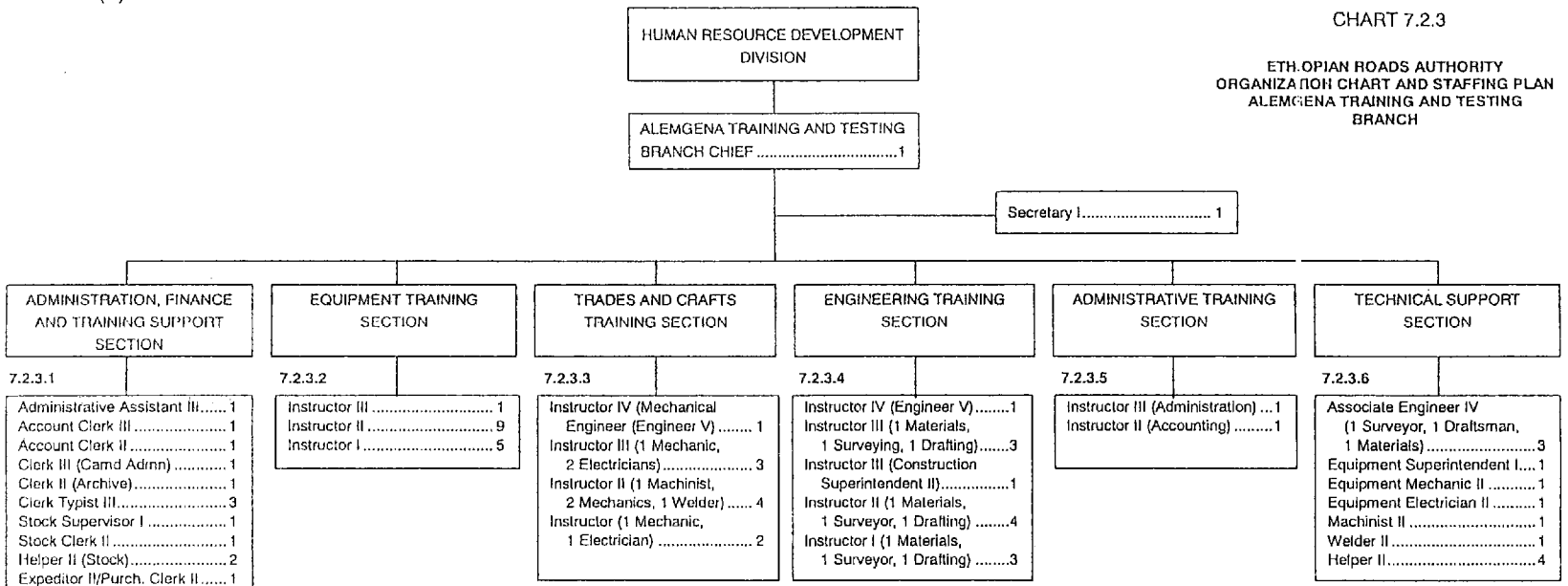


Total 19

Annex 15 (3)

