4-2-3 Design of Buildings

1) Planning

(a) Administration/classroom building

As mentioned in the section on facility layout planning, it is almost impossible to use single storey buildings alone in view of the site area, its shape and the scale of facilities required. Therefore, in consideration of room size and patterns of use, the administration/ classroom building is planned to be 2-storeyed

As for the layout of rooms, a compact plan can be conceived and its total floor area can be minimized if a center corridor design is employed. If the fact that the site is in the tropics is taken into consideration, however, environmental conditions will be improved if a side corrider design is adopted for better ventilation. To prevent elongation of traffic lines, rooms will not be lined up right next to each other. Instead, a courtyard will be in the center and the rooms laid out surrounding it.

Also, to prevent strong sunshine and rain penetration, the building will be surrounded by corridors on its four sides.

(1) The administration division and part of the education division including the training staff room will be located on the ground floor and the rest of the education division on the 1st floor.

The layout of the ground floor rooms has the administration division nearer to the entrance and the education division farther from the entrance, symbolizing their division according to function.

(2) The office is designed to allow centralized control of all facilities in this training center.

To this end, all control devices such as the telephone exchange, the PA system, fire-alarm signal receiver, etc will be centered in this office.

(3) The reception room is for the use of the Center's management board and can accommodate up to 10 visitors. For those who pay visits to the director or the secretary, the reception corner in each room is to be used.

(4) As the conference room is used for liaison meetings between training staff members and administrators and for briefing guests, it is situated near the training staff room on the ground floor.

(5) As classrooms are also used as trainees' homerooms, a classroom is assigned to each course. However, the evening course trainees are supposed to use one of the classrooms jointly.

As overhead projectors shall be used to assist lessons, the necessary distance for projection should be taken into consideration. Also, space must be available for trainees to store their tools. Two classrooms separated by movable partitions will be used as one large room to accommodate larger numbers of people on occasions such as lecture meetings and entrance and graduation ceremonies. These two classrooms are laid out so that they can be reached easily from the entrance.

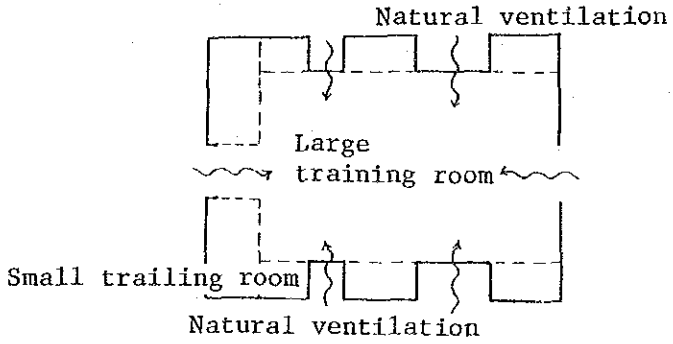
(b) Training Buildings

The training building is divided in two based on the work performed, training building No. 1 and No. 2, and facilities for vehicle inspection and car washing that are considered desirable to be independent are housed in independent buildings.

Between training buildings No. 1 and 2 are related facilities including a trainees' locker room, shower room and toilet.

Training building No. 1 is to include a general repair training room, electrical equipment training room, parts washing training room, tire maintenance training room, etc. where work is relatively quiet and No. 2 is to include a machinist training room, manual work training room, welding training room, injection pump training room, etc. for work that generates noise and/or emission gas and where welding takes place. Each building will also have a tool room and the storage space necessary for the respective practical exercises. Each building will have two classrooms as a quiet place is needed to outline precautions and preliminary knowledge for trainees prior to practical exercises and for a Q & A sessions after the exercises.

As in the case of the administration/classroom building, a side corridor plan and a courtyard to allow natural ventilation are desirable. Training buildings, however, must have a mix of rooms of various sizes from large to small as the contents of training call for a variety of areas. Therefore, it is very difficult to line up rooms in a row along the side corridor or to employ a courtyard. Consequently, the plan is such that small rooms are arranged around a large room so that the latter may receive outdoor air directly.



Concept Diagram of Practical Training Building

(1) General repair training room

As the practical maintenance exercises will employ actual vehicles, a vehicle passage is planned for the center to facilitate the exit

and entry of vehicles and 7 work areas are laid out on both sides of the passage, totalling 14 in all. Each work space is to have ample area to enhance safety and each work area will be clearly marked off on the floor with paint.

Faucets, drainage pits, perforated plates, power outlets, compressed air outlets, etc. are located at proper points.

(2) Electrical equipment training room

As repairs are made with the front half of the actual vehicle in the room, the opening must be designed with sufficient area and a rolling shutter.

(3) Oil storage

The floor must be designed to resist oil and, at the same time, allow sufficient ventilation. As inflammable items are to be stored here, it has to be completely separated from other rooms.

(4) Battery room

As this room could fill up with explosive gas, it has to be perfectly separated from others and ventilated sufficiently.

(5) Air compressor room

As noise is generated here, the interior walls must be sound-proofed.

(6) Component repair training room

As engines are run here, a duct system should be introduced to discharge emission gases. The floor must be finished to resist oil and have a water drainage ditch, grease trap and oil trap.

(7) Body repair training room

This place allows direct access of an actual vehicle from outside and its opening is equipped with a rolling shutter.

(8) Painting training room

The paint booth is so laid out that an actual vehicle can enter and leave directly from outside. Ventilation is provided by a fan in the booth.

(9) Engine dynamo measuring training room

Ventilation should be sufficient in addition to soundproofing. As part of the equipment uses a large amount of water, a water tank will be provided for recycling water. Also, there is a duct system planned for discharging gas emissions.

(10) Injection pump training room

An air-conditioning system is provided since a constant temperature condition is required for measurement. However, the system doesn't have to be totally accurate. Hoods are located over the measurement devices and the air is directly discharged through ducts.

Ventilation should be sufficient and devices and instruments must be explosion-proof.

(c) Car washing/inspection training bldg., training-use car garage

These buildings are built independently but are located in the vicinity of the training buildings because of their functions.

(d) Canteen

This is positioned between the administration/classroom building and the training buildings for easy access from both.

2) Section Planning

As mentioned in the section on basic policies, sections are so planned that the architecture of the buildings matches the climate, history and environment of Sri Lanka. The sections are shaped so as to block strong sunshine, prevent rain penetration and take advantage of natural ventilation.

(a) The four sides of each building will have deep eaves and corridors.

(b) Except for rooms that functionally require air conditioning or mechanical ventilation, all rooms have transoms directly below the ceiling to ensure natural ventilation.

(c) To create a comfortable environment with the natural ventilation mentioned above, the ceiling height of the buildings will be 4 m on the ground floor and over 3.7 m on the first floor.

(d) To enhance heat-insulating effects, the roof of the administration/classroom building will first be made of concrete slabs and then covered with an inclined roof. Ventilation of the "loft" should be sufficient.

(e) As the column spacing of the training buildings is longer, a concrete slab roof is difficult to employ.

To thatch the roof, therefore, long steel sheets lined with a heat insulating material are to be used. At the same time, a monitor roof will be in the center of the roof for ventilation purposes.

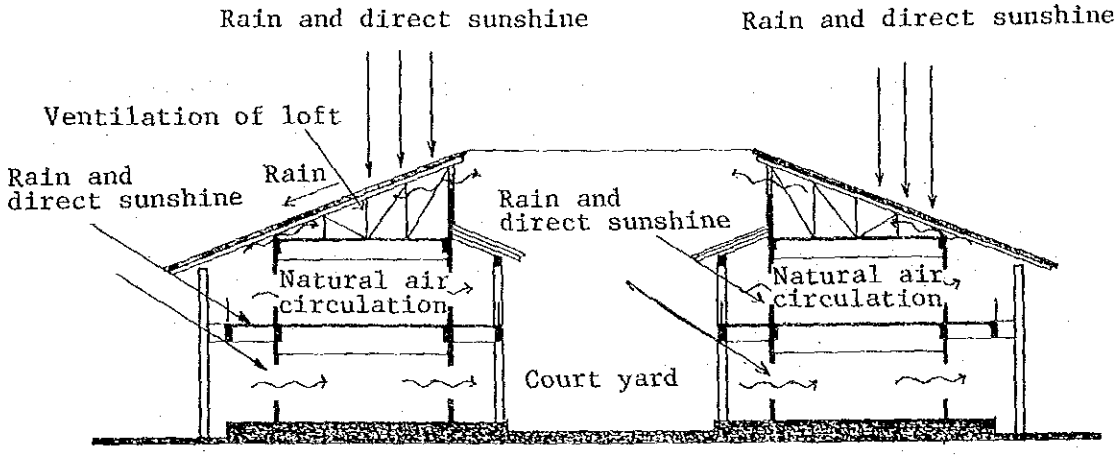
Except for rooms that have to be independent from others because of air conditioning and sound insulation needs, the partition walls of all rooms will not extend to the roof but will be limited to a height of 4 m. Also, these rooms will not have their own ceilings so that the spaces above will be connected to facilitate air circulation on a large scale.

(f) The depth of the practical training building must necessarily be greater because of its functional requirements and it is difficult for the central part of the building to receive natural lighting from windows. To overcome this drawback, skylights will be on the monitor roof.

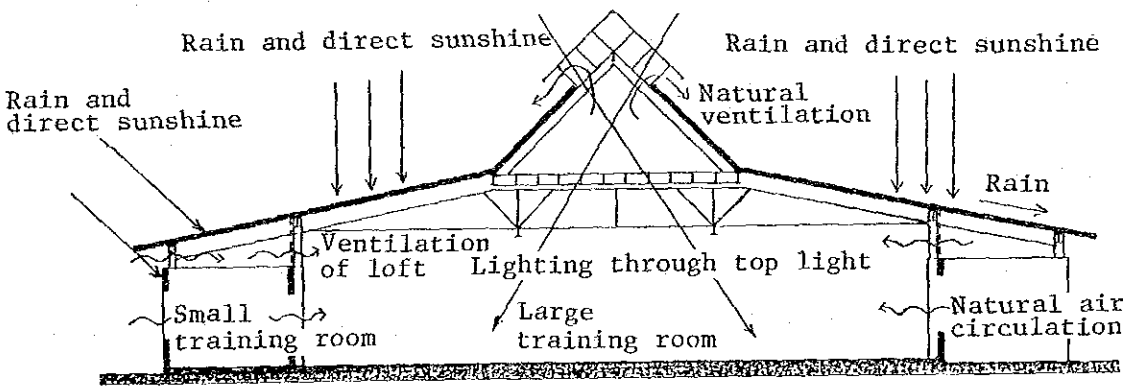
(g) The roof of each building is designed to be inclined so that rainwater may run off quickly.

(h) The shapes of each building are designed such that the maintenance and control of building facilities can be done easily.

The training buildings should be planned very carefully as they have a complicated network of equipment wiring and ducting including electric wiring, compressed air piping, emission gas discharging ducts, monorail hoist, etc.



Section of Administration/Classroom Building



Training Building Section

3) Structure Planning

The administration/classroom building will be made of in-situ reinforced concrete as it is considered best in view of its design and scale.

The training building will have a steel frame structure as a longer column spacing is required to minimize the number of columns, which are obstacles to practical training.

With respect to the car washing yard, vehicle inspection training building, garages, substation, canteen, guard house, etc., although reinforced concrete structures are acceptable in view of their structural scales, steel frame structures for roofs will be employed to reduce the construction period.

The walls of each building will be of brick or concrete block masonry.

(a) Ground conditions

This training center is on the flood plain of the Kelani Ganga and has a top alluvial stratum consisting of very soft organic clay to a depth of 6 to 10 m. Immediately below it is a stratum of sand which is more compacted but it is soon replaced by a soft and weak clay-filled stratum. The bedrock is located 18 to 19 m under the ground.

Judging from such ground conditions, it is considered reasonable to place a foundation supported by piles reaching to the becrock 18 to 19 m beneath the ground as the foundation of the buildings of this training center.

Incidentally, the ground level of this site has to be raised by about 1.2 m by landfilling. The volume of settlement due to this landfilling is predicted to be 20 to 30 cm and it is estimated that settlement will be completed within 3 to 6 months. Therefore, land grading

work should include landfilling to raise the ground level by 20 to 30 cm. Paving should be done in the final stage of construction to avoid the influence of ground settlement.

(b) Structural design

The administration/classroom building and the other buildings except the training buildings will be of a reinforced concrete rigid fram structure and the exterior and partition walls will be made of brick or concrete block masonry.

The roof truss will be made of steel frame.

The training buildings will be of steel frame.

As Sri Lanka uses British standards as its design standards, the following standards will also be adopted for this project.

Load conditions	British standards
Reinforced concrete structure	British standards
Steel frame structure	Calculation standards of the Architectural Institute of Japan

The following are the load conditions.

(1) Live load (kg/m^2)

Office	225
Classroom	306
Corridor/Hall	306
Practical Training Building	510

(2) Wind load

Basic wind speed for monsoon belt 35 m/sec

(3) Seismic load

This is not relevant as Sri Lanka has had no earthquakes to date.

(c) Materials used

Materials to be used as structural materials are to be procured in the domestic market to the extent possible. Only materials of which supply capacity and quality are insufficient will be procured in Japan.

Cement	: Ordinary Portland cement, locally procured
Coarse aggregate	: Local crushed stone
Fine aggregate	: Local river sand
Reinforcement bars	: Deformed reinforcement bars made in Japan SD30, SD35 (JIS products)
Steel frame	: Shaped steel made in Japan, SS41, SSC41 (JIS products)

4) Facility Planning

The basic policies of facility planning for the project are to employ systems for which maintenance and upkeep are easy, equipment for which after-sale service is locally available and design systems that consume less electricity.

(a) Air conditioning/ventilation system

The use of air conditioning/ventilation equipment is limited to rooms that require it functionally and an air ventilation system that takes advantage of natural air ciculation effectively will be employed to the extent possible.

(1) Room equipped with air conditioning

° Director's room, Secretary's room, Reception room, Outside lecturers' room, Injection pump exercise room

Design temperature	25 to 27°C
Design humidity	Natural, as is.
Air-conditioning system	By an air-cooled package air conditioner

(2) Rooms ventilated mechanically

The toilet, Kitchenette, kitchen, shower room, oil storage, battery room, painting training room and injection pump training room. With respect to the engine dynamo measuring training room and component repair training room, gas emissions will be directly ejected outside by ducts buried under the floor.

(3) Rooms equipped with ceiling fans

° Office, meeting room, training staff room, classrooms, library, printing room, medical room and hall.

° General repair training room, parts washing training room, tire maintenance training room, electrical equipment training room, machinist training room, component repair training room, manual work training room, welding training room, body repair training room, engine dynamo measuring training room, power booster testing training room and classrooms.

° Inspection training building

° Canteen

° Guard's house

(b) Water supply/drainage and plumbing system

(1) Water supply

A Colombo municipal water supply pipe 4 inches in diameter is located along the Baseline Road. According to the Water Supply & Drainage Board, branching from the above water supply pipe at one point with a 1-inch pipe is possible.

As it is impossible, however, to secure the necessary volume of water supply from this direct branching, a water receiving tank and an elevated water tank will be located on the premises.

Calculation of the necessary volume of water assumes 100 trainees and 40 staff members, 140 in all, plus an extra 50 people occasionally. The water consumption in the training buildings and canteen is also included.

For the evening course, 20 trainees and 10 staff members, 30 in all, are assumed.

Water for use by people

Trainees (daytime)	80 ℓ/person·day	x	100 persons		=	8.000 ℓ/day
Staff members (daytime)	100 ℓ/person·day	x	40 persons		=	4.000 ℓ/day
Trainees(evening course)	80 ℓ/person·day	x	20 persons	x 0.5	=	800 ℓ/day
Staff members (nighttime)	100 ℓ/person·day	x	10 persons	x 0.5	=	500 ℓ/day
Visitors	100 ℓ/person·day	x	50 persons	x 0.5	=	2.500 ℓ/day
				Total		15.800 ℓ/day

Average hourly water consumption 15.800/8 hrs = 1975 → 2000 ℓ/hr
—— ①

(Note) 1. The volume of water consumption is based on the Handbook of the Japan Society of Air-Conditioning and Sanitary Engineering.

2. The amount of water use by the evening course is assumed to be 50% of daytime.

3. The volume of water consumption by the canteen is included in the above.

Water for use in training

Parts washing training room			
Parts washing stand	840 ℓ/unit·hr x 8 units x 1 hr/day	= 6.720	ℓ/day
Automatic washer	15.000 ℓ/unit·hr x 1 unit x 0.5 hr/day	= 7.500	ℓ/day
Engine dynamo measuring training room	70 ℓ/unit·hr x 2 units x 7 hr/day	= 980	ℓ/day
Car washing training building	1.600 ℓ/unit·hr x 3 units x 1 hr/day	= 4.800	ℓ/day
	Total	20.000	ℓ/day

Average hourly water consumption 20.000/8 hrs = 2.500 ℓ/hr

— ②

(Note) 1. Hand washing water, etc. is included in the water for use by people.

2. As floors will be mopped, it has been disregarded.

3. Training rooms other than the above will not consume much water.

Total hourly water consumption ① + ② = 4.500 ℓ/hr

The capacity of the water receiving tank is sufficient to supply one day's (8 hours) volume

4.500 ℓ x 8 = 36.000 ℓ → 40 m^3

The capacity of the elevated water tank is 5 m^3 and is sufficient to supply one hour's volume.

In view of hygiene, the water receiving tank will be installed on the ground.

(2) Hot water supply equipment

To supply hot water to serve tea, an independent electric water heater with hot water tanks will be employed.

(3) Water drainage system

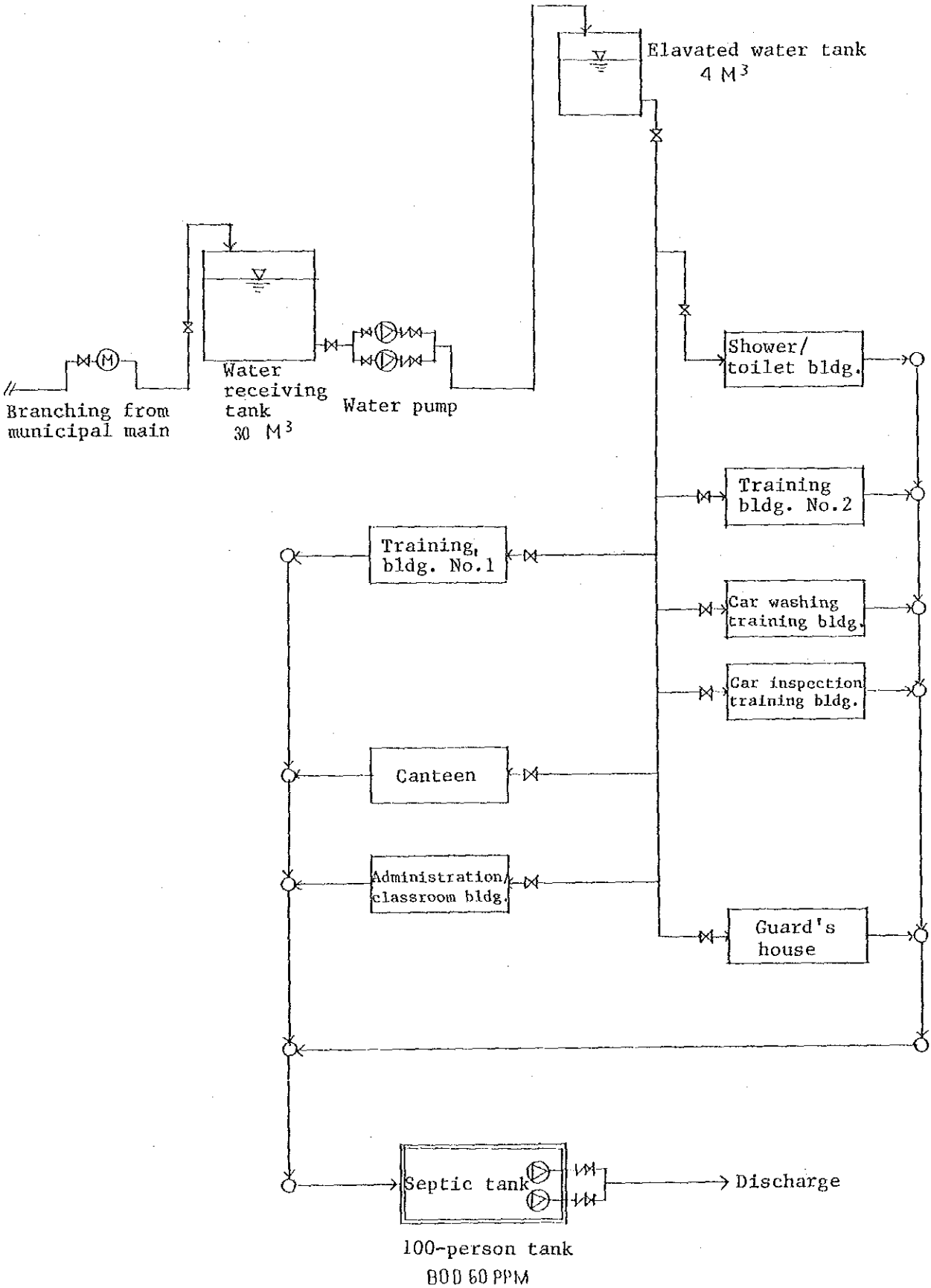
Drainage water will be processed in three divisions: human waste water, training building-related waste water and rainwater.