CHART 7.2.3

ETHIOPIAN ROADS AUTHORITY
ORGANIZATION CHART AND STAFFING PLAN
ALEMGENA TRAINING AND TESTING BRANCH

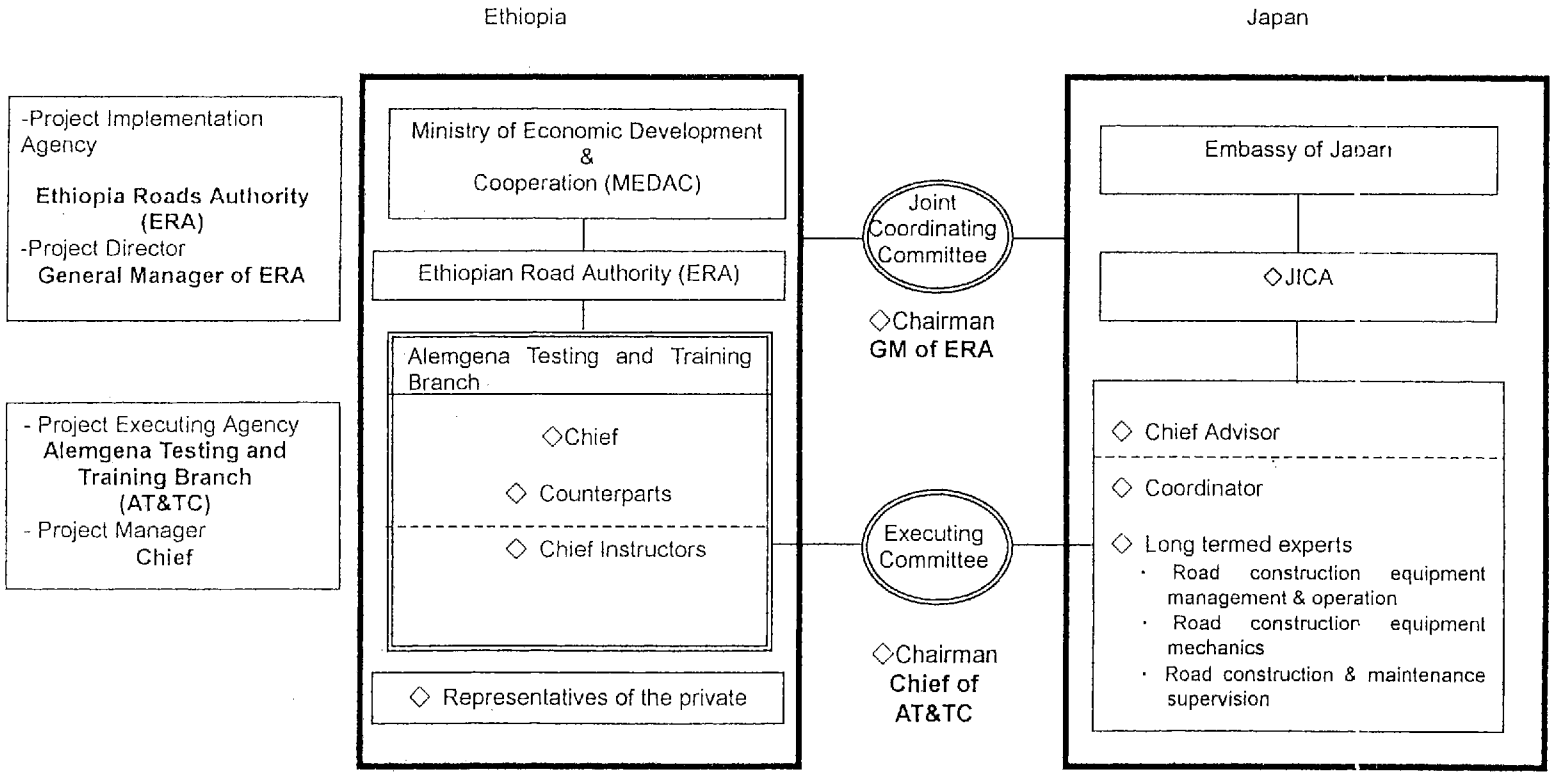


Total Alemgena Training and Testing Branch Staff

Permanent	**108**
Temporary	**14**
Total	**122**

Annex 16: Tentative Organization Chart of the Project

◆Project Implementation Framework



◇member of Joint Coordinating Committee
◇the representatives of the private sectors are private road construction companies, equipment dealers, and road users.

Appendix 1

Estimate of numbers of Manpower required for Mechanized Construction Method (MCM)

[Estimate Method]

(1) The numbers of manpower required for mechanized construction method (MCM) was estimated by applying a method used for the Master Plan in April 1998 note), and by using information that a JICA preparatory team collected in April 2001. The project applying method (the project method) is shown at Fig. 1 " an Estimate Flowchart of Manpower for CMC"

(2) The project flow is divided into three sub-flows: Flow A: estimate of the standard number of manpower at a construction site unit (CSU); Flow B: calculation of total numbers of CSUs in RADP II; and Flow C: estimate of total required numbers of manpower for MCM.

(3) The above standard number of CSU are compared with the actual numbers at the on-going construction site for reviewing its correctness.