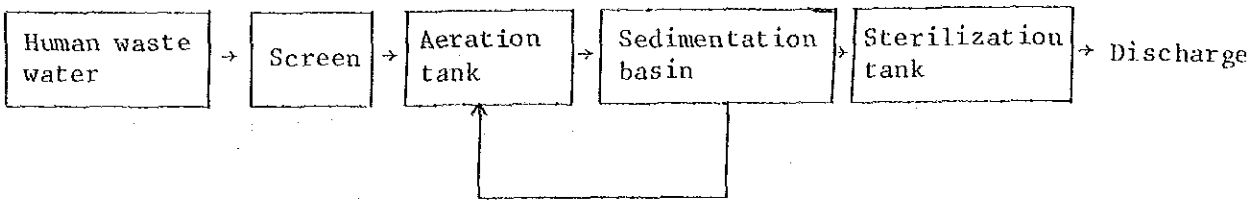
Human waste water will be discharged into the brook after processing in the septic tank on the site.

Waste water from the training buildings will be processed by seepage after going through the oil separator to be located in each building.

Rainwater will be released to side ditches and discharged to the brook via a regulating pond.

Diagram of Water Supply/Drainage System





Human waste water treatment system

Training bldg. waste water treatment plant

(4) Sanitary system

Necessary sanitary equipment will be introduced at the locations set in the architectural plan.

(5) Gas equipment

Propane gas will be supplied from gas cylinders with the amount of gas necessary for each location.

(6) Fire-fighting system

A 50 m^3 fire-fighting water tank will be suitably located on the site. Also, each building will have outdoor fire hydrants.

(7) Other equipment

Canteen will have kitchen equipment with a 90-meal capacity.

As trash, including oil-stained rags, will be generated in the training buildings, an incinerator will be installed on the site.

(c) Electrical equipment

As stated in the basic policies, electricity fees represent a large part of the administration costs. In planning the electrical equipment, therefore, energy efficiency as well as safety were considered in depth.

(1) Electric power lead-in and substation equipment

An aluminum 400 V power cable and a high voltage 33 KV trunkline run along the Baseline Road to the west of the site. On the other hand, an 11 KV power cable is available roughly 1 km away from the site to the east.

After discussions with the electric company, it was found that branching 150 KVA or so was possible from the 400 V power cable but this is insufficient to cover the power needed by this training center. If a line is branched from the 33 KV cable, the cost of substation equipment will soar and, in addition, its maintenance and management will require special skills.

Consequently, electric power will be led from the 11 KV cable. The 11 KV power led in to the substation will be transformed to 400 V/ 230 V and supplied to the distribution panel in each building.

As the general load of interior lighting, outdoor lamps, air conditioner, ceiling fans, etc. is 230 KVA and the load of equipment in the training buildings is 270 KVA (on the assumption that 40% of the machines will be used simultaneously), the capacity of the transforming equipment must be 500 KVA.

As the division of this lead-in work, the Sri Lankan side is responsible for the 11 KV power cable to the high voltage switch on the first pole on the site and the Japanese side for the work from the high voltage switch.

(2) Emergency power system

A diesel engine powered 100 KVA power generator will be installed for emergency lighting and the operation of warning devices, transforming equipment and power systems.

(3) Trunkline equipment

Power distribution to the equipment is as follows:

Lamp/power trunkline	3-phase 4-wire	400/230 V
Lighting/outlets	Single phase 2-wire	230 V
Fans/pumps	3-phase 3-wire	400 V

(4) Lighting system

The lighting equipment consists chiefly of fluorescent lamps since they are economical and easy to maintain. Economy has also been emphasized in planning the lighting systems so that independent switches control small sections and half-scale lighting is possible.

As this training center will also be used during nighttime, it has emergency lighting equipment that serves as security lamps, too.

The intensities of illumination are as follows.

Office, director's room, secretary's room, training staff room, outside lecturers' room, classrooms, library, meeting room, reception room, printing room, medical room, canteen, kitchen	300 to 400 LX
Each training room in the training buildings	400 to 500 LX
Car washing training bldg.	250 to 300 LX

Hall, corridors, staircases, locker rooms, shower room, toilets, kitchenette	100 to 150 LX
Storage, oil storage, tool rooms, material storage, paint storage, battery room, air compressor rooms	50 to 100 LX

(5) Outdoor lighting system

Outdoor lamps will be installed on the site for evening course trainees, crime prevention and security on the premises.

(6) Outlet equipment

In addition to general use outlets located in the office, classrooms, etc., outlets that match the capacity of each device will be placed in the training buildings at proper locations.

(7) Telephone system

As telephone lines are found along the Baseline Road to the west of the site, telephone lines for the center will be branched from them. Sri Lankan side is responsible for the lead-in of telephone circuits up to the lead-in terminal board in the office of the administration/classroom building and Japanese side is responsible for all the rest. Five subscriber's circuits will be led in and a digital telephone exchange with an extension capacity of 40 circuits will be used. Discussions with the Colombo Central Exchange confirmed that the lead-in of 5 subscriber's circuits was possible.

Extension lines reach the director's room, secretary's room, office, reception room, meeting room, training staff room, outside lecturers' room, library, medical room, training buildings and guard house for a total of 20 circuits. Of the above, the director's room, secretary's room, office and outside lecturers' room are equipped with handsets capable of calling outside,

receiving outside calls and connecting to other extension lines All others are equipped with telephones capable of answering outside calls and connecting to other extension lines.

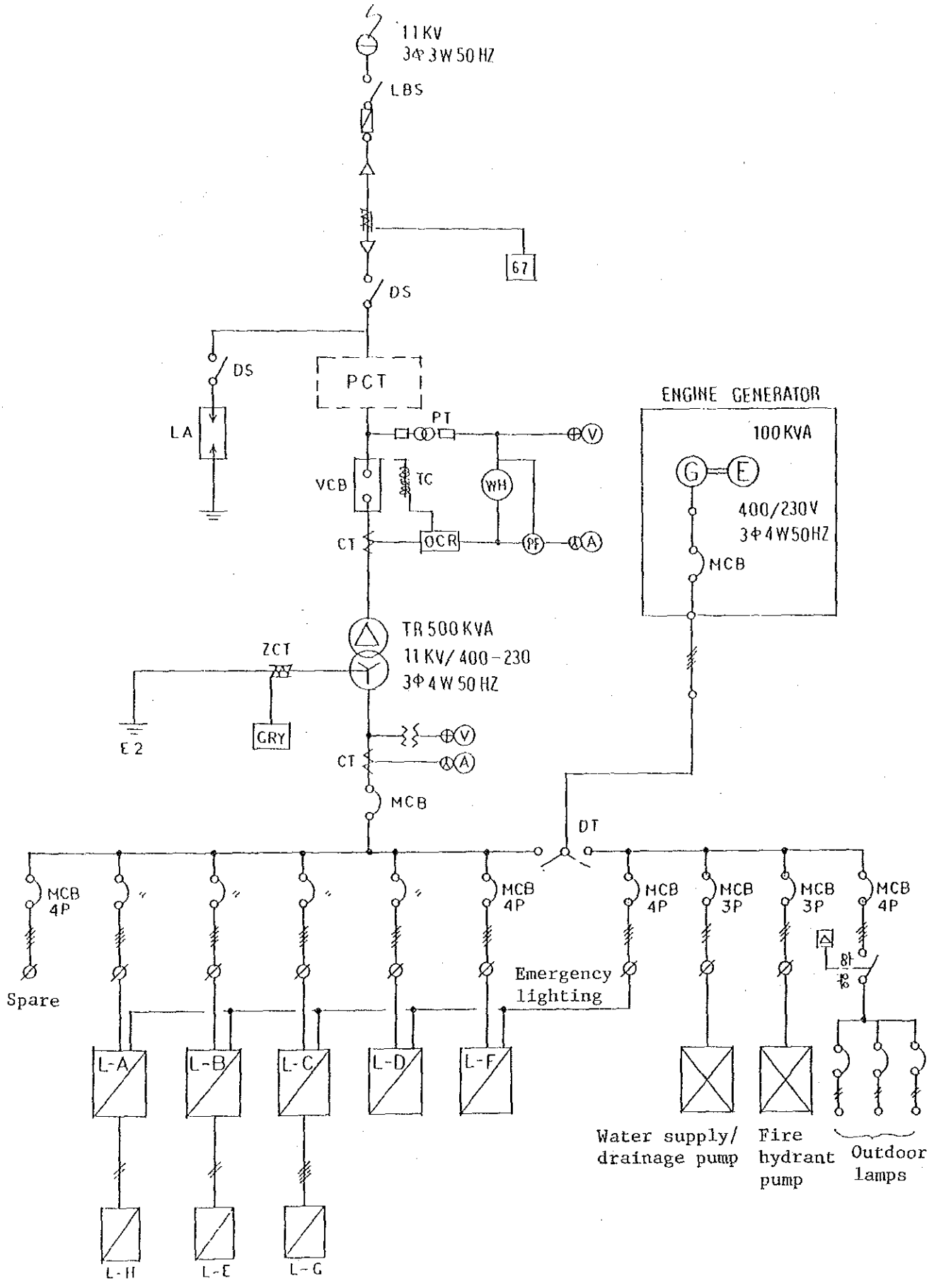
(8) PA equipment

For public addresses including the communication of messages, calling of personnel and announcing the time in the training center, loudspeakers will be placed in such key locations as the administration/classroom building, training buildings No.1 and 2, inspection training building, shower/toilet building, car washing training building, canteen and guard house and an amplifier and a microphone will be installed in the office. The PA system will be capable of addressing each building independently.

(9) Electric clock

A master clock will be installed in the office and clocks contingent upon it in the administration/classroom building, training buildings No. 1 and 2, inspection training building and canteen.

Diagram of Power
Receiving System



(d) Fire-fighting system

(1) Automatic fire alarm equipment

A central display panel with indication lamps which is connected to sensors, transmitters (push buttons operated manually), and emergency bells will be placed in suitable locations in each building. Heat sensors will be used in the training buildings and canteen and smoke sensors in all others.

Fire signals will be received from the central panel and the receiver will indicate where a fire has broken out on its display panel. They will also be connected to the actuator of the fire hydrant pump.

A transmitter that notifies the nearest fire station if necessary will also be installed in the office.

(2) Fire-extinguishing equipment

Powder fire extinguishers (good for various types of fires including ordinary fires, oil fires, electric fires, etc.) will be placed at proper locations in each building. In addition, two large powder fire extinguishers portable by car will be in training buildings No. 1 and 2.

(3) Guide lamps and signs

Guide lamps and signs will be in proper locations in the inner passages, corridors, staircases, hall and entrance of each building.

(e) Lightning-arresting equipment

A lightning rod will be fixed on the top of the elevated water tank to protect personnel and buildings from lightning.

5) Construction Material Planning

The construction materials to be used in building this training center will be procured locally to the extent possible. Also, materials that complement facility functions and are easy to maintain and control will be used.

(a) Principal structures

(1) Administration/classroom building

Columns, beams, floor slab ... Reinforced concrete
This is considered most suitable in view of facility scale, functions and design.

Walls ..... Concrete block and brick masonry
They are commonly used in Sri Lanka and it is not structurally necessary to build concrete walls.

Roof trusses ..... Steel frame and light gauge steel frame
As the local procurement of timber is difficult and as the maintenance, control and durability of wooden trusses are problematical and subject to termite damage.

(2) Training building, etc.

Columns, beams ..... Steel frame
A steel frame structure is most reasonable in view of the architecture of the facilities and the necessity for wider column spacing.

Walls ..... Concrete block and brick masonry

Roof trusses ..... Steel frame and light gauge steel frame

(b) Exterior finishing materials

Roof ..... Administration/classroom building
Locally-made roofing tiles will be place on locally-made corrugated asbestos cement sheets, the most common method in Sri Lanka.
Roofing tiles will be used in view of their heat insulation ability and design effects, and at the same time, corrugated asbestos cement sheets will be used in consideration of waterproofing.

Training buildings
Long folded colored steel sheets lined with heat-insulating material. This was decided in consideration of the material's light weight and heat-insulating effects.

Exterior walls .... Acrylic resin coating over first coat of mortar.
Repair and recoating can be done with locally-made materials.

Fittings ..... Made of steel, aluminum and wood.

(c) Interior finishing materials

Floors ..... Terrazzo tile flooring over a first coat of mortar.
Can be repaired with locally-made materials.
Durable.
If the floor is required to resist chemicals, etc. in the training buildings, a floor coating material that meets such requirements will be used.

Walls ..... Finished with coating over a first coat of mortar. Can be repaired and recoated with locally-made materials.

Ceilings ..... Finished with coating over a first coat of mortar. Can be repaired and recoated with locally-made materials.

Rock wool acoustic tiles will be used for the classrooms, etc. where a quiet environment is needed.

Table of Interior Finishing

Administration/Classroom Building

Rooms	Floors	Walls	Ceilings
Director's	Terrazzo tile	VP over first coat of mortar	Rock wool acoustic tile
Secretary's	"	"	"
Reception room	"	"	"
Office	"		EP over a first coat of mortar
Training staff room	"	"	"
Outside lecturers' room	"	"	"
Classroom	"	"	Rock wool acoustic tile
Meeting room	"	"	"
Library	"	"	EP over a first coat of mortar
Printing room	"	"	"
Medical room	"	"	"

Rooms	Floors	Walls	Ceilings
Locker room	Terrazzo tile	VP over first coat of mortar	EP over a first coat of mortar
Kitchenette	"	"	Asbestos cement board
Toilet	Ceramic tile	Semi-ceramic tile	"
Storage	Mortar	Mortar	Mortar
Corridor	Terrazzo tile	VP over first coat of mortar	EP over a first coat of mortar
Hall	"	"	"
Staircase	Terrazzo block	"	"

Training Buildings No. 1 and 2

Rooms	Floors	Walls	Ceilings
Parts washing training room	Non-slip, oil-resistant and coated flooor material	VP over a first coat of mortar	As is, with roof exposed
Engine dynamo measuring training room	Mortar	Glass wool, fixed with glass cloth	Glass wool, fixed with glass cloth
Injection pump training room	Oil-resistant coated floor material	VP over a first coat of mortar	Rock wool acoustic tile finish
Battery room	Acid-resistant coated floor material	Acidproof paint over a first coat of mortar	Acidproof coating over asbestos cement board
Air compressor room	Mortar	Glass wool, fixed with glass cloth	Glass wool, fixed with glass cloth
Oil storage	Oil-resistant coated floor material	VP over a first coat of mortar	VP over asbestos cement board

Rooms	Floors	Walls	Ceilings
Classroom	Terrazzo tile	VP over a first coat of mortar	Rock wool acoustic tile finish
All other rooms	Dustproof coated floor material	VP over a first coat of mortar	As is, with roof exposed

Inspection Training/Car Washing Training Building

Rooms	Floors	Walls	Ceilings
Inspection training	Concrete, trowel finished	VP over a first coat of mortar	Wooden roof board, oil-stained
Car washing training	"	"	"

Shower/toilet Building

Rooms	Floors	Walls	Ceilings
Toilet	Ceramic tile	Wainscoting: Semi-ceramic tile Upper wall : VP over first coat of mortar	VP over asbestos cement board
Shower room	"	"	"
Locker room	Terrazzo tile	VP over a first coat of mortar	Wooden roof board, oil-stained

Canteen

Rooms	Floors	Walls	Ceilings
Dining room	Terrazzo tile	VP over a first coat of mortar	Wooden roof board, oil-stained
Kitchen	Ceramic tile	Semi-ceramic tile	VP over asbestos cement board
Toilet	"	"	"
Warehouse	Mortar	Mortar	Wooden roof board, oil-stained

Others

Rooms	Floors	Walls	Ceilings
Training-use car garage	Concrete, trowel-finished	Mortar	Wooden roof board, oil-stained
Personal-use car	"	"	"
Substation	"	"	"
Guardhouse	"	VP over a first coat of mortar	"

VP: Acrylic resin-based paint

EP: Synthetic resin emulsion paint

4-2-4 Equipment Plan

1) Basic Policies

Considering the curriculum for the training courses for automobile mechanics, automobile electricians, and automobile machinists as well as the number of trainees for each course, some practical training rooms with the necessary equipment will be provided.

(1) All the trainees including those attending the mechanic, electrician, and machinist courses will receive both general repair training and manual work training as part of their basic training in automobile maintenance. In the general repair and the manual work training rooms, the necessary equipment such as two-post auto lifts, jacks, alignment inspection tools, tire repair tools, manual work tools, etc. will be provided.

(2) For the training of mechanics, a component repair training room, a power booster testing training room, an engine dynamo measuring training room, and a fuel injection pump training room will be necessary in addition to the general repair and the manual work training rooms. In these rooms, brake-booster testers, hydraulic engine dynamometers, fuel injection pump testers, welding machines, etc. required for specific training will be installed.

(3) In the electrical equipment training room where electrician trainees will mainly be trained, various types of testers including starter/generator testers will be provided for various items of training including repair training and trouble shooting.

(4) In the machinist training room, machining equipment required for the rebuilding of parts such as fine boring machines, honing machines, crank-shaft grinders, and other grinding machines will be installed.

(5) The equipment was selected on the basis of types and specifications that can be fully maintained in Sri Lanka and that will be helpful when trainees execute repair work after they have graduated from the center.

2) Training Rooms

The table below shows the rooms to be used for each course of training.

◎ : Indicates the room mainly used.

Training buildings	Rooms	Mechanic course	Electrician course	Machinist course
Training Building No. 1	1 General Repair Training Room	◎	○	○
	2 Parts Washing Training Room	◎	○	○
	3 Tire Maintenance Training Room	◎	○	○
	4 Electrical Equipment Training room	○	◎	○
Training Building No. 2	1 Machinist Training Room	○	○	◎
	2 Component Repair Training Room	◎	○	○
	3 Power Booster Testing Training Room	◎	○	○
	4 Engine Dynamo Measuring Training Room	◎	○	○
	5 Fuel Injection Pump Training Room	◎	○	○
	6 Manual Work Training Room	◎	○	○
	7 Welding Training Room	◎		
	8 Body Repair Training Room	◎		
	9 Painting Training Room	◎		
Inspection Training Building		◎	○	○
Car Washing Training Building		◎	○	○

3) List of Training Equipment in Each Room

The following are the lists of equipment to be installed in each practical training room.

(a) Training building No. 1

(1) General repair training room

	Equipment	Q'ty	Remarks
1	Two-post car lift	14	Hydraulic type, capacity: 2.5 t
2	Transmission jack	5	Capacity: 800 kg
3	Diff. jack	5	Capacity: 500 kg
4	Garage jack	5	Capacity: 3.0 t
5	Rigid rack	14	Capacity: 1.5 t x 2 (2/set)
6	Turning radius gauge	7	Allowable axle load: 750 kg
7	Camber - caster - kingpin gauge	7	
8	Toe-in gauge	7	
9	Hydraulic portable crane	4	Hoisting capacity: 1.0 t
10	Electric chain block with electric trolley (Monorail hoist)	4	Hoisting capacity: 1.0 t
11	Work bench with vice	14	Vice jaw width: 150 mm Work bench 1,780(L) x 600 mm(D)
12	Tool stand	14	650(L) x 440(W) x 860(H) mm
13	Portable oil lubricator	12	3 different lubricating oils x 3 sets
14	Portable grease lubricator	4	
15	Engine tune-up tester	7	Cam angle and timing advance; D.C. voltage and resistance; ignition timing, etc.
16	Diesel timing and tacho-tester	5	

General repair training room (cont'd)

	Equipment	Q'ty	Remarks
17	Air-conditioner service set	7	Flare tool, tube cutter, rachet wrench, freon gas detector, thermometer, etc.
18	Tool polisher	2	Dust collector, eye shields.

(2) Parts washing training room

1	Parts washing stand	8	Tank capacity: 100 ℓ (55 ℓ water + 45 ℓ oil)
2	Compressed air gun	8	

(3) Tire maintenance training room

1	Wheel balancer	2	To be disassembled for inspection
2	Tire changer	2	
3	Workbench with vice	2	

(4) Battery room

1	Battery charger	6	
2	Battery quick charger	2	
3	Battery cable	12	300 amp; 2/set
4	Battery hydrometer set	8	
5	Dry battery	30	12 V, 70 amp

(5) Electrical equipment training room

	Equipment	Q'ty	Remarks
1	Generator and starter test bench	3	
2	Distributor test bench	3	
3	Oscilloscope	10	
4	Armature tester	3	
5	Mica cutting lathe	2	
6	Coil rewinding machine	3	Manual type
7	D.C. voltage stabilizer	2	
8	Revolution irregularity meter	2	
9	Frequency counter	2	
10	Workbench	15	
11	Chair	26	Folding type
12	A.C. repair unit	7	

(6) Air compressor room

1	Air compressor	2	22 kW, 12 kg/cm^2
2	Air purifier	2	
3	Air pressure transformer	50	
4	Air hose	10	6 ϕ x 50 m (for general use)
5	Air hose	5	9 ϕ x 50 m (for impact wrench)

(7) Oil storage

	Equipment	Q'ty	Remarks
1	Drum can carrier	2	Capacity: 250 kg
2	Drum pump	5	Capacity: 0.34 ℓ/revolution

(8) Tool room

1	Tool rack	5	900(W) x 600(D) x 1,800(H) mm
2	Tool rack	24	900(W) x 450(D) x 800(H) mm
3	Tool rack	2	875(W) x 450(D) x 1,800(H) mm
4	Tool rack (with cover)	2	875(W) x 450(D) x 1,800(H) mm
5	Steel desk	1	
6	Chair	1	
7	Footstool	1	600(H) mm
8	Tool storage box	56	Outside dimensions: 434(W) x 354(D) x 195(H)
9	Hand cart	1	Capacity: 300 kg
10	Air impact wrench set	2	1/2" and 3/8" sq., 16 mm, and 20 mm
11	Flare nut wrench	7	12 x 14 mm
12	Hexagonal wrench set	7	
13	Adjustable wrench set	2	450 mm, 600 mm
14	Snap ring plier set	20	
15	Test hammer	20	100 g
16	Plastic hammer	20	225 g, 450 g
17	Copper hammer	20	450 g

Tool room (cont'd)

	Equipment	Q'ty	Remarks
18	Sledge hammer set	2	4.5 kg, 9.0 kg
19	Adjustable reamer set	2	Extent adjustable: 12∿38 mm
20	Tool set with key and lock	65	
21	Taps & dies set	2	
22	Chisel & punch set	2	
23	File set	2	
24	Screw extractor set	5	
25	Gasket punch set	2	5∿16 mm
26	Electrical soldering iron set	25	60 W, 150 W
27	Scraper blade (for gasket remover)	20	
28	Torque wrench set	10	30∿230 kg-cm, 50∿460 kg-cm 100∿920 kg-cm, 200∿1300 kg-cm 300∿1900 kg-cm
29	Socket wrench set	7	3/8" and, 3/4" sq., socket 6∿21 mm, 21∿50 mm
30	Vernier caliper	25	300 mm
31	Straight rule set	25	300 mm
32	Measuring tape set	2	10 m, 50 m
33	Dial gauge	25	
34	Surface gauge	15	
35	Thickness gauge	5	0.15, 0.20, 0.25 mm
36	Screw pitch gauge	5	For metric threads
37	Special service tool set	5	

(9) Classroom (two rooms)

	Equipment	Q'ty	Remarks
1	Folding chair with side table	45	Seating capacity No.1 classroom: 20 No.2 classroom: 25 (for electrician course)
2	Workbench	2	
3	Blackboard	2	
4	Overhead projector	2	

(10) Storage

1	Shelf (for heavy materials)	2	2,300(W) x 900(D) x 3,000(H) mm Loading capacity: 3.0 t/shelf
2	Hand lifter	1	Capacity: 500 kg, lift 90~1,500mm
3	Hand cart	1	Capacity: 300 kg
4	Forklift	1	Capacity: 1.5 t
5	Wooden pallet	50	

(b) Training building No. 2

(1) Machinist training room

	Equipment	Q'ty	Remarks
1	Crank shaft grinder	3	Max. center distance: 1,550 mm Swing: 540 mm max.
2	Surface grinder	3	Max. grinding length: 1,500 mm Width: 350 mm max.

Machinist training room (cont'd)

	Equipment	Q'ty	Remarks
3	Cylinder fine boring machine	3	Boring range: 32∿200 ϕ Boring depth: 395 mm max.
4	Cylinder honing machine	3	Max. honing length: 260 mm Honing stroke : 500 mm max.
5	Line boring machine	3	Boring length: 28∿230 mm Max. cylinder block length: 2,000 mm max.
6	Crankshaft press	1	Max. crankshaft length: 1,830 mm
7	Brake drum clutch lathe	5	Drum dia.: 130∿380 mm Drum width: 200 mm max.
8	Brake shoe grinder	5	Diameter : 380∿450 Lining width: 250 mm max.
9	Valve grinder	5	Chuck capacity: 6∿14.5 mm
10	Valve seat grinder	5	Valve seat dia.: 28∿60 mm Valve stem dia.: 6∿10 mm
11	Precision high-speed lathe	5	Max. swing : 360 mm Center distance: 1,000 mm
12	Universal milling machine	3	Table width : 1100 x 280 mm
13	Shaping machine	3	Max. stroke : 550 mm
14	Upright drilling machine	3	Max. hole dia. : 32 mm max.
15	Pedestal grinder	5	Wheel size, outside diameter: 255 mm
16	Workbench with vice	2	Vice jaw width : 150 mm Table: 1,780(L) x 600(D) mm
17	Workbench	5	1,780(L) x 600(D) mm
18	Hack sawing machine	1	Bar : 200 mm max. Square: 180 x 180 mm max.
19	High-speed cutoff machine	1	Grindstone dia.: 405 mm

(2) Component repair training room

	Equipment	Q'ty	Remarks
1	Engine stand	7	Capacity: 450 kg
2	Workbench with vice	7	Vice jaw width: 150 mm Table: 1,780(L) x 600(D) mm
3	Tool stand	7	600(W) x 400(D) x 1,050(H) mm
4	Hydraulic press	3	Capacity: 35.0 t
5	Parts washing table	3	Tank capacity: 100 ℓ (55ℓ oil + 45ℓ water)
6	Electric chain block with electric trolley	2	Hoisting capacity: 1.0 t
7	Valve lapper	7	
8	Piston ring tool	10	150 mm long
9	Connecting rod aligner	7	
10	Surface plate	2	600 x 600 mm
11	Cylinder gauge	7	50∿150 mm
12	Compression gauge	7	
13	Tachometer	7	
14	Radiator gap tester	7	0∿2 kg/cm^2
15	Sound scope	7	
16	Bench drilling machine	2	13 mm max.

(3) Power booster testing training room

	Equipment	Q'ty	Remarks
1	Brake booster tester	6	
2	Workbench with vice	6	Vice jaw width: 150 m Table: 1,780(L) x 600(D) mm
3	Shelf	6	900(W) x 600(D) x 1,800(H) mm

(4) Engine dynamo measuring training room

1	Hydraulic engine dynamo meter	2	Capacity: 150 hp/7000 rpm
2	Cooling fan	2 sets	
3	Chain block (manual operation)	2	Capacity: 1.0 t
4	Blackboard	2	1,800 x 900 mm
5	Workbench with vice	2	Vice jaw width: 150 mm Table: 1,780(L) x 600(D) mm

(5) Fuel injection pump training room

1	Fuel injection pump tester	4	Up to 12 cylinders can be tested
2	Nozzle tester	4	Pressure gauge: 0∿500 kg/cm^2
3	Parts washing table	2	Tank capacity: 62 ℓ = 35ℓ oil + 27ℓ water
4	Shelf	4	900(W) x 600(D) x 1,800(H) mm
5	Blackboard	4	1,800 x 900 mm
6	Special tool set	4	
7	Torque wrench	4	
8	Compressed air gun	2	

(6) Manual work training room

	Equipment	Q'ty	Remarks
1	Workbench with vice (2 vices/work bench)	13	
2	Surface plate	6	450 x 300 mm
3	Bench drilling machine	6	Capacity: 13 mm max.
4	Drill set	30	8, 10, 12 mm
5	Taps set	30	8ϕ p = 1.0 10ϕ p = 1.5 12ϕ p = 1.25
6	Dies set	30	8ϕ p = 1.0 10ϕ = 1.5 12ϕ p = 1.25
7	File set	30	
8	Chisel	30	

(7) Welding training room

1	Gas welder tool	5	
2	Arc welder set	5	
3	Mig welder set	5	
4	Welding table with chair	10	

(8) Bady repair training room

1	Body frame repair unit	1	
2	Two-post car lift	1	Hydraulic type, capacity: 4.0 t
3	Anvil	1	50 kg

(9) Painting training room

	Equipment	Q'ty	Remarks
1	Paint booth	1	
2	Spray gun, (suction type)	4	
3	Spray gun, (gravity type)	4	
4	Paint filter	2	

(10) Air compressor room

The same as the Compressor Room of Training Building No. 1

(11) Material storage

	Equipment	Q'ty	Remarks
1	Cabinet: 5 shelves	8	1,800(W) x 600(D) x 1,800(H) mm
2	Cabinet: 5 shelves	4	900(W) x 600(D) x 1,800(H) mm
3	Footstool	1	600(H) mm

(12) Storage-I

1	Cabinet: 4 shelves	8	1,800(W) x 600(D) x 1,800(H) mm
2	Hand lifter	1	Capacity: 500 kg Lift : 90∿1,500 mm
3	Hand cart	1	Capacity: 300 kg

(13) Storage-II

	Equipment	Q'ty	Remarks
1	Cabinet: 5 shelves	12	1,800(W) x 600(D) x 1,800(H) mm
2	Footstool	1	600(H) mm

(14) Tool room-I

1	Cabinet: 5 shelves	9	1,800(W) x 600(D) x 1,800(H) mm
2	Cabinet: 5 shelves	3	900(W) x 600(D) x 1,800(H) mm
3	Footstool	1	600(H) mm
4	Desk, chair	1 set	

(15) Tool room-II

1	Cabinet: 5 shelves	8	1,800(W) x 600(D) x 1,800(H) mm
2	Cabinet: 5 shelves	1	900(W) x 600(D) x 1,800(H) mm
3	Desk, chair	1 set	
4	Tool box	40	Outside dimensions: 434 x 354 x 195 mm
5	Vernier caliper	5	300 mm
6	Outside micrometer	5	0∿150 mm
7	Inside micrometer	10	25∿50 mm 50∿150 mm
8	Dial gauge	10	
9	Surface gauge	5	300 mm
10	Straight rule set	10	300 mm, 600 mm

Tool room-II (cont'd)

	Equipment	Q'ty	Remarks
11	V-block set	6	2/set, 100 mm, 200 mm
12	Square set	9	100 mm, 200 mm, 300 mm
13	Surface plate	2	750 x 500 mm
14	Straight edge	3	500 mm
15	Screw pitch gauge set	20	

(16) Painting storage

1	Cabinet: 5 shelves	8	1,800(L) x 600(D) x 1,800(H) mm
2	Hand cart	1	Capacity: 300 kg

(17) Classroom (2 rooms)

The same as the classroom of Training Building No. 1

Inspection training building

	Equipment	Q'ty	Remarks
1	Brake tester	1 set	Max. axle load: 3.0 t
2	Speedmeter tester	1 set	Max. axle load: 3.0 t
3	Side-slip tester	1 set	Max. axle load: 3.0 t
4	Headlight tester	1 set	
5	Blackboard	1	1,800 x 900 mm
6	Workbench	1	Table: 1,780(L) x 600(D) mm
7	Air compressor	1	2.2 kW, 9.9 kg/cm^2

c) Car washing training building

	Equipment	Q'ty	Remarks
1	High pressure car washing machine	3	Max. pressure: 100 kg/cm^2 1550 ℓ/h

4) Training Materials

(a) General repair training room

(1) Passenger car	Front wheel drive type	7
(2) Passenger car	Rear wheel drive type	7
(3) Light truck, 2 tonner, diesel engine		5

(b) Electrical equipment training room

(1) Passenger car (with electronic devices)	2
(2) Starter motor (for gasoline engine car and for diesel engine car)	10 each
(3) Alternator (A.C. power generator)	10
(4) Distributor	10
(5) Electronic fuel injection pump (MPI)	10
(6) Ignition coil	25
(7) Lighting system assembly	10
(8) Horn system assembly	10
(9) Audio system, etc.	10

(c) Component repair training room

(1) Propeller shaft (for truck)	10
(2) Rear axle for truck	10
(3) Steering gear assembly, etc.	10

(d) Power booster testing training room

(1) Hydromaster (for trucks)	10
(2) Master vacuum (for passenger cars)	20

(e) Fuel injection pump training room

(1) Fuel injection pump (for trucks)	10
(2) Fuel injection pump (for passenger cars)	10

(f) Machinist training room

(1)	Crankshaft	10
(2)	Crankcase	10
(3)	Cylinder head	10
(4)	Bars and squares 30 ϕ, 50 ϕ, ℓ = 1,000 m	10 each
(5)	Brake drum	10
(6)	Clutch pressure plate, etc.	

(g) Manual work training room

(1)	Steel sheet 0.8 mm, 1.0 mm, 1.2 mm, 3.2 mm, 4.5 mm, 9.0 mm 1,800 x 900 mm	20 each

(h) Cut-away model

(1)	4-cycle gasoline engine	10
(2)	4-cycle diesel engine	10
(3)	Steering gear	1
(4)	Differential gear	1
(5)	Starter	1
(6)	Alternator	1
(7)	Drum and disc brake	1
(8)	Fuel injection pump for Diesel engines	1
(9)	Gasoline engine and transmission	1
(10)	Diesel engine and transmission	1
(11)	Gasoline engine dis. - Reassembly and operation unit	1
(12)	Diesel engine dis. - Reassembly and operation unit	1

5) Spare Parts and Expendable Items

a) Training equipment

(1) Components of the hydraulic equipment installed in the general repair training room and the component repair training room:
Packings, gaskets, and other components that are easily damaged.

(2) Tools used in the machinist training room:
Grinding stones, honing stones, bits for boring machines, cutters for milling machines, drills, bits, etc.

(3) Bench drilling machines, up-right drilling machines, V-belts, etc.

(4) Packings, V-belts of the testing devices such as the engine dynamometers, fuel injection pump testers, etc.

Appropirate parts and components among the items (1) to (4) will be provided.

b) Training materials

(1) Parts required to be replaced when assembling or disassembling:
Gaskets, oil seals, etc.

(2) Parts that are easily damaged when assembling or disassembling:
Bearings, snap rings, etc.

(3) Parts used for adjustment after assembling:
Shims for diff-gear boxes, and spacers

(4) Parts that are frequently damaged:
Electric bulbs, fuses, rings for synchro-missions, etc.

Appropriate parts and components among the items (1) to (4) will be provided.