Note) Ethiopian Roads Authority, ROAD SECTOR REFORM TRAINING MASTER PLAN (Second Draft), DTZ, ADMAS Management and Economic Consultants(ADMEC), April 1998

Flow A: estimate of the standard number of manpower at a construction site unit (CSU)

1. **[Decision of a construction site unit]**

The number of manpower of MCM for a construction site unit (CSU) is estimated from the standard model site assumption. In the Master Plan, it is defined that the standard construction site makes a 50km long road work per year.

2. **[Standard number of equipment operators]**

The Mater Plan estimated the number of equipment operators for a CSU to be 67. This numbers is considered as standard number of equipment operators, which will be used for calculation of total required numbers in Activity 11. The operators are classified in accordance with ERA's job titles and shown in Table 1 below.

Table 1: Equipment Operators Required at a CSU of MCM

ERA Title	Numbers	Operable Equipment
Equipment Operator's Helper	0	
Equipment Operator I	17	4X4, Tractor
Equipment Operator II	26	Dump Truck・Roller・Tanker etc.
Equipment Operator III	16	Loader, Fuel Tanker etc.
Equipment Operator IV	8	Bull dozer, Motor grader, Heavy crane etc.
Total	67	

Source: the above Maser Plan

Note: Equipment Operators IV include Stationary equipment operators I (for generators etc.) and Stationary equipment operators II (for crushing plant etc.)

3. **[Standard number of equipment mechanics]**

The Master Plan, however, did not include the necessary number of equipment mechanics. The project requires 13 equipment mechanics, which is 20% of the total equipment operators, as the standard number of equipment mechanics at a CSU. (This percentage is based on experiences in on the job training of AT&TC and confirmed at an Advisory Office of RSDP in ERA))

4. [Standard number of supervisors]

The Master Plan did not decide standard number of supervisors either. Therefore, the project estimated three persons to be required for a CSU of MCM. The targets are senior site management staffs such as a resident engineer, an engineer for construction engineering, and an engineer for construction management, shown in an organization structure of typical construction site. (See Fig 2)

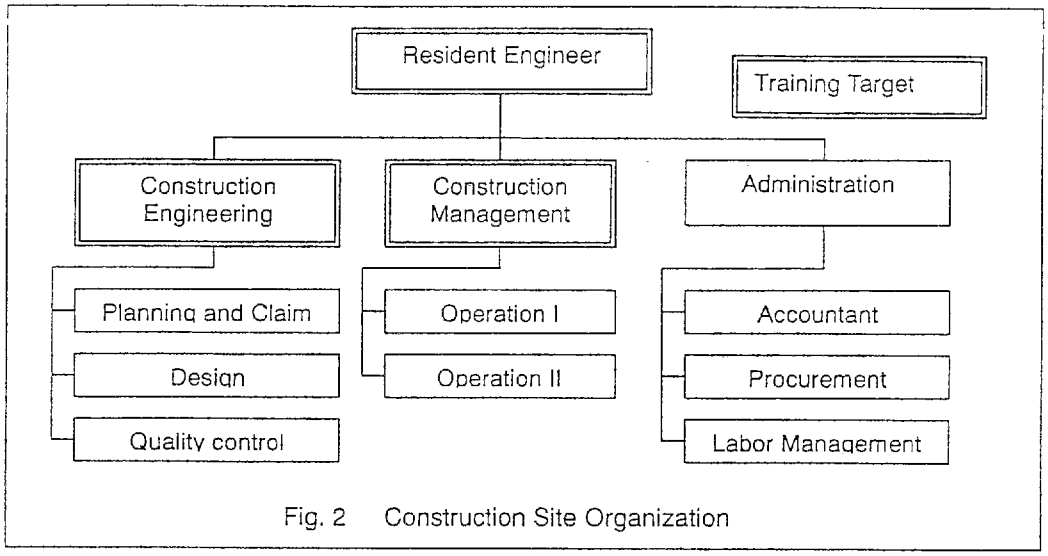


Fig. 2 Construction Site Organization

Source) Mr. Sintaro Yano "Doboku Seko System" (Construction System) Kajima Shuppan, 1981

5. [Manpower at a sampled construction site]

In order to examine correctness of the standard number of manpower at a CSU, an on-going construction site was taken as a sample for comparison. The sample site is Japanese contractor's site where road rehabilitation is under way by Japanese grant aid, which has a 190km long road section and a four-year construction period. Actual numbers of manpower at the sample site is shown in Table 2 below. There are 92 equipment operators for 91 equipment and 2 plants, and 72 mechanics including electricians. The construction management organization is similar to that of Fig. 2 above. Senior management staffs are Japanese engineers.