6) Administration/classroom building

a) Office

	Equipment	Q'ty	Remarks
1	Typewriter	3	
2	Typewriter table (stand)	3	
3	Personal computer	1	
4	Computer table (stand)	1	
5	Data table	1	

b) Printing room

1	Layout table, etc.	1	
2	Photoengraving machine	1	
3	Rotary press	1	
4	Electronic copying machine	1	
5	Paper folding machine	1	
6	Bookbinding machine (Back covering)	1	
7	Bookbinding machine (Back binding)	1	
8	Cutting machine	1	
9	Hand cart	1	
10	Work desk 1200 x 800 x 700	2	
11	Chair	2	
12	Steel cabinet	2	

(c) Training staff room and outside lecturers' room

	Equipment	Q'ty	Remarks
1	Bulletin board 1.200 x 900	2	1 for each room
2	Desk and chair	24 sets	20 for training staff room and 4 for outside lecturers' room
3	Blackboard 4,800 x 1,200, 1,200 x 900	2	Larger one for training staff room, smaller one for lecturers' room
4	Bookshelf 880 x 515 x 1,790	2	One for each room
5	Locker	4	For outside lecturer's room only

(d) Meeting room

1	Blackboard 4.800 x 1.200	1	Gray board for OHP projecting
2	Table 1,800 x 410 x 700 Chair	9 20	

(e) Classroom (5 rooms)

1	Teaching desk 900 x 450 x 900	5	
2	Teacher's chair	5	
3	Student's chair	100	
4	Work bench 1.800 x 900 x 760	10	
5	Blackboard 4.800 x 1.200	5	Gray board for OHP use
6	Bulletin board 1.200 x 900	5	
7	Overhead projector	5	Including screen
8	Video tape recorder	5	
9	Color television	5	

(f) Library

	Equipment	Q'ty	Remarks
1	Reading desk 1.800 x 1.200 x 700	4	
2	Chair for reading desk	16	
3	Steel book shelf 880 x 515 x 1.790	4	Closed type
4	Steel book shelf 1.880 x 325 x 1.155	1	Open type
5	Counter 1.760 x 700 x 700	1	
6	Chair for counter	2	
7	Index case 515 x 380 x 880	1	
8	Bulletin board 1.200 x 900	1	

(g) Medical room

1	Bed for resting 2.097 x 910 x 1.000	1	
2	Chemical storage shelf 898 x 270 x 1.050	1	
3	Chemical storage shelf 898 x 600 x 790	1	
4	Desk 1.200 x 700 x 700	1	
5	Chair	1	
6	Blackboard 1.200 x 900	1	
7	Bulletin board 1.200 x 900	1	

(h) Hall

	Equipment	Q'ty	Remarks
1	Reception counter 1.800 x 550 x 950	1	
2	Chair for receptionists	2	
3	Information board 1.800 x 900	1	

7) Canteen

	Equipment	Q'ty	Remarks
1	Table 2.100 x 750 x 700	8	Bench with 8-person seating capacity
2	" 850 x 850 x 600	6	Bench with 4-person seating capacity
3	Round chair	24	
4	Bulletin board 1.200 x 900	1	
5	Kitchen equipment	1	

8) Shower/toilet building

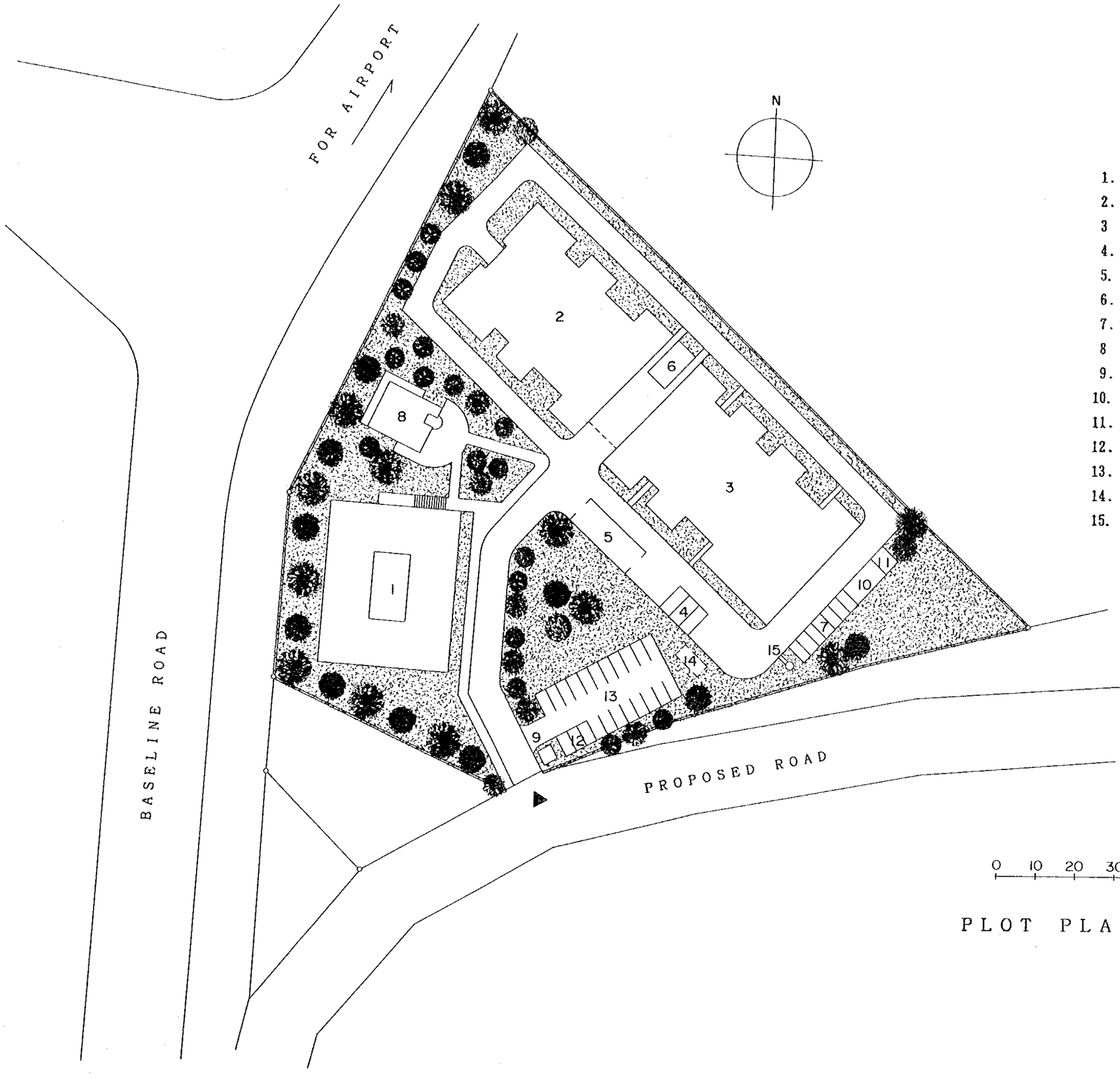
1	Locker 900 x 515 x 1.790	40	For 3-person

9) Guardhouse

	Equipment	Q'ty	Remarks
1	Desk 1.200 x 700 x 700	1	
2	Chair	1	
3	Locker 317 x 515 x 1,790	1	

4-2-5 Basic Design Drawings

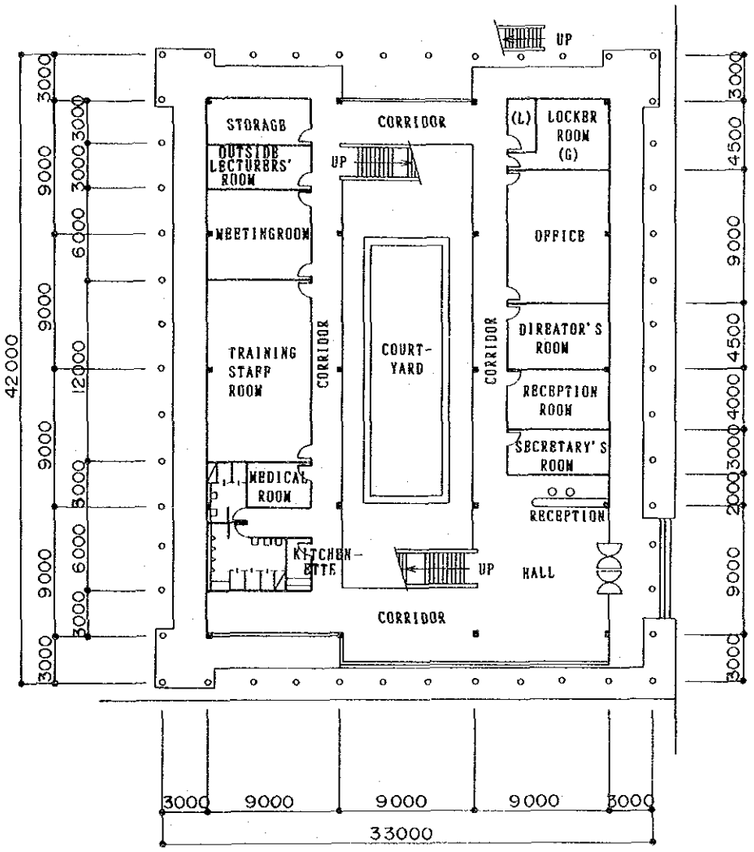
1)	Plot Plan	
2)	Administration/Classroom Building	Plan
3)	Administration/Classroom Building	Elevation and Section
4)	Training Buildings No. 1 and 2	Plan
5)	Training Buildings No. 1 and 2	Elevation
6)	Training Buildings No. 1 and 2	Roof Plan and Section
7)	Inspection Training Building/ Car Washing Training Building Training-use Car Garage/ Sub-station/Generator House	Plan, Elevation and Section
8)	Canteen	Plan, Elevation and Section



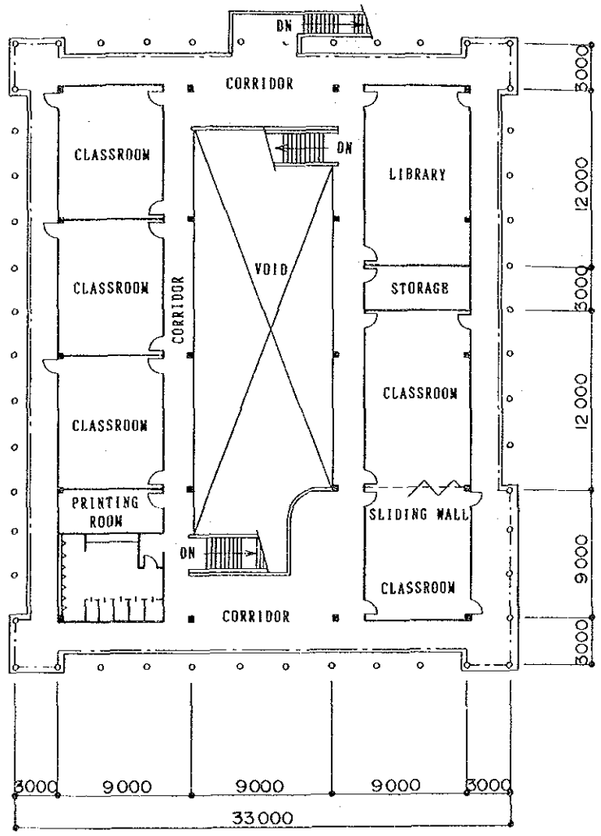
1. ADMINISTRATION/CLASSROOM BLDG.
2. TRAINING BLDG. NO. 1
3 TRAINING BLDG. NO. 2
4. CAR WASHING TRAINING BLDG.
5. INSPECTION TRAINING BLDG.
6. SHOWER/TOILET BLDG.
7. TRAINING-USE CAR GARAGE
8 CANTEEN
9. GUARDHOUSE
10. SUB-STATION
11. GENERATOR HOUSE
12. PERSONAL-USE CAR GARAGE
13. PARKING
14. SEPTIC TANK
15. INCINERATOR

0 10 20 30 40 50m

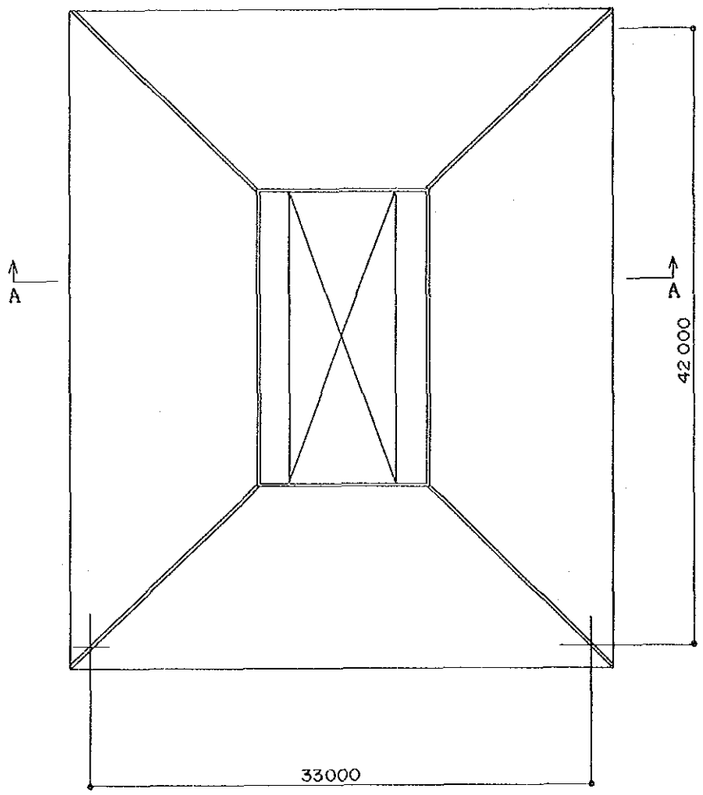
PLOT PLAN 1/1000



GROUND FLOOR PLAN



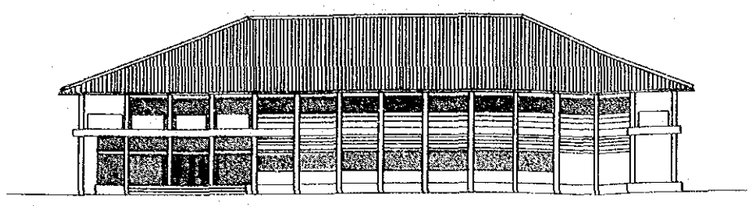
1ST FLOOR PLAN



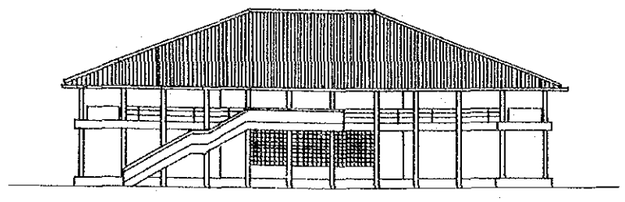
ROOF PLAN

0 1 2 3 4 5 10

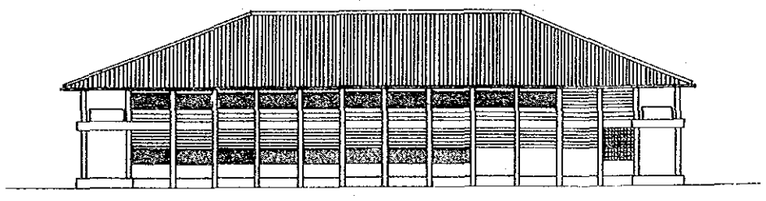
ADMINISTRATION/CLASSROOM BLDG.



EAST ELEVATION



NORTH ELEVATION



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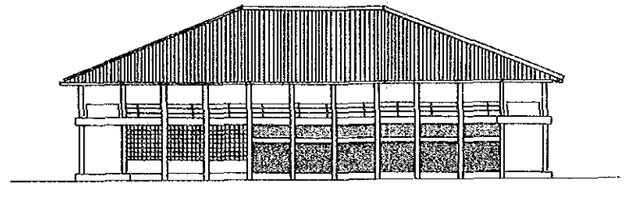
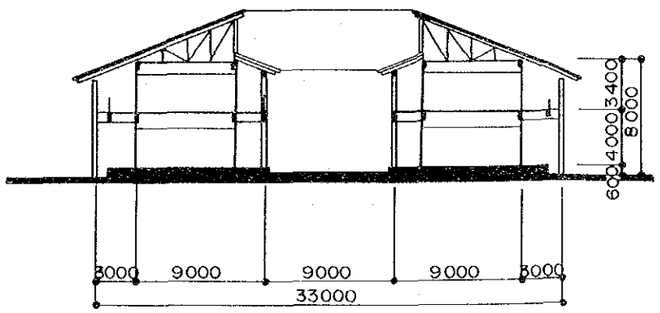
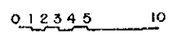


SOUTH ELEVATION



SECTION A-A

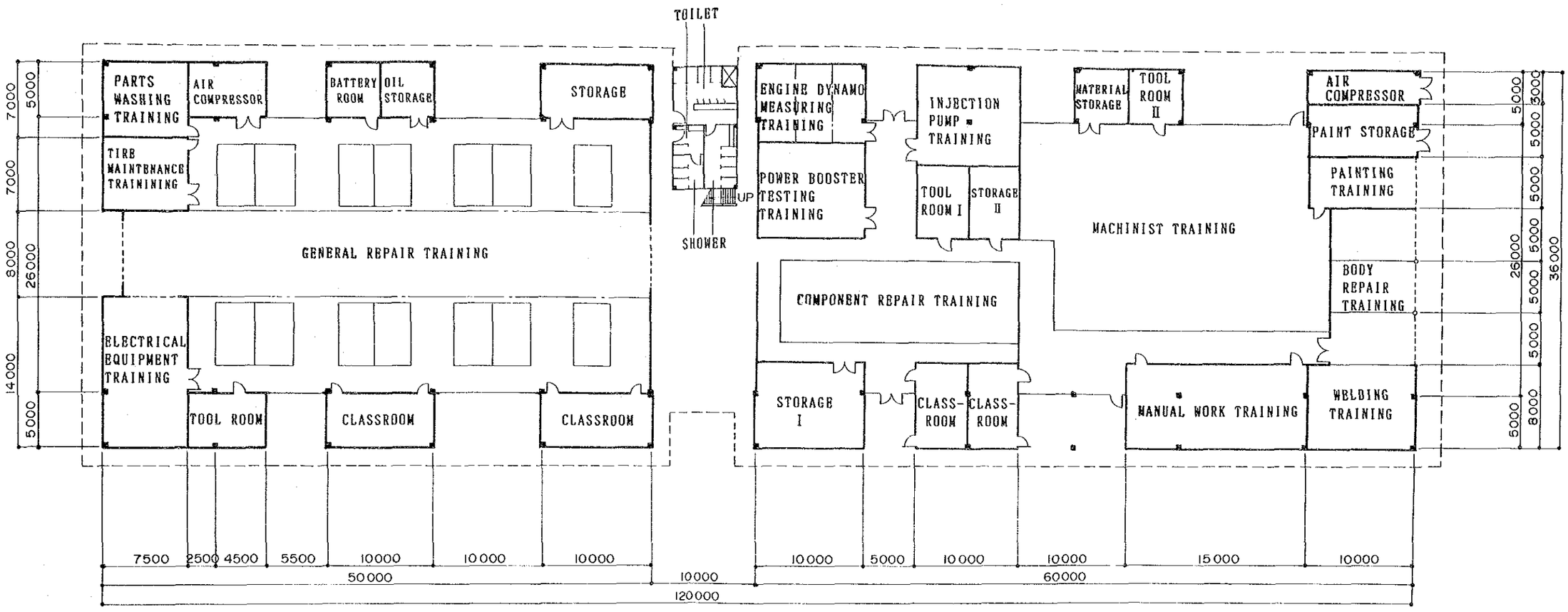


ADMINISTRATION/CLASSROOM BLDG.

TRAINING BLDG. NO. 1

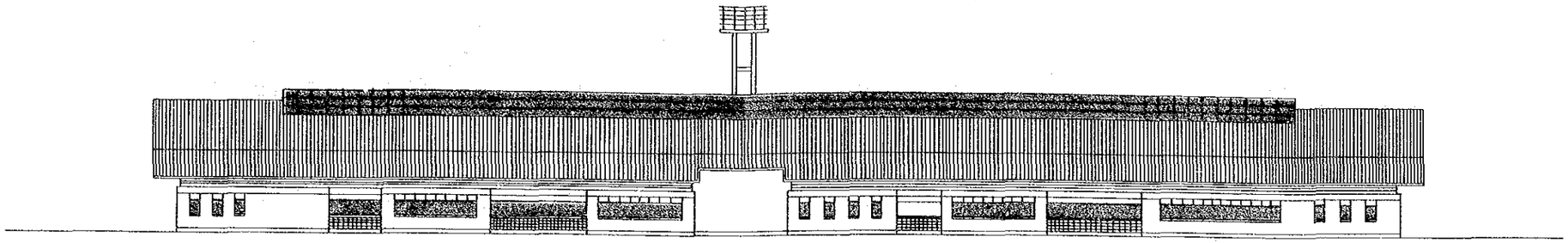
SHOWER/
TOILET BLDG.

TRAINING BLDG. NO. 2

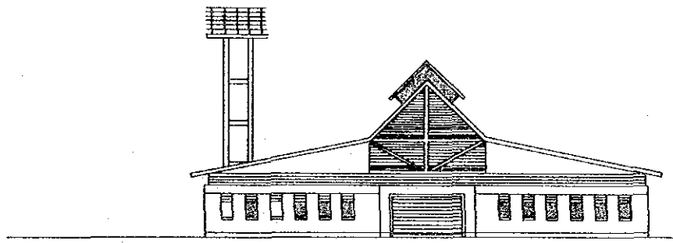


1 2 3 4 5 10

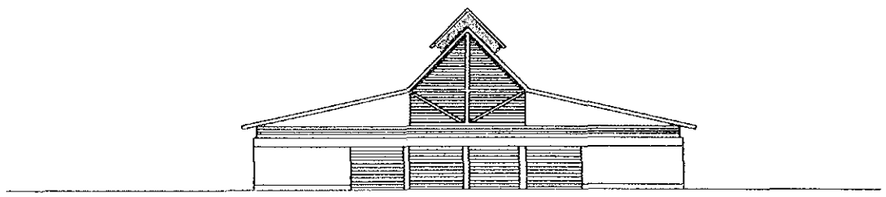
TRAINING BLDG. NO. 1 & NO. 2



SOUTH ELEVATION

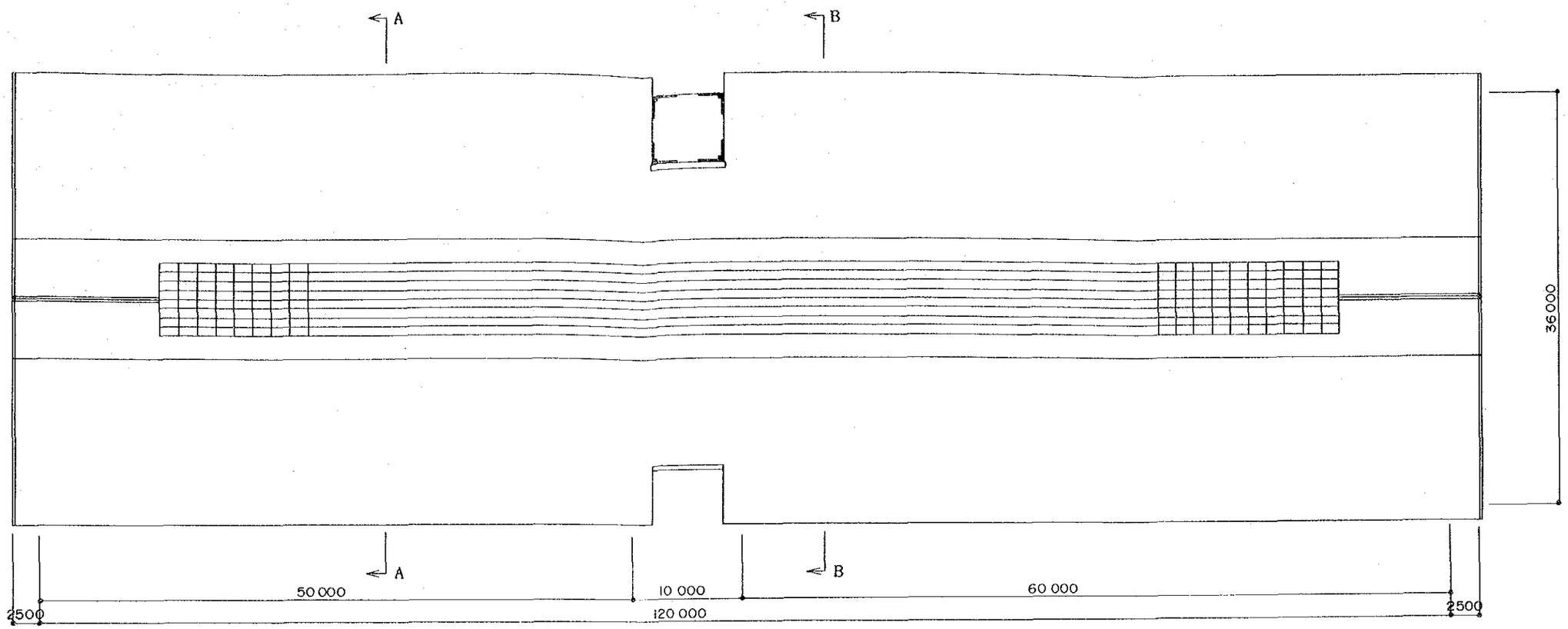


WEST ELEVATION

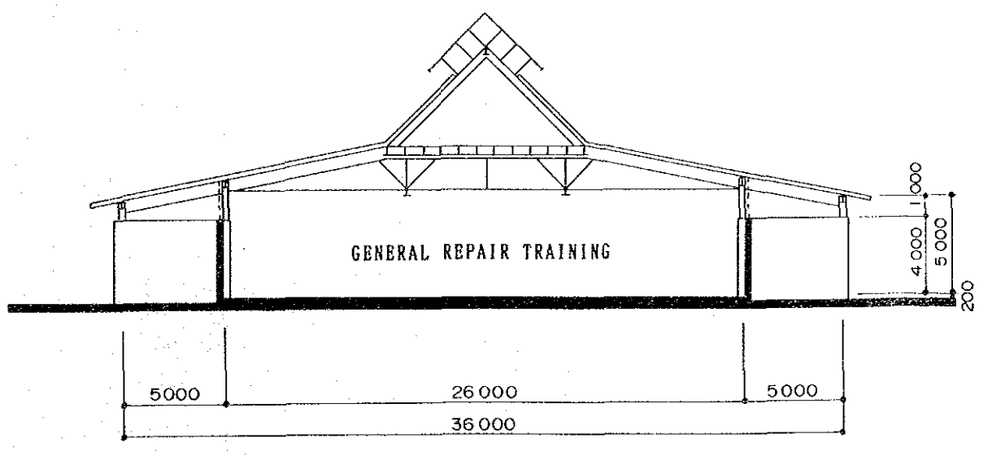


EAST ELEVATION

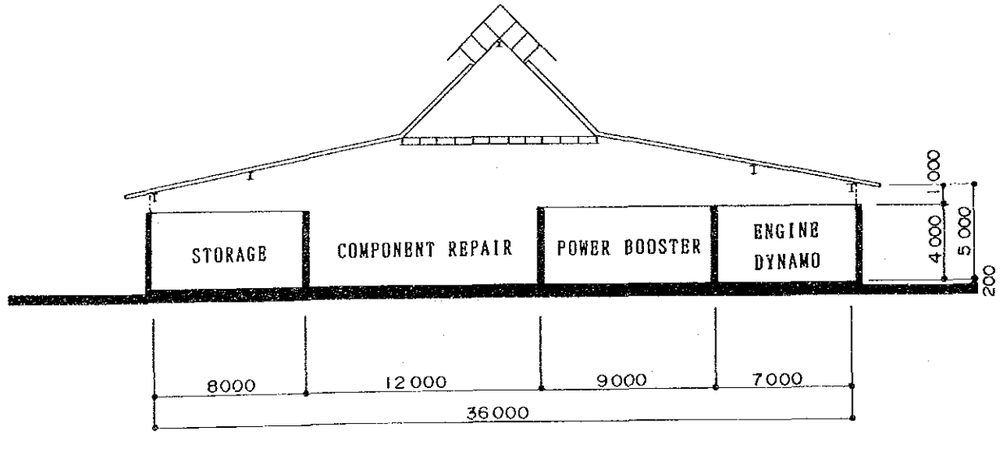
TRAINING BLDG. NO. 1 & NO. 2



ROOF PLAN

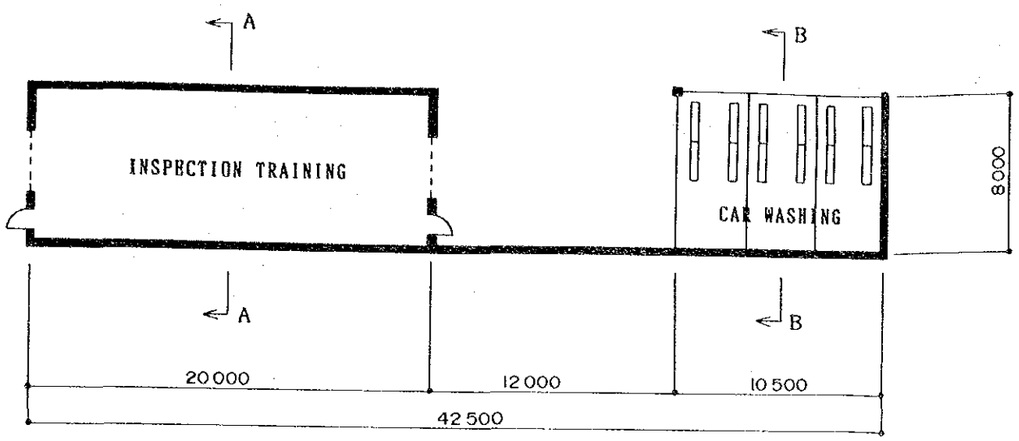


SECTION A-A

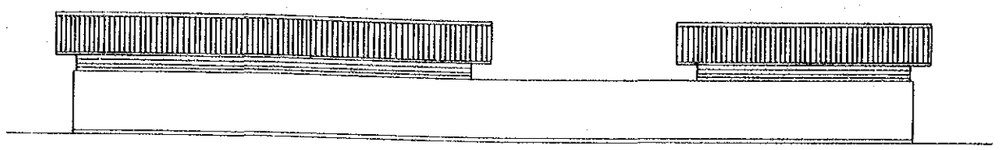


SECTION B-B

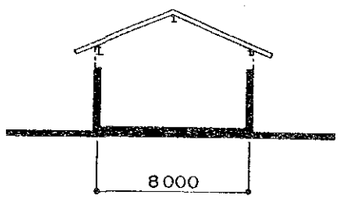
TRAINING BLDG. NO. 1 & NO. 2



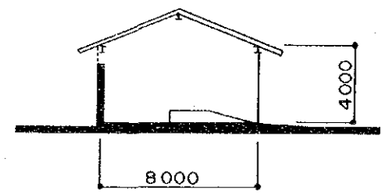
INSPECTION TRAINING BLDG./
CAR WASHING TRAINING BLDG. 1/300



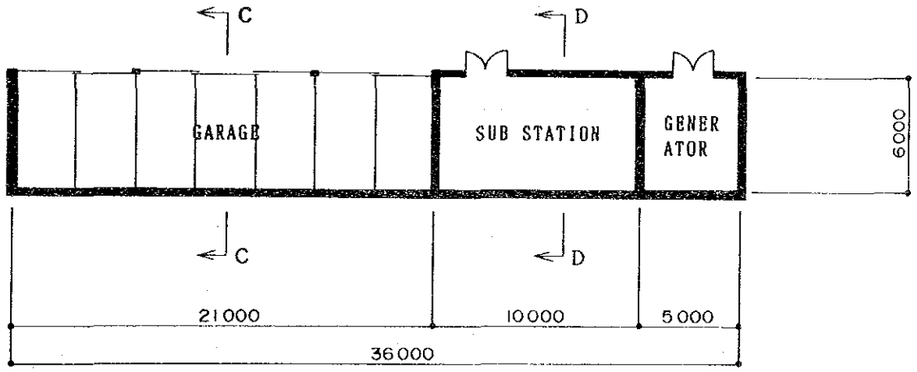
SOUTH ELEVATION



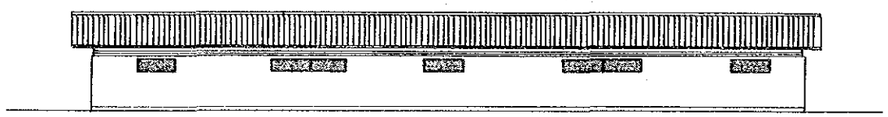
SECTION A-A



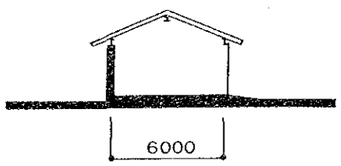
SECTION B-B



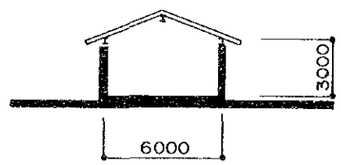
TRAINING-USE CAR GARAGE/
SUB-STATION/
GENERATOR HOUSE 1/300



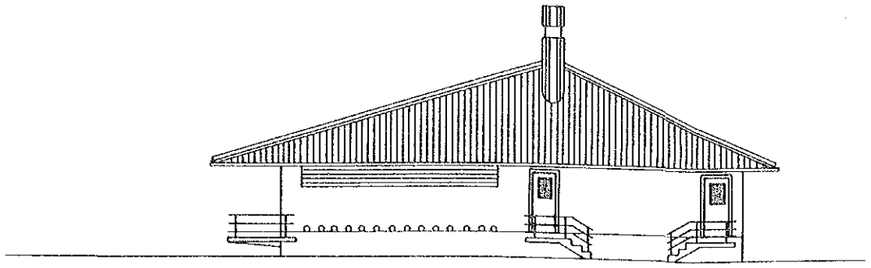
EAST ELEVATION



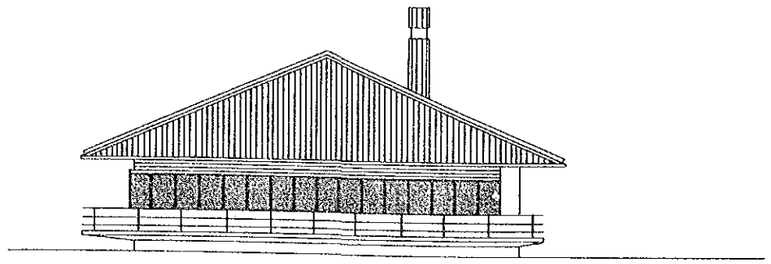
SECTION C-C



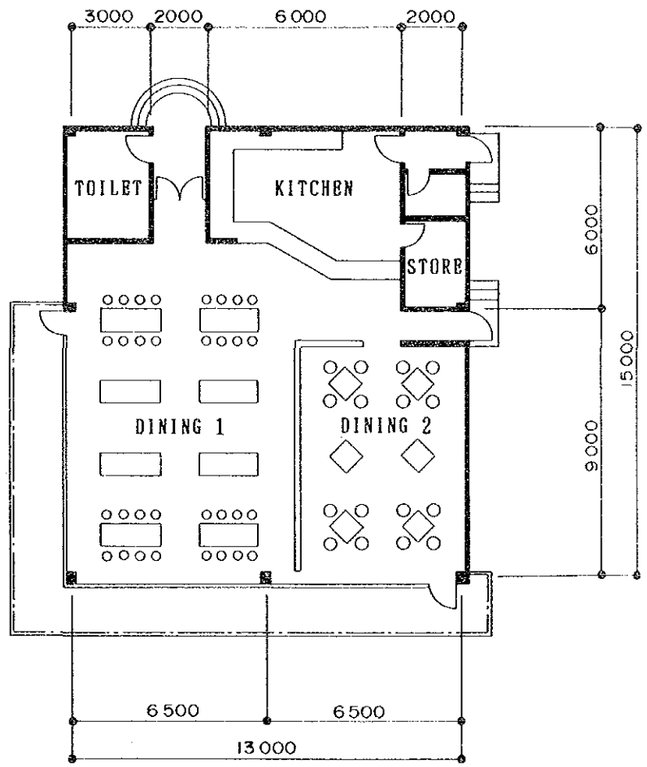
SECTION D-D



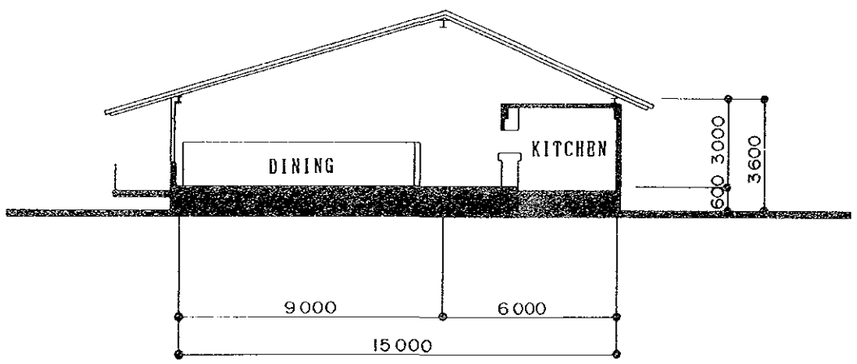
SOUTH ELEVATION



WEST ELEVATION



PLAN 1/200



SECTION

CANTEEN

4-3 CONSTRUCTION PLAN

4-3-1 Condition of the Construction Industry in Sri Lanka and Construction Policies

1) Condition of the Construction Industry

The construction industry in Sri Lanka differs greatly between the public sector and private sector. In constructing public facilites, various tasks from planning, designing, and procurement of materials and equipment, to construction are in many cases controlled by a department or a public corporation of the relevant ministry. Therefore, the public corporations have a large amount of heavy machinery and are able to undertake large-scale construction work. They, however, do not participate in private construction work. Although private construction companies take part in large-scale construction projects including those conducted by the public sector, as they lack heavy machinery their work is inevitably inefficient.

Many private construction companies are therefore forced to subcontract their services to foreign or foreign-capital based companies with more powerful machinery and to merely supply labour to them. Since Sri Lanka has received assistance from many foreign countries, many of the large-scale construction projects have been undertaken by foreign or foreign-capital based companies.

With regard to building facility work, there are many specialized firms but not many of them have sufficient capabilities.

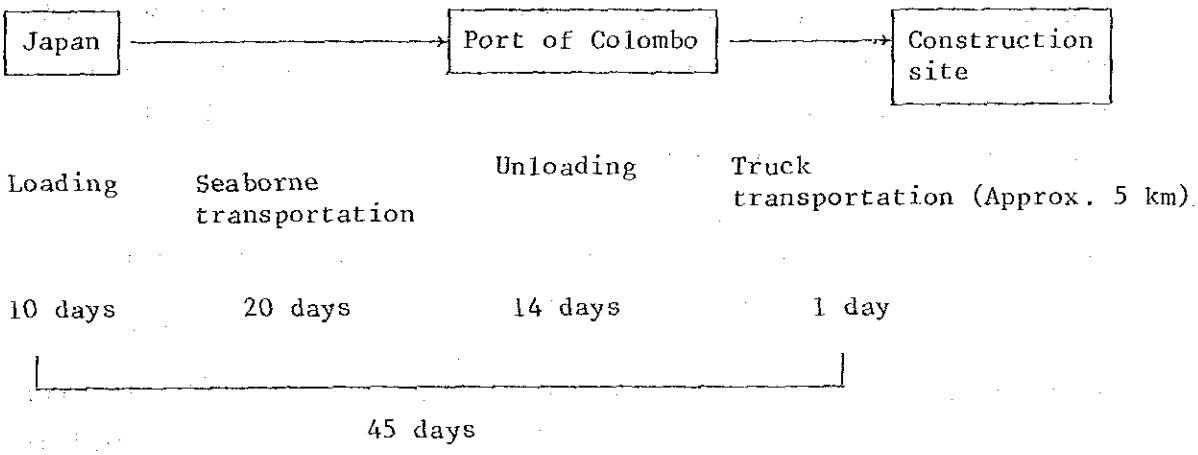
The engineering capacity of local contractors in Sri Lanka is in general insufficient due to the shortage of experienced engineers and skilled workers, delayed mechanization, and the limited types of materials available.

Regarding the construction of general structures, the main portions such as foundations, columns, beams, and floor slabs are of

reinforced concrete, walls are made of bricks, and roofs are made of corrugated asbestos cement sheets or clay roof tiles. Houses are generally built of brick.

As some construction work such as concrete placing relies on manual labor, there still remain quite a few problems in construction methods, quality control, and progress control. With regard to the construction period, due to the lack of heavy machinery, insufficient numbers of skilled workers, unstable material supply, and the poor understanding laborers have of progress control, work proceeds at a slow pace and projects are rarely completed on schedule. Although basic construction materials can be procured in Sri Lanka, there are problems in terms of quality and marketability.