Table 2 Numbers of Equipment Operators at Sample Site

ERA Title	Numbers	Operable Equipment
Equipment Operator's Helper	0	
Equipment Operator I	6	4X4, Tractor
Equipment Operator II	42	Dump Truck・Roller・Tanker etc.
Equipment Operator III	31	Loader, Fuel Tanker etc.
Equipment Operator IV	13	Bull dozer, Motor grader, Heavy crane etc.
Total	92	

Source: JICA Preparatory Study, April 2001 "Monthly Report"

6. [Decision of standard number of manpower]

Standard number of equipment operators

The sample site has 1.3 times as many equipment operators as that of a CSU due to the difficult work conditions. The site requires a long distance of transportation of construction materials from borrow pit for embankment and crushing site for pavement materials. Therefore, the numbers of transport vehicles are quite larger than the standard number. Taking the above site conditions into account, the project decided to apply 67 of the standard number of equipment operators for estimate of training needs.

Standard number of equipment mechanics

For examining the standard number of equipment mechanics, the actual numbers of mechanics at the sample site was studied. The sample site has equipment mechanics who shares 32% of total equipment operators. Note 1). The sample site needs to increase it by 10% comparing a CPS because of the above site conditions. Therefore, the standard number of equipment operator, 20% of equipment operators, is applied to the project.

Note) As in the monthly progress report, equipment operators and vehicle machinists are registered a "mechanics", the numbers of vehicle drivers are added to ones of equipment operators for this estimate.

Standard number of supervisors

The project applied the standard number of supervisors because the management organization at the sample site is similar to a CPU.

Further Survey

As mentioned above, the required numbers and necessary tusks of manpower will vary due to differences of the site conditions, and the contractors' policy on MCM. As MCM constructions increase, future changes in the training needs will be surveyed by monitoring of PDM and the Joint Coordinating Committee of which representatives of the private sector are members. Furthermore, during the project implementation, it is necessary to increase sampling numbers from the construction sites of RSDP II, to investigate the actual sites as well as study on progress reports for review on the above standard number of manpower.

Flow B: Estimate of numbers of CSUs of RSDP II

After estimating the standard number of manpower at a CSU, the Flow B's activities are conducted as follows.

7. [Road work quantity of RSDP II]

A total road work quantity is decided in the program of RSDP II. Note)

Note) ERA, ROAD SECTOR DEVELOPMENT PROGRAM II (JULY 2002-JUNE2007), First Draft, May 2001

8. [Annual work plan]

An annual work plan in the above program shows an annual maximum work quantity to be 2,460km, an annual quantity of 1,458km, and an annual averaged quantity of 2,300km.

9. **[Numbers of CSUs for RSDP II]**

As the above estimated annual quantities are divided by 50km, the numbers of CSUs for RSDP are calculated as follows; an annual maximum numbers of 49 CSUs, an annual minimum numbers of 30 CSUs, and an annual averaged numbers of 46 CSUs.

10. **[Numbers of CSUs for ERA Road Maintenance]**

In addition, ERA operates 56 sections for road maintenance by MCM in the country. Each section has an approximately 300km of maintenance roads. When about 15~20% (50km) of road lengths out of the 300km is planned to be maintained annually, the numbers of CSUs for ERA road maintenance is estimated to be 56.

11. **[Total Numbers of CSUs]**

Total numbers of CSUs are calculated by adding CSUs of RSDP II and ones of ERA road maintenance. (Table 3)

Table 3 Required numbers of manpower of MCM

Ethiopian Fiscal Year (July ~ June)		FY2002	FY2003	FY2004	FY2005	FY2006	Averge
RSDP II Road work quantity (km)	8)	1,852	2,415	2,460	1,485	1,562	1,955
Numbers of CSUs for RSDP II	9)	37	48	49	30	31	39
Numbers of CSUs for ERA Road Maintenance	10)	56	56	56	56	56	56
Total Numbers of CSUs	11)	93	104	105	86	87	95
Equipment Operators (persons)	12)	6,231	6,968	7,035	5,762	5,829	6,365
Equipment Mechanics (persons)	13)	1,246	1,394	1,407	1,152	1,166	1,273
Supervisors (persons)	14)	279	312	315	258	261	285

Flow C: Required numbers of manpower

12. **[Required total annual numbers of equipment operators]** (See Table 3)
Multiplying the standard number of 67 by total numbers of CSUs, approximately 6,300 equipment operators will be required annually for MCM during RSDPII.

13. **[Required total annual numbers of equipment mechanics]** (See Table 3)

Applying 20% of the above total numbers of equipment operators, approximately 1,270 equipment mechanics will be required annually for MCM during RSDP II.

14. **[Required total annual numbers of supervisors]** (See Table 3)

Multiplying the standard number of 3 by total numbers of CSUs, approximately 280 supervisors will be required annually for MCM during RSDPII.

[END]

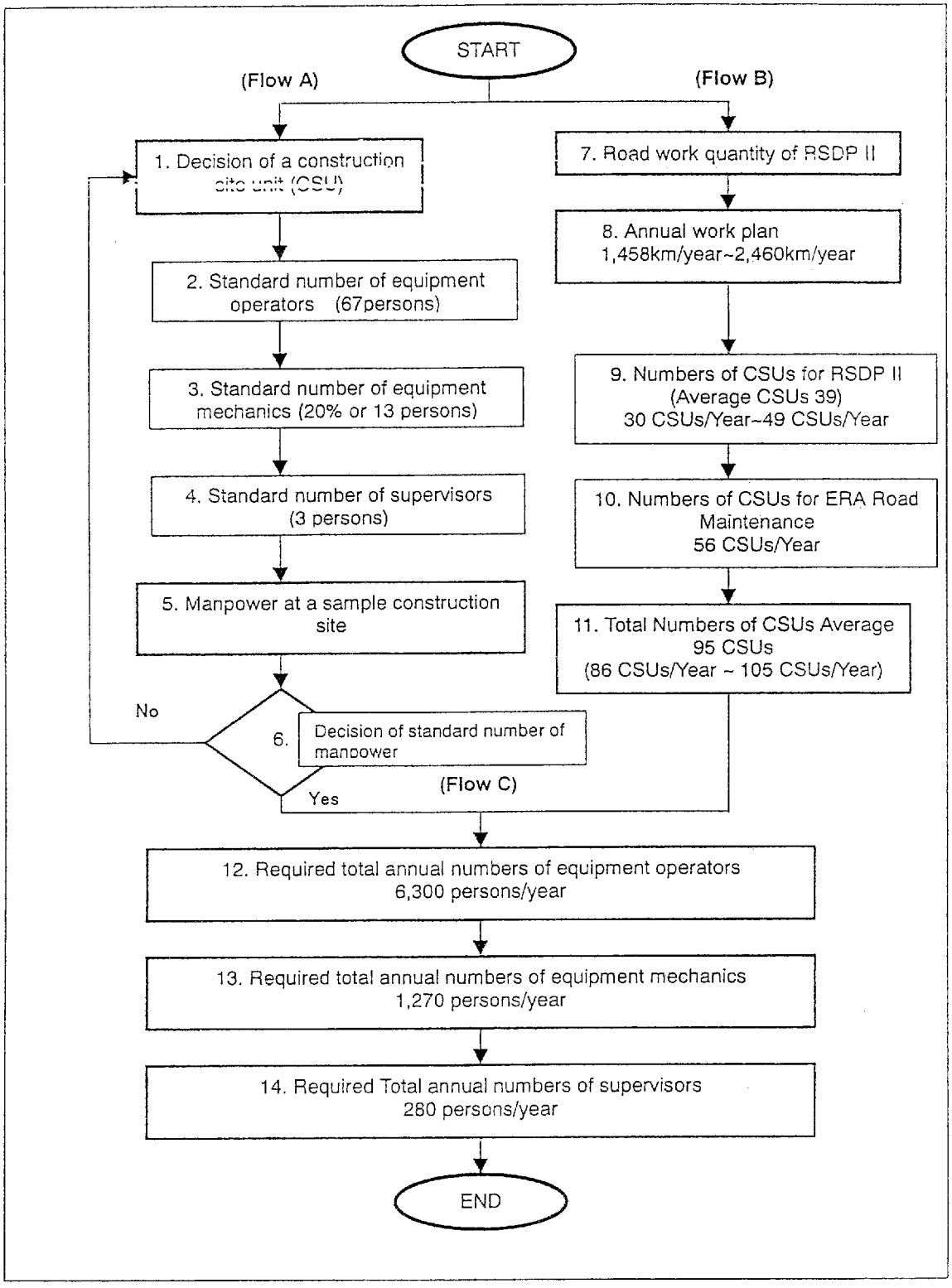


Fig 1 an Estimate Flowchart of Manpower for MCM

Appendix 2 Project Output