The figure below shows material transportation routes. There seems to be no special problems with them. Because of the political instability in Sri Lanka, it will be necessary to obtain the latest information concerning unloading at the port of Colombo, as well as the safety and stability of the truck transportation route.



2) Construction Policies

The Ministry of Industries and Scientific Affairs is the main body executing this project on the Sri Lankan side. The Department of External Resources of the Ministry of Finance and Planning will undertake the tasks related to the arrangements to be made with the donor country as the agent in charge.

With regard to the construction of the facilities, and the provision of equipment for the project, a Japanese consulting company will undertake detail design, tender and contract related tasks, and supervision of work for the Government of Sri Lanka according to the system of the Japanese Giant Aid Program.

The construction of the facilities including the supply and installation of equipment will be undertaken by a Japanese contractor selected through tendering, one which has abundant experience in overseas projects, the capability to complete the work on schedule, and a thorough understanding of the Grant Aid Program.

With regard to the materials and construction methods to be used for the work, as many local materials and products as possible as well as local construction methods suitable for the local conditions will be used. The physical conditions of the site, the quality of and supply capacity for local materials, and the ease of repair work after the completion of the project will also be taken into consideration.

In the vicinity of Colombo where the construction site is located, there is a considerable amount of precipitation from April to May, and from October to November. It is necessary therefore, to make a plan wherein exterior work as well as material transportation in large quantities will be avoided during these periods. When considering the soil quality of the site, it is also considered necessary to avoid earth work and foundation work during the rainy seasons.

4-3-2 Scope of Work

The scope of work assigned respectively to the Japanese side and the Sri Lankan side is as follows. Among the work to be executed by the Sri Lankan side, the land and utility preparation work should be completed before the work to be conducted by the Japanese side starts, and the gate and fence work and the landscaping work should be carried out after the work to be executed by the Japanese side has been completed and before the facilities are put to use.

1) Work to be Borne by the Japanese Side

(a) Buildings

Administration/classroom building, Training building No. 1, Training building No. 2, Car washing/Inspection training building, Shower/toilet building, Canteen, Training-use car garage, Personal-use car garage, Sub-station/generator house, and Guardhouse.

(b) Building facilities

Water supply system (within the site), drainage system and a septic tank (within the site), sanitary system, power receiving system (within the site), telephone exchange system, lighting and receptacles system, public announcement system, air-conditioning and ventilation system, and fire-fighting system.

(c) Exterior work

Private roads within the site, regulating ponds, and exterior lamps.

(d) Training equipment and materials.

(e) Other work

Transportation of materials and equipment from Japan to the construction site in Sri Lanka, and detail design and supervision of construction work.

2) Items to be Borne by the Sri Lankan Side

(a) Land preparation and exterior work

Securing of land, clearance, and landfilling
Gate and fence work
Landscaping work

(b) Work related to infrastructure

Leading in of electricity, water supply, and telephone lines to the site boundary
Provision of drainage channels to the outside of the site

(c) Equipment and furniture

Equipment and furniture not covered by the items to be prepared by the Japanese side.

(d) Expenses, formalities, etc.

(1) Expenses

Expenses required for the banking arrangements.
Expenses required for the exemption of import taxes imposed on construction materials and equipment.

(2) Prompt handling of the matters related to customs clearance.

(3) Procedures to exempt the Japanese staff engaged in the Project from customs duties and other Sri Lankan domestic taxes in accordance with the agreement.

4-3-3 Construction Supervision Plan

In order for the project to proceed smoothly, communication and adjustment among the Japanese and Sri Lankan governmental authorities, the consultant and the contractor are very important. Prior to the commencement of the work, the consultants and the contractor should prepare a construction plan with the following points taken into consideration:

- ° Natural conditions
- ° Labour conditions and engineering capacity
- ° Extent of the work to be executed by each country
- ° Procurement and delivery of materials and equipment, and construction
- ° Trial run

In the construction supervision stage, the consultant will have supervisors with adequate engineering knowledge stationed at the construction site, and will dispatch a general manager and specialized engineers to the site according to the progress of the work.

As it is expected that a considerable amount of products, materials, and equipment will be procured in Japan for this project, the supervisors stationed at the site and designers should cooperate with each other under the chief designer who holds responsibility for the detail design in various matters such as the preparation of working drawings, inspection of standards, and inspection and acceptance of products.

Based on the construction supervision policies as mentioned above, the consultant will execute the following tasks.

1) Work Contract

Selection of tenderers to be invited, preparation of work contract documents, preparation for and attendance at tendering, evaluation of the breakdown of estimates, attendance at the conclusion of contracts.

2) Inspection and Approval of Working Drawings

Inspection and approval of working drawings, specifications, material samples, and equipment to be provided by the contractor.

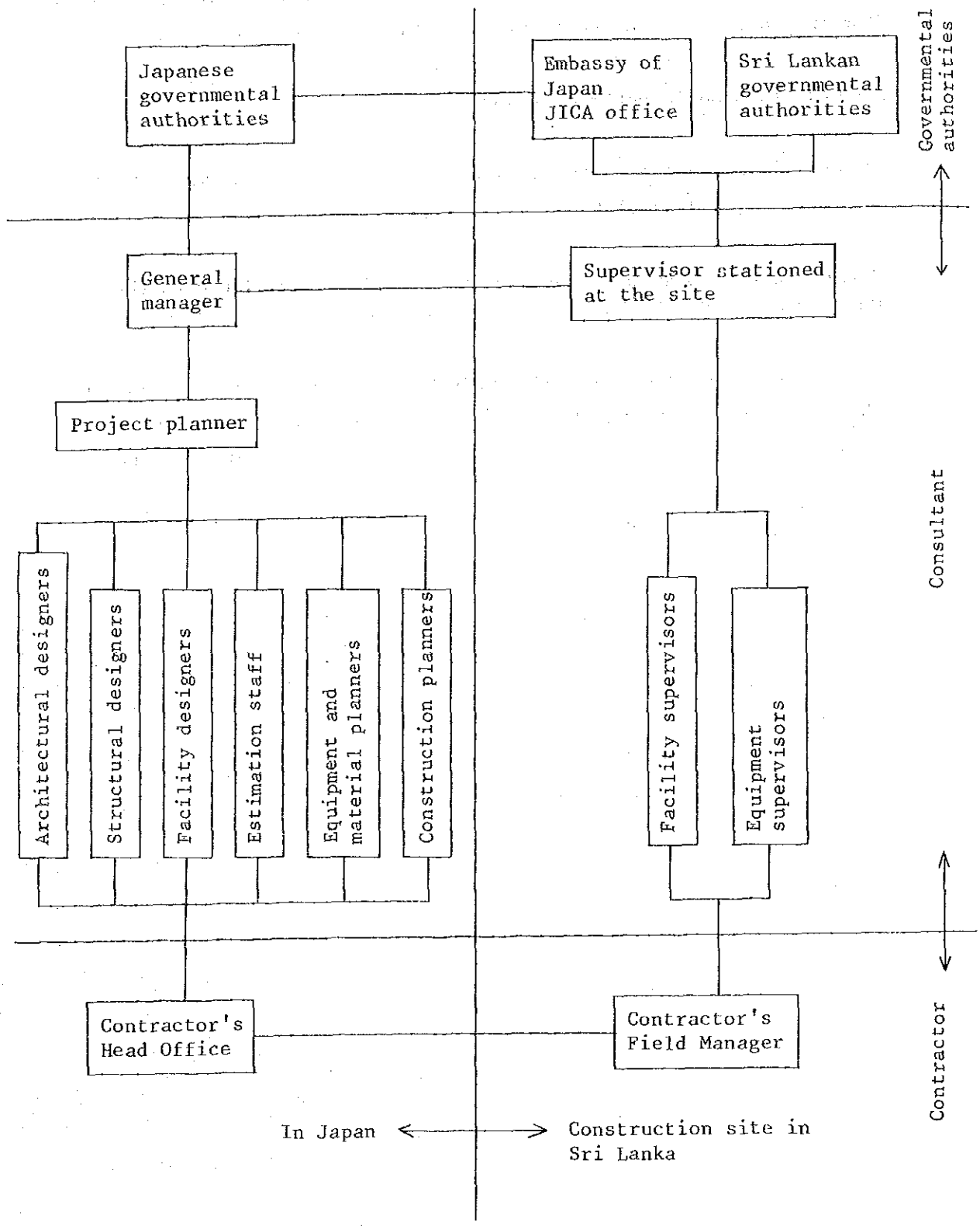
3) Instruction and Inspection of Work

Instructions concerning the work plan and construction, inspection of progress, and completion inspection.

4) Reporting to the authorities concerned, and cooperation with the Government of Sri Lanka as to Issuing of Payment Certificates

Reporting to the owner on the progress of the work, cooperation with the owner as to issuing of certificates, and reporting to the Japanese Governmental authorities as to the progress of the work.

Detail Design and Construction Supervising System



4-3-4 Construction Materials and Training Equipment, Procurement Plan

As many local materials as possible will be used in construction. It will be necessary, however, to thoroughly investigate the quality, practicability, price, and supply capacity of available materials.

Training-use equipment and materials will in general be procured in Japan. Materials, which can be easily serviced in Sri Lanka will take priority.

Thorough care should be exerted when transporting the equipment and materials supplied from Japan to the construction site. Since the site is in a tropical area with high temperatures and humidity, some materials and products will need to be double-packed for waterproofing.

The procurement plan of construction materials is as follows:

1) Construction Work

Material	Sri Lanka	Japan	Remarks
Sand	○	-	The sand collected from the upstream of the Mahaweli Ganga will be used. It is difficult, however, to collect sand in bulk at one time as it is collected manually.
Gravel	○	-	Produced in small plants located in the central mountainous area and the suburbs of Kandy. It is difficult to acquire gravel in bulk at one time.
Cement	○	-	There are some cement production plants in Sri Lanka. As the output from the plants is small, imported cement will also be used. Because imported cement is available in bulk, there are no problems in terms of the procurement of cement.
Reinforcing bar	-	○	Although some reinforcing bars are produced in Sri Lanka, most of them are imported from India, Taiwan, etc. Imported reinforcing bars are inferior in quality; their machinability is especially low.

Material	Sri Lanka	Japan	Remarks
Steel frames	-	○	Most steel frames are imported. Fabricators do not have sufficient engineering capacity.
Forms	○	-	Imported products are available.
Concrete block	○	-	There are many manufacturers in Colombo and therefore there are no problems in terms of both quality and supply.
Bricks	○	-	There are many manufacturers in Colombo and Kandy, and therefore there are no problems in terms of supply. As the appearance of the products is not consistent, there may be a problem when using them as facing bricks.
Terrazo tiles	○	-	Terrazo tiles are widely used as a common floor finishing material in Sri Lanka, and there are no problems in terms of both quality and supply.
Ceramic tiles	○	-	Produced by a public corporation. Not many types of products are available.
Painted floor material	-	○	Not produced in Sri Lanka.
Plywood	○	-	There are some problems in terms of both quality and supply.
Rock wool acoustic board	○	-	Not many types are available
Asbestos cement board	○	-	Same as the above.
Wooden material	○	-	Many types of tropical hardwoods are available. Although they are suitable for furniture, doors and windows, they are not suitable for structural members.
Glass	-	○	Many products are imported from Indonesia, Australia, and Europe. Imported products have low smoothness.
Metal doors & windows	-	○	Aluminium sashes are locally manufactured using imported raw material. The quality is, however, inferior.

Material	Sri Lanka	Japan	Remarks
Wooden doors & windows	○	-	Imported products are available.
Metal fixtures	○	○	There are problems in terms of both quality and product types.
Corrugated asbestos cement sheet	○	-	There are no problems in terms of both quality and supply.
Roof tiles	○	-	As the sintering temperature is low, the roof tiles available are fragile, although they are traditional materials.
Long folded colored steel sheet	-	○	Not locally manufactured.
Equipment and fixtures	○	○	According to uses.

2) Building Facility Work

Vinyl pipe	-	○	Not locally manufactured. The wall thickness of the imported products available locally is thin.
Steel pipe	-	○	There are problems in terms of quality.
Metal pipe support	-	○	Same as the above.
Pump	-	○	Same as the above.
Sanitary fixtures	-	○	Same as the above.
Air-conditioning equipment	-	○	Not manufactured.
Transformer	-	○	Same as the above.
Distribution board	-	○	Same as the above.
Telephone exchange unit	-	○	Same as the above.
Wire and cable	-	○	Same as the above.

Material	Sri Lanka	Japan	Remarks
Lighting fixtures	-	○	Not manufactured.
Low voltage equipment	-	○	Same as the above.
Fire-fighting equipment	-	○	Same as the above.
Kitchen equipment	-	○	Same as the above.

4-4 EXECTION SCHEDULE

When the project to establish this training center under the Grant Aid of the Government of Japan is executed, the entire project shall be divided into 2 phases, and each phase shall be executed in the following order.

1) Exchange of notes by the both governments

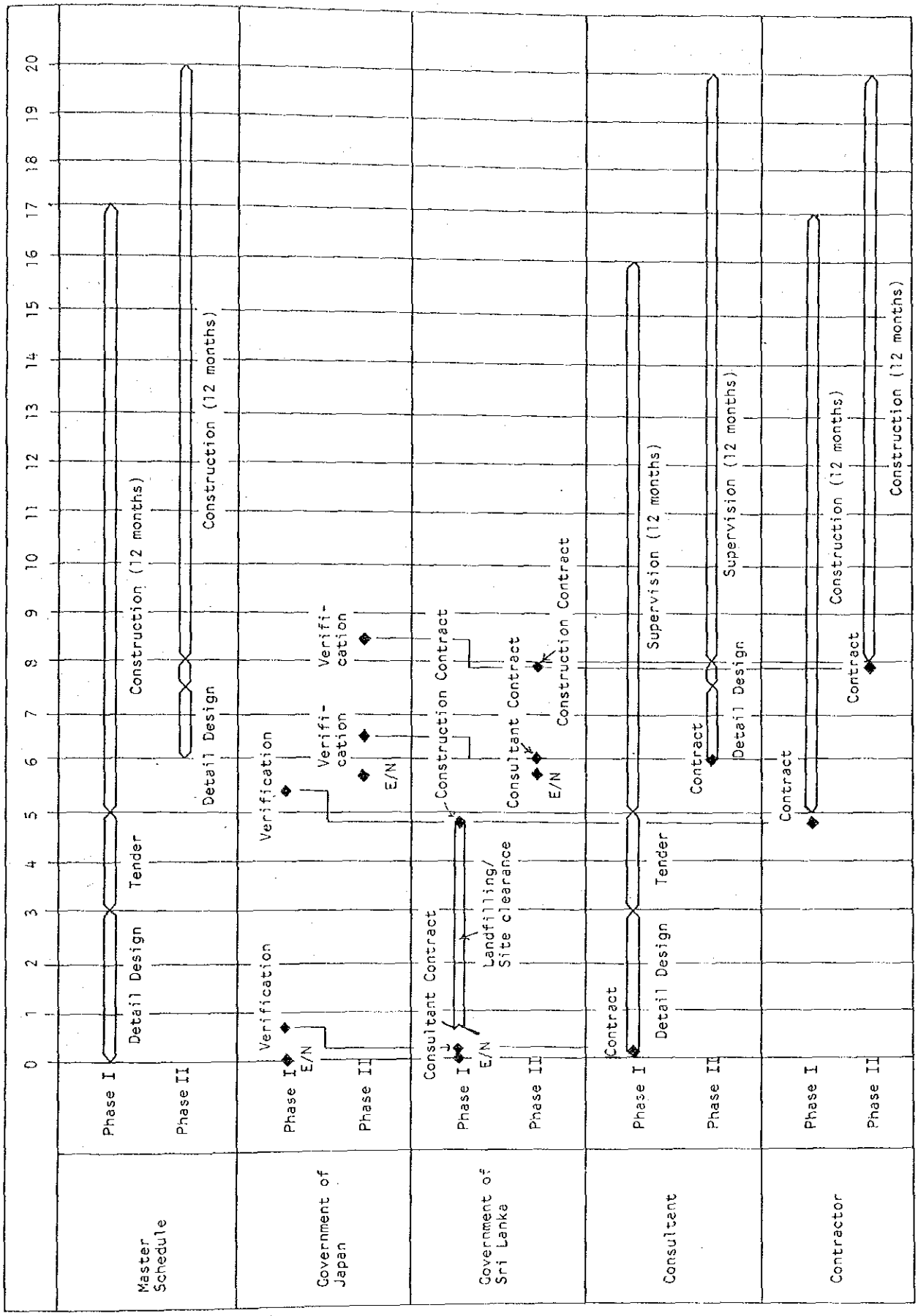
2) Detail design ------ Preparation of detail design drawings, specifications, and calculation sheets. Approval by the Government of Sri Lanka.

3) Tendering ---------- Prequalification (P/Q) for tender of the construction. Tendering (Tender will be opened in Japan.) Construction contract

4) Construction work -- After signing the construction contract, the construction shall commence upon verification by the Government of Japan.

The expected construction period required for the above operations shall be as per the following Execution Schedule.

Execution Schedule



4-5 OPERATION AND MANAGEMENT COSTS

A rough estimate of the costs of operating the training center for the initial year is as follows:

1) Personnel Expenses

Administration section		943,200 RS
Director	5.000 RS/month·person x 12 month x 1 person =	60,000 RS
Secretary	3.500 RS/month·person x 12 month x 1 person =	42,000 RS
Administrative officer	3.000 RS/month.person x 12 month x 1 person =	36,000 RS
Accountant	4.000 RS/month·person x 12 month x 1 person =	48,000 RS
Computer operator	2.500 RS/month·person x 12 month x 1 person =	30,000 RS
Accounting staff	1.500 RS/month·person x 12 month x 3 persons=	54,000 RS
Security staff	1.250 RS/month·person x 12 month x 4 persons=	60,000 RS
Drivers	1.200 RS/month.person x 12 month x 3 persons=	43,200 RS
Typists	1.500 RS/month·person x 12 month x 3 persons=	54,000 RS
	Total	427,200 RS

Training section		
Engineer	4.000 RS/month·person x 12 month x 1 person =	48,000 RS
Asst. engineer	3.000 RS/month·person x 12 month x 1 person =	36,000 RS
Lecturers	2.500 RS/month.person x 12 month x 6 persons=	180,000 RS
Instructors	2.000 RS/month.person x 12 month x 6 persons=	144,000 RS
Assistants	1.500 RS/month·person x 12 month x 6 persons=	108,000 RS
	Total	516,000 RS

Total personnel expenses	943,200 RS

2) Lighting and Heating Expenses 441,040 RS

(a) Electric charges

It is assumed that the max. consumption of electricity will be 35% of the electric capacity of the facilities.

500 KVA x 0.35 = 175 KVA

Calculation of electric charges

(1) Basic charge (demand charges)

115 RS/KVA.month x 175 KVA x 12 months = 241,500 RS

(2) Charges for consumption (unit charges)

1. General (lighting, air conditioning, etc.)

1.5 RS/KWH x 230 KVA x 0.4 x 8 hrs x 0.4 x 200 days = 88,320 RS

2. Training-use equipment

1.5 RS/KWH x 270 KVA x 0.4 x 8 hrs x 0.1 x 200 days = 25,920 RS

Total 114,240 RS

(3) Fixed rate

200 RS/month x 12 months = 2,400 RS

Total of electric charges 358,140 RS

(b) Water charges

It is assumed that the average water consumption/day will be 40% of the capacity of the water receiving tank.

5.5 RS/m^3 x 30 m^3 x 0.4 x 200 days = 13,200 RS

(c) Telephone charges

5.3 RS/call x 50 calls/day x 200 days = 53,000 RS

(d) Power generator fuel consumption

It is assumed that the generator will be operated for 3 hours/month.

9.28 RS/ℓ x 50 ℓ/hr x 3 hrs x 12 months = 16,700 RS

Total of lighting and heating expenses 441,040 RS

3) Operating Costs of Personal-Use Cars 24,000 RS

20 RS/ℓ x 20 km ÷ 10 km/ℓ x 3 cars x 200 days = 24,000 RS

4) Office Supplies, Copies, Printing, etc. 47,700 RS

According to statistical data available in Japan, these costs will amount to 5 to 10% of the personnel expenses. With the present situation in Sri Lanka taken into consideration, it is assumed that these costs will be 5% of the personnel expenses.

943.200 RS x 0.05 = 47,200 RS

Total 1,455,400 RS —— ①

It is expected that the training center can be operated at the costs calculated above for the first two years of operation. From the third year, additional costs as calculated below will be required and the

operating costs required will total 1,954,830 RS/year. It is necessary for the Sri Lankan side to allow for increases in the budget for additional operating costs.
The cinteen will be operated by an outside contractor.

5) Building Maintenance Cost 208,890 RS

According to statistical data available in Japan, it is estimated that the maintenance cost required for the buildings will be about 0.1% of the construction cost, and about 0.4% for facilities. It will be about ¥ 240/m^2 or 30 RS/m^2 in total for both buildings and facilities with the conditions of this center and the actual situations in Sri Lanka taken into consideration.

30 RS/m^2 x 6,963 m^2 = 208,890 RS

6) Training Maintenance Cost 90,500 RS

It is assumed that it will be 0.1% of the cost of training equipment requiring maintenance.

7) Cost for Training Materials 200,000 RS

This covers the costs of supplemental oil and spare parts. As some of the spare parts are included in the items to be supplied by Japan, these costs will not exist for the first one and a half years.

Operating costs required from the third year = ① + 5) + 6) + 7)
= 1,954,830 RS

4-6 SCOPE OF WORK

The scope of work to be borne by the Japanese side will be as follows:

1) Construction of Administration/classroom building, Training buildings No. 1 and No. 2, Car washing/inspection training building, Shower/toilet building, Canteen, Training-use car garage, Personal-use car garage, Sub-station/generator house, and Guard house.

2) Water supply, drainage and sanitary work (within the site)
3) Electrical equipment work (within the site)
4) Fire-fighting equipment work
5) In-site road and regulation pond work
6) Provision of training equipment

The scope of work to be borne by the Sri Lankan side will be as follows:

1) Clearance of land, and landfilling
2) Gate and fence work, and landscaping work
3) Electricity lead-in work
4) Telephone lead-in work
5) Supply water lead-in work
6) Drainage channel connection work
7) Procurement of general furniture

2) Rough estimation of costs to be borne by the Government of Sri Lanka

(a) Preparation of land (including landfilling work)	2,000,000 RS
(b) Gate and fence work	300,000 RS
(c) Landscaping work	432,000 RS
(d) Electricity lead-in work	172,000 RS
(e) Telephone lead-in work	52,000 RS
(f) Supply water lead-in work	15,000 RS
(g) Drainage channel connection work	50,000 RS
(h) Procurement of general furniture	80,000 RS
Total	3,101,000 RS
	(¥ 15,691,000)

CHAPTER 5. EVALUATION OF PROJECT

CHAPTER 5. EVALUATION OF PROJECT

In Sri Lanka, the number of automobiles is sharply increasing year by year. In contrast to this trend, however, there is only one automobile mechanic training institute fully equipped with the necessary facilities and most mechanics only receive education on the job from their superiors. Therefore, there is a shortage of competent automobile mechanics with adequate knowledge and techniques. Moreover, there are only a few maintenance facilities which have the flexibility to cope with the advanced electronic systems, modern equipment and new materials developed through recent technical innovations which are found in modern automobiles.

Under such circumstances, it is considered a timely policy to establish a fully equipped automobile mechanic training center, and the following benefits are expected from doing so.

1) By graduating mechanics who have learned the basics of automobile maintenance and have received systematic training, proper knowledge and techniques will be disseminated, leading to an overall improvement in the level of the automobile maintenance industry in Sri Lanka.

2) In addition to the initial objective of training automobile mechanics, information on the most up-to-date technology can be disseminated through seminars.

3) Employment opportunities will be provided for young people.

As for indirect benefits,

4) With the improvement in the level of the automobile maintenance industry as a whole, not only will the ratio of working automobiles be increased but also the service life of automobiles will be extended, which will contribute to economic improvement in Sri Lanka.

The only full-scale automobile mechanic training facility is the CGTTI, which was established with the assistance of the Federal Republic of Germany with

the aim of training automobile mechanics who can maintain the large buses operated by the SLTB.

Japan exports to Sri Lanka passenger cars, vans, wagons, etc., which amount to more than 80% of Sri Lankan motor vehicle imports. The provision of proper maintenance technology and the propagation of information on Japanese vehicles, the imports of which are increasing year by year in Sri Lanka, are therefore considered to be obligations that Japan ought to fulfill. Providing training using Japanese passenger cars as well as small and medium-sized buses and trucks and turning out well-trained graduates will certainly contribute to the improvement of automobile maintenance in Sri Lanka.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

Due to the insufficient number of competent automobile mechanics as well as repair shops with up-to-date technology and facilities, quite a few poorly-maintained vehicles are presently running in Sri Lanka, which leads to traffic jams throughout the country and causes-traffic accidents.

With the execution of this project, it is expected that competent automobile mechanics will enter the automobile maintenance industry in Sri Lanka and exhibit proven expertise and techniques as key workers in repair shops, consequently allowing the country to overcome the aforementioned unfavorable circumstances.

The training center will be an agency affiliated with the Ministry of Industries and Scientic Affairs. Most of its working expenses will be borne by United Motors, an excellent corporation with a sufficient financing capability and one of the twelve public corporations under the control of the Ministry. The Ministry has also planned to establish a management board consisting of representatives from other ministries and private repair shops to administer the operation of the training center. As the Ministry has drawn up a carefully though-out plan to guide the project, it is expected that the training center will operate very smoothly. It is considered that this project which will be undertaken under these circumstances will greatly contribute to improvement in the automobile maintenance situation in Sri Lanka and also to the friendly relationship between the two countries. In consideration of the significance and the expected results of this project, it is judged that this project is appropriate as a project to be executed under the Japanese Grand Aid Program, and it is hoped that this project will be executed with dispatch.

In order to have the project progress and function effectively, the following is proposed to the Government of Sri Lanka:

1) To execute training and education of varied content according to a fully thought-out curriculum under the guidance of competent training staff members.

2) To meet the needs of private automobile repair shops by maintaining a good relationship with the Technical Educational System of the Ministry of Higher Education, the NAB controlled by the Ministry of Youth Affairs & Employment, and the CGTTI, and by actively exchanging technical know-how with these organizations.

3) To make efforts to acquire the most advanced technology through close relationships with foreign countries including Japan and also to spread the acquired knowledge and technology through seminars, etc.

4) It is indispensable to establish the management board, consisting of representatives of various fields in order to smoothly operate the training center and to provide carefully thought-out training by reflecting the demands of the automobile maintenance industry in Sri Lanka. It is proposed to the management board to establish appropriate operating policies.

In order to implement a systematic training rich in content, it is necessary to carefully prepare in advance an training curriculum including the materials for lectures, definite practical training programs and to excute simulation exercises. In preparing an training curriculum, the cooperation of Japanese experts is absolutely necessary. It is desired that Japanese specialists who will give valuable advices be dispatched for a certain period when the training center is opened. The Sri Lankan side is planning to receive three experts for preparing an training curriculum, which should be prepared through the cooperation of both the Sri Lankan staff and the Japanese experts before the training center is opened. In order to smoothly execute the curriculum, it is desired that the lecturers who will work at the center be trained in Japan in advance. With these points taken into consideration, the following proposals are made:

Dispatch of experts

No. of experts:

General automobile engineering : 2
Automobile electrical engineering: 1 } 3 experts

Period: 2 years from the beginning of 1989

Training of Sri Lankan counterparts in Japan

No. of counterparts: Those to be employed as the instructors and lecturers of the center: 2

Period : Approx. 6 months from the middle to the end of 1988

APPENDIX

APPENDIX

APPENDIX 1. Minutes of Meeting
2. Members of Study Team
3. Schedule of Basic Design Study
4. List of People Concerned
5. Length of Public Roads
6. Number of Motor Vehicles or Registers
7. Road Vehicles Registered by Classes of Vehicle and Fuel Used
8. Number of Traffic Accidents Reported to Police
9. Number of Persons Killed in Road Accidents
10. Omnibus Services
11. Length of Railway Track
12. Locomotives and Rolling Stock
13. Passengers and Goods Traffic by Railway
14. Statistical Data Related to Education
15. Technical Education System of the Ministry of Higher Education
16. Training Course Provided by NAB

Sources of statistical data: Unless otherwise specified, the statistical data were taken from:

Statistical Abstract of the Democratic Socialist Republic of Sri Lanka, 1985, Department of Census and Statistics

APPENDIX 1. Minutes of Meeting

1) Basic Design Study

BASIC DESIGN STUDY

On the Project

For establishing The National Training Center for

Automobile Engineering

in

The Democratic Socialist Republic of Sri Lanka

July, 1987

MINUTES OF DISCUSSIONS
THE PROJECT FOR ESTABLISHING
THE NATIONAL TRAINING CENTER FOR AUTOMOBILE ENGINEERING
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a basic design study on the Project for establishing the National Training Center for Automobile Engineering (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Democratic Socialist Republic of Sri Lanka the study team headed by Mr. Kazuyoshi Matsumoto, Assistant Director of Vehicle Repair Division, Regional Transport Bureau, Ministry of Transport, from June 30 to July 23, 1987.

The team had a series of discussions on the Project with the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka and conducted a field survey.

As a result of the study, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Colombo, July 8, 1987

MR KAZUYOSHI MATSUMOTO
Leader, Basic Design Study Team,
Japan International Cooperation
Agency

MR A A JUSTIN DIAS
Secretary, Ministry of
Industries and Scientific
Affairs

ATTACHMENT

1. The objective of the Project is to provide necessary facilities and equipment for establishing the National Training Center for Automobile Engineering (hereinafter referred to as "NTC") which aims at bringing up mechanics with skill and knowledge.

2. The executing agency for the implementation of the Project in Sri Lanka is Ministry of Industries and Scientific Affairs.

3. The proposed site for the Project is located at:
Weragoda Ward No.7, Weragoda. Within Urban Council limits of Kolonnawa in Western Province of Colombo District.
The map of the site is shown in Annex I.

4. The outline of NTC is shown in Annex II.

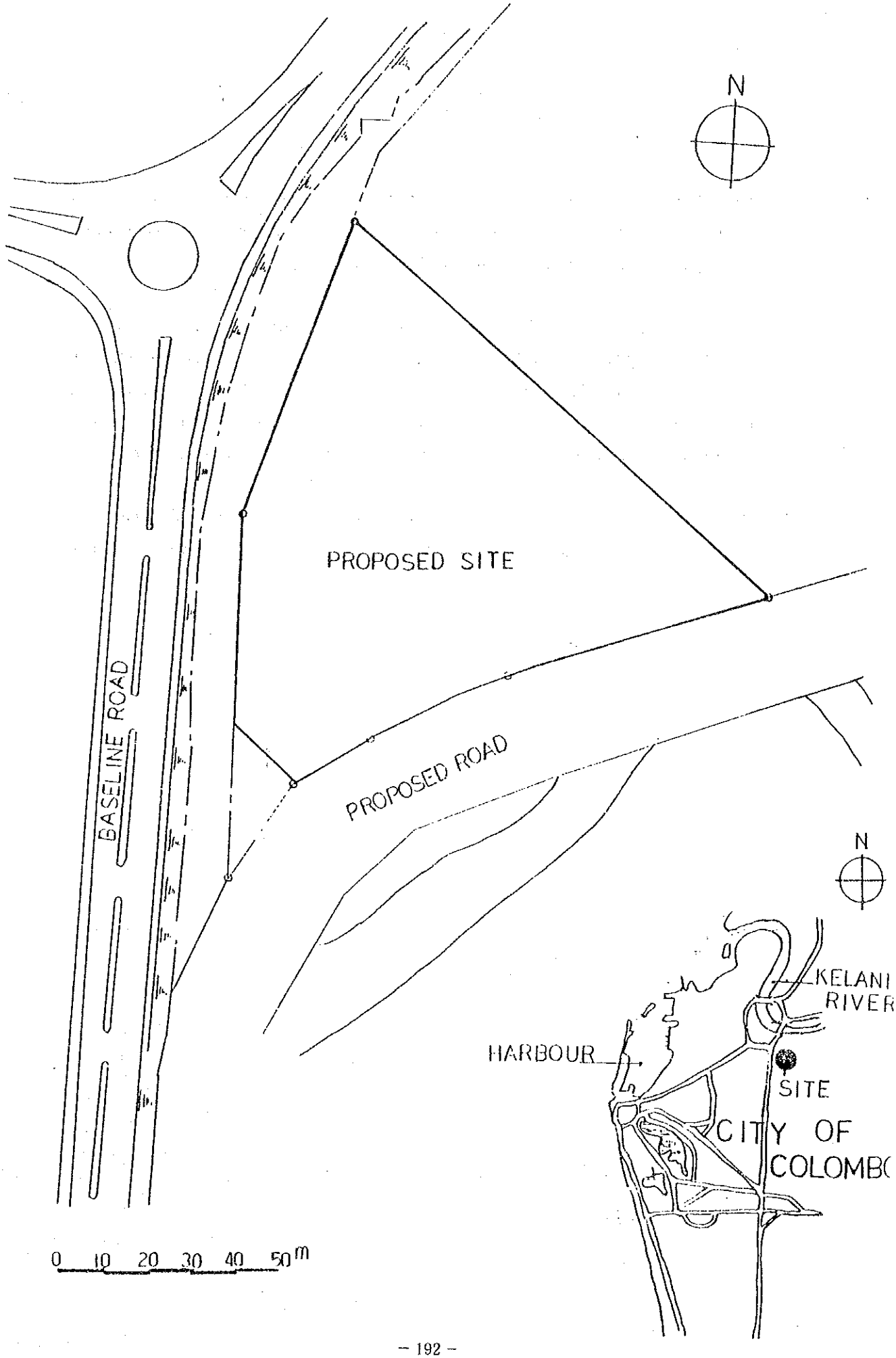
5. The team will convey to the Government of Japan the desire of the Government of the Democratic Socialist Republic of Sri Lanka that the Government of Japan takes necessary measures to cooperate in providing the items listed in Annex III within the scope of Japan's Grant Aid Program.

6. The Government of the Democratic Socialist Republic of Sri Lanka has understood the Japan's Grant Aid system explained by the team, including a principle that a Japanese consultant firm and a Japanese general contractor should be used for the implementation of the Project.

7. The Government of Sri Lanka will take necessary measures as listed in Annex IV on condition that Grant Aid by the Government of Japan is extended to the Project.

8. The Government of Sri Lanka requested two Japanese experts specialized in Automobile Engineering and one Japanese expert specialized in Automobile Electric under the Japan s technical cooperation and also requested that two Sri Lankan Instructor/Foreman be trained in Japan under the same program.

9. The Government of Sri Lanka confirmed that it would properly clear, fill and level the project site before the start of the construction.

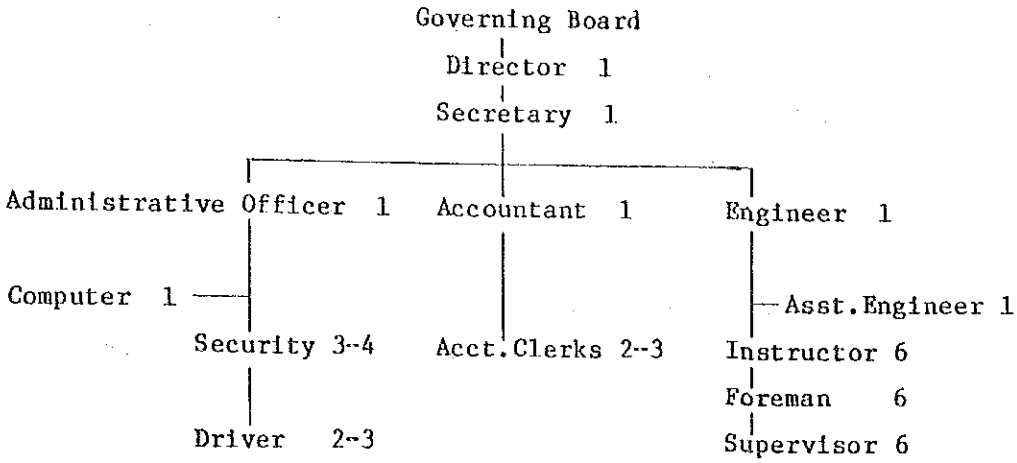

N
PROPOSED SITE
BASELINE ROAD
PROPOSED ROAD
0 10 20 30 40 50 m
N
KELANI
RIVER
HARBOUR
SITE
CITY OF
COLOMBO

LOCATION AP

ANNEX II

The outline of NTC is as follows:

A. Organization chart and number of staff members



B. Operation and maintenance cost

The operation and maintenance cost of NTC is to be covered by United Motors and trainees.

C. Instructor and foreman

	Instructor	Foreman
Gasoline & diesel engine	2	2
Chassis	2	2
Electric & electronics	1	1
Machining	1	1

D. Training course

(1) Automobile Mechanic course

Number of classes	: 3
Number of trainees in each class	:20
Term	: 1 year and a half

(2) Automobile Electrician course

Number of class	: 1
Number of trainees	:25
Term	: 1 year and a half

(3) Automobile Machinist course

Number of class	: 1
Number of trainees	: 15
Term	: 1 year and a half

(4) Automobile Mechanic Course for semi-skilled mechanics (evening classes)

Number of class	: 1
Number of trainees	: 20
Term	: around 6 months

E. Vehicle as training materials:

Car (front wheel drive & rear wheel drive) and 2 tonner truck with diesel engine

F. Curriculum

(1) Automobile Mechanic course

a. Theory (420 hours/term)

Automobile engineering

Repair & Maintenance

b. Practice (1680 hours/term)

Manual work

Machine

Measuring

Engine

Chassis

Electric & Electronics

(2) Automobile Electrician course

a. Theory (800 hours/term)

Automobile engineering

Repair & Maintenance

Principles of electricity and electronics

General study of automobile electrical components

Radio, cassette stereo and clock

Air conditioning system

b. Practice (1300 hours/term)

Automobile electrical components

Radio, cassette sterero and clock

Air conditioner

Machining of electrical components

Rewinding of armature wire

Manual work

Engine

Chassis

(3) Automobile Machinist course

a. Theory (700 hours/term)

Automobile engineering

Repair & Maintenance

Structure and function of machines

Principles of matallography

Simple theory of metal cutting

b. Practice (1400 hours/term)

Measuring devices

Operation and maintenance of machines

Welding and soldering

Machining

Chassis

Electric apparatuses and electronic devices

ANNEX III

1. Facilities

- Classroom
- Practice area for general repair
- Practice area for others (machine, component repair, tinker, painting, manual work)
- Administrative area
- Canteen
- Garage

2. Equipment

- Equipment for Automobile Mechanic course
- Equipment for Automobile Electrician course
- Equipment for Automobile Machinist course
- Training materials (car, truck and their components)
- Audio-Visual materials (O.H. projector, VTR, auto-slide projector)
- Printing machine (photocopy, duplicating machine)

ANNEX IV

Following arrangements are required to be taken by the Government of the Democratic Socialist Republic of Sri Lanka.