For monitoring and tracing the graduate from AT&TC after the training, the project output flow is shown below.

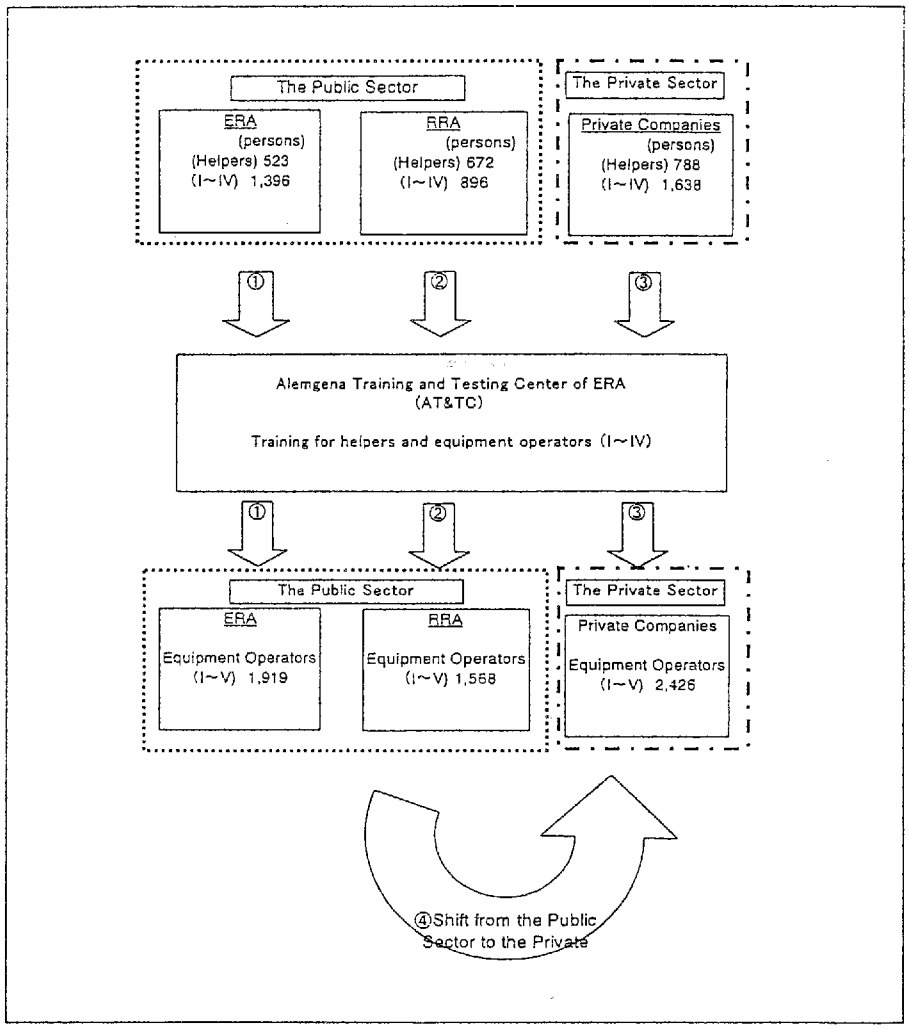


Fig. Graduates Movement

Note:

1) ①ERA graduates return to ERA. ②RRA graduates return to RRA. ③The private graduates return to the private companies. ④The graduates of the public sector shift to the private sector.
2) Measurement indices in PDM is useful to trace the graduate. According to the chief of AT&TC, 90% of the equipment operators who work in the private sector are retired ERA operators.