1. To secure a lot of land necessary for the construction of facilities and to clear, fill and level the site as needed before the start of the construction.

2. To provide necessary data and information for the Project.

3. To construct an access road to the proposed project site; to provide facilities for distribution of electricity, telephone, water supply, drainage and other incidental facilities up to the site; and to provide temporarily the above road and facilities before the start of the construction.

4. To undertake incidental civil works such as gardening and fencing, if needed.

5. To provide general furniture and materials for daily activities.

6. To bear the following commissions to a Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
   * Advising commission of Authorization to Pay
   * Payment commission

7. To ensure prompt unloading, tax exemption, customs clearance of the products and related equipment under the Grant Aid at the port of disembarkation in Sri Lanka.

8. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Sri Lanka with respect to the supply of the products and the services under the verified contracts.

9. To bear all expenses other than those to be borne by the Grant Aid Program, necessary for construction of the facilities as well as for transportation and installation of the equipment.

10. To maintain and use properly and effectively the facilities constructed and the equipment provided under the Japan's Grant Aid Program.

2) Draft Final Report Explanation

ON

THE PROJECT FOR ESTABLISHING
THE NATIONAL TRAINING CENTER FOR AUTOMOBILE ENGINEERING
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka for Grant Aid for the Project for establishing the National Training Center for Automobile Engineering (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Democratic Socialist Republic of Sri Lanka the study team headed by Mr. Kazuyoshi Matsumoto, Assistant Director, Vehicle Service Division, Land Transport Engineering Department, Regional Transport Bureau, Ministry of Transport.from June 30 to July 23, 1987.

As the result of the study, JICA prepared a draft report and dispatched a draft final report explanation team headed by Mr. Yuji Ono, Vehicle Service Division, Land Transport Engineering Department, Regional Transport Bureau, Ministry of Transport, to explain and discuss it from October 3 to October 12, 1987.

Both parties had a series of discussions on the report and have agreed to recommend to their respective Government that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Colombo, October 8, 1987

Mr. Yuji ONO
Leader, Draft Final Report
Explanation Team
Japan International Cooperation
Agency

Mr. A.A. Justin Dias
Secretary, Ministry of
Industries and Scientific Affairs

ATTACHMENT

1. The Sri Lankan side has principally agreed to the basic design proposed in the draft final report with minor but appropriate alterations as shown in Annex I mutually agreed upon to be incorporated in the Final Report.

2. The Sri Lankan side has understood Japan's grant aid system and reconfirmed the necessary measures to be taken by the Sri Lankan side for the realization of the Project shown in Annex II as agreed upon the Minutes of Discussion dated July 8, 1987.

3. Both parties confirmed that the proposed site should be decreased from 5 acres to 4.5 acres as requested by the Sri Lankan side as shown in Annex III.

4. The Government of Sri Lanka requested to dispatch two Japanese experts specialized in Automobile Engineering and one Japanese expert specialized in Automobile Electric under the Japan's technical cooperation and also requested that two Sri Lankan lecturers/instructors be trained in Japan under the same program.

5. The Government of Sri Lanka confirmed that it should take necessary measures for the followings.
   a) Provision of necessary budget for the import tax to be imposed on all the materials and equipment for the execution of the Project which will be brought from Japan to Sri Lanka.
   b) Provision of enough funds for the operation of this training center.
   c) To fill the project site to the level of the proposed road which is located on the south side, before the start of the construction work.

6. The Final Report (10 copies in English) will be submitted to the Sri Lankan side by the beginning of December, 1987.

ANNEX I

The following alterations will be incorporated in the Final Report.

1. CHAPTER 3, 3-1 Objectives on P.40

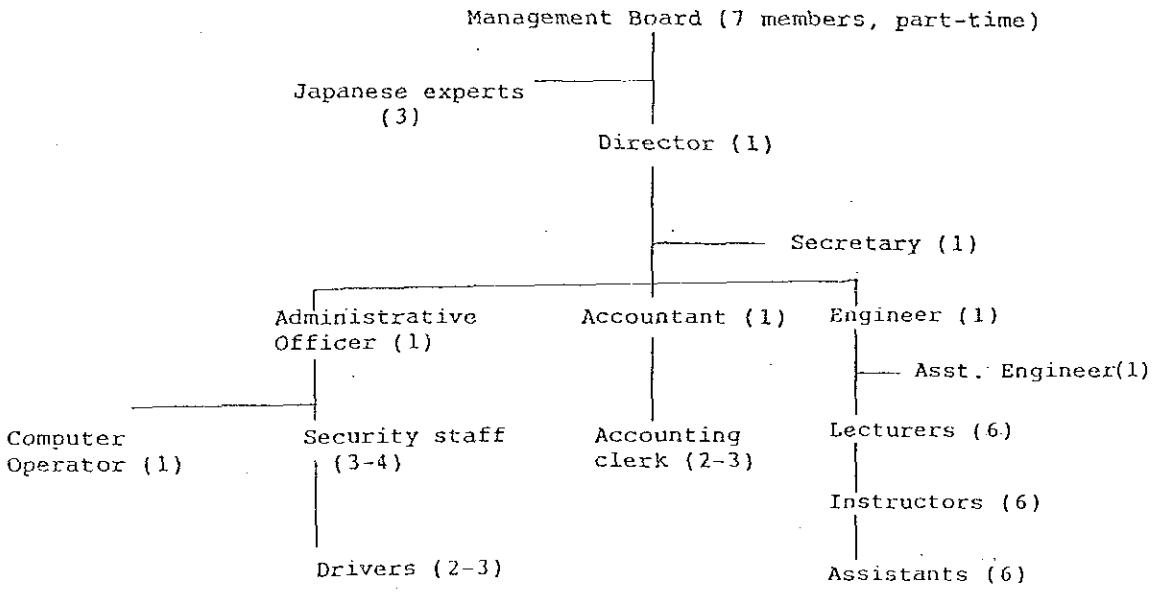
Passages which emphasize the following philosophy will be added in this section.

a) The training knowledge which will be obtained from the center will contribute to the reduction of prevailing traffic accidents.

b) Establishment of this center is a national project to bring up competent automobile mechanics for the whole vehicle maintenance industry in Sri Lanka by using passenger cars and small/middle size trucks, different from available training centers in Sri Lanka.

2. The organization chart P.50

The organization chart will be changed as follows.



3. Electrical equipment training room, P.120

Seven (7) air-conditioner repair units will be added in the equipment list.

4. CHAPTER 6 P.171

The period for dispatching of Japanese experts and acceptance of Sri Lankan counterparts will be changed as follows

Dispatch of experts

Period : 2 years from the beginning of 1989

Training of Sri Lankan counterparts in Japan

Period : Approx. 6 months from the middle of 1988 to the end of 1988.

ANNEX II

Following arrangements are required to be taken by the Government of the Democratic Socialist Republic of Sri Lanka.

1. To secure a lot of land necessary for the construction of facilities and to clear, fill and level the site as needed before the start of the construction.

2. To provide necessary data and information for the Project.

3. To construct an access road to the proposed project site; to provide facilities for distribution of electricity, telephone, water supply, drainage and other incidental facilities up to the site; and to provide temporarily the above road and facilities before the start of the construction.

4. To undertake incidental civil works such as gardening and fencing, if needed.

5. To provide general furniture and materials for daily activities.

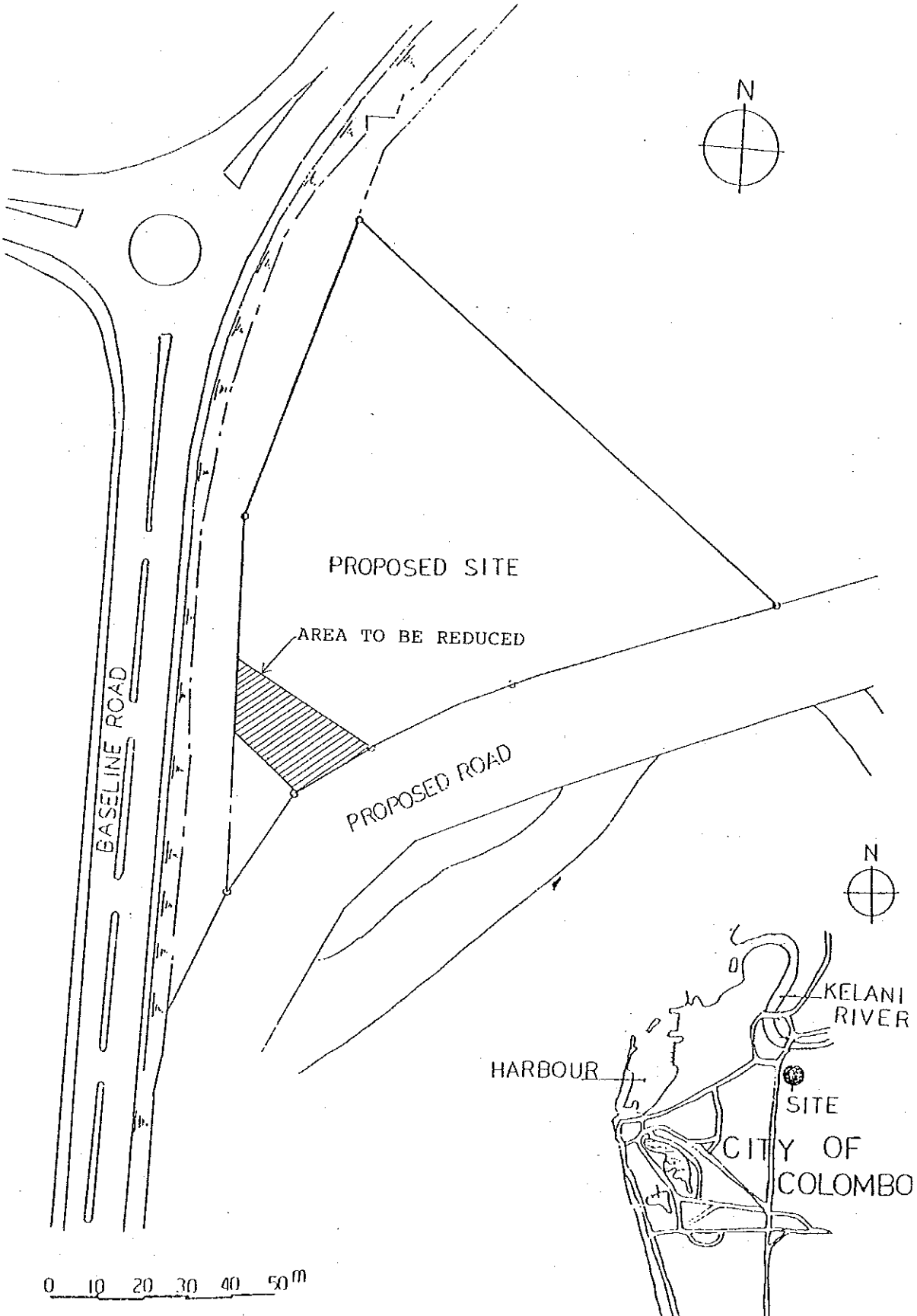
6. To bear the following commissions to a Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
   * Advising commission of Authorization to Pay
   * Payment commission

7. To ensure prompt unloading, tax exemption, customs clearance of the products and related equipment under the Grant Aid at the port of disembarkation in Sri Lanka.

8. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Sri Lanka with respect to the supply of the products and the services under the verified contracts.

9. To bear all expenses other than those to be borne by the Grant Aid Program, necessary for construction of the facilities as well as for transportation and installation of the equipment.

10. To maintain and use properly and effectively the facilities constructed and the equipment provided under the Japan's Grant Aid Program.



LOCATION MAP

APPENDIX 2. Members of Study Team

1) Basic Design Study Team

Mr. Kazuyoshi MATSUMOTO	Leader	Assistant Director, Vehicle Repair Division, Land Transport Engineering Department, Regional Transport Bureau, Ministry of Transport
Mr. Hideaki ARIMORI	Equipment Planner	Educational Department, Japan Automobile Service Promotion Association
Mr. Ryota ONO	Project Coordinator	2nd Basic Design Study Division, Grant Aid Planning & Survey Department, JICA
Mr. Akira TAKAHASHI	Architectural Planner	Daiken Architects & Engineers, Inc.
Mr. Junichi NEGORO	Architectural Designer	- do -
Mr. Toru KANAZAWA	Facility Engineer	- do -
Mr. Hikoyasu KAGEYAMA	Automobile Engineer	- do -
Mr. Masaharu KOBAYASHI	Cost Estimator	- do -

2) Draft Final Report Explanation Team

Mr. Yuji ONO	Leader	Vehicle Repair Division, Land Transport Engineering Department, Regional Transport Bureau, Ministry of Transport
Mr. Akira TAKAHASHI	Architectural Planner	Daiken Architects & Engineers, Inc.
Mr. Hikoyasu KAGEYAMA	Automobile Engineer	- do -

APPENDIX 3. Schedule of the Basic Design Study

1) Basic Design Study

June 30 (Tue) Departure from Tokyo and arrival in Bangkok. Stay in Bangkok.

July 1 (Wed) Departure from Bangkok and arrival in Colombo, courtesy visit to the Embassy of Japan and the JICA office.

July 2 (Thu) Meeting with the Asst. Director of the Dept. of External Resources of the Ministry of Finance and Planning at the JICA office.
The 1st meeting with MISA (Ministry of Industries and Scientific Affairs).
Observation of CGTTI and United Motors.

July 3 (Fri) Observation of the repair shop of United Motors. The 2nd meeting with MISA.

July 4 (Sat) Sorting and arranging documents.

July 5 (Sun) Internal meeting.

Jul16 6 (Mon) The 3rd meeting with MISA. Observation of automobile repair shops in Colombo.

July 7 (Tue) The 4th meeting with MISA.
Investigation of the proposed site.
Preparation of Minutes of Meeting. Internal meeting.

July 8 (Wed) The 5th meeting with MISA. Signing of the Minutes of Meeting. Reporting to the Embassy of Japan and the JICA office.

July 9 (Thu) Governmental staff return to Japan.
The 6th meeting with MISA.
Meeting at UDA. Investigation of the proposed site.
Observation of repair shops in Colombo.

July 10 (Fri) Sorting and arranging documents. Request for site investigation.

July 11 (Sat) Sorting and arranging documents. Internal meeting.

July 12 (Sun) Internal meeting.

July 13 (Mon) Observation of CGTT and repair shops. Meeting with Sri Lanka Reclamation & Development Corp. and Water Supply & Drainage Board.

July 14 (Tue) Investigation of site conditions. Meeting with Ceylon Electricity Board and Regional Telecommunication Board.

July 15 (Wed) The 7th meeting with MISA.
Investigation of site conditions.
Confirmation of the site boundary with UDA.

July 16 (Thu) Investigation of site conditions. Visit to the Municipal Fire Fighting Depo and the Housing and Construction Dept.
Intermediate report to the JICA office.

July 17 (Fri) Observation of facilities previously built under the Japanese Grant Aid System.
(Pharmaceutical Center and the Naional Youth Center)

July 18 (Sat) Observation of facilities previously built under the Japanese Grant Aid System.
(Sri Jayawardenapula General Hospital, TV station, State Medical Store)

July 19 (Sun) Sorting and arranging of documents and internal meeting.

July 20 (Mon) Investigation into site conditions. Visit to the Ministry of Higher Education and NAB.

July 21 (Tue) The final meeting with MISA.
Reporting to the Embassy of Japan and the JICA office.

July 22 (Wed) Departure from Colombo, and arrival in Bangkok.
Stay in Bangkok.

July 23 (Thu) Departure from Bangkok and return to Tokyo.

2) Draft Final Report Explanation

October 3 (Sat) Departure from Tokyo and arrival in Bangkok.
Stay in Bangkok.

October 4 (Sun) Departure from Bangkok and arrival in Colombo.

October 5 (Mon) Courtesy visit to the Embassy of Japan and the JICA office. The 1st meeting with MISA.

October 6 (Tue) 2nd meeting with MISA. Internal meeting.

October 7 (Wed) 3rd meeting with MISA. Preparation of Minutes of Meeting.

October 8 (Thu) Discussion of the Minutes of Meeting. Signing of the Minutes of Meeting.

October 9 (Fri) Report to the Embassy of Japan and the JICA office.

October 10 (Sat) Supplemental investigation of the proposed site and the United Motor's repair shop.

October 11 (Sun) Departure from Colombo and arrival in Bangkok.
Stay in Bangkok.

October 12 (Mon) Departure from Bangkok and return to Tokyo.

Note CGTTI: Ceylon-German Technical Training Institute
UDA: Urban Development Authority
MISA: Ministry of Industries and Scientific Affairs

APPENDIX 4. List of People Concerned

1) Embassy of Japan in Sri Lanka

Yasuya Hamamoto	Ambassador Extraordinary and Plenipotentiary
Toshimichi Urabe	Councilor
Kazuhiko Maruyama	First Secretary

2) JICA Office in Sri Lanka

Jiro Hashiguchi	Director/Resident Representative
Tetsuo Amagai	Assistant Resident Representative

3) Ministry of Industries & Scientific Affairs

A.A. Justin Dias	Permanent Secretary
T.D.J. Vicharane	Senior Asst. Secretary

4) United Motors

S.D. Liyanage	General Manager
K. Kumarasany	Works Manager

5) CGTTI

V.L.C. Perera	Director/Principal
A.C.M. Shafeck	Deputy Director/Principal

6) Ministry of Finance and Planning

S. Weerapana	Asst. Director, Dept. of External Resources.

APPENDIX 5. Length of Public Roads

Length of Public roads (1)

Kilometres

Division	1981	1982	1983	1984*
Sri Lanka	25,295·9	25,446·7	25,446·7	25,446.7
Western Division	3,196·1	3,223·2	3,223.2	3,223.2
Central Division	3,940·4	3,986·8	3,986.8	3,986·8
Southern Division	2,800.8	2,843·8	2,843.8	2,843.8
Northern Division	2,990·0	2,967·4	2,967·4	2,967·4
Eastern Division	1,816·2	1,863.0	1,863.0	1,863·0
NothWestern Division	3,208·3	3,226·9	3.226.9	3,226·9
North-Central Division	2,685·9	2,688·0	2,688.0	2,688·0
Uva Division	2,438·0	2,462·5	2,462.5	2,462·5
Sabaragamuwa Division	2,220·0	2,185·1	2,185·1	2,185·1

(1) Maintained from Central Government Funds. Source : Department of Highways.

*Provisional.

APPENDIX 6. Number of Motor Vehicles or Registers

Number of Motor Vehicles on registers

At 31st December in each year

Item	1981	1982	1983	1984
All Vehicles	374,110	403,014	439,661	478,099
Total Cars etc.	223,107	239,202	258,693	280,362
Cars and Cabs	126,256	131,437	136,843	141,730
Motor Cycles	96,851	107,545	121,840	138,632
Vehicles for Public Conveyance : Buses	23,092	26,172	30,438	34,681
Goods Vehicles, Lorries, Vans etc.	68,427	74,770	82,845	90,974
Total Agricultural Tractors and Engines	58,826	62,185	66,973	71,353
Tractors	40,681	43,539	47,616	51,278
Trailors	18,145	18,646	19,357	20,075
Ambulances and Hearses	658	685	712	729

Source : Department of Motor Traffic.

APPENDIX 7. Road Vehicles Registered by Classes of Vehicle and Fuel Used

Road Vehicles Registered by Class of Vehicles and Fuel used

Number

Item	1981	1982	1983	1984
Cars				
Private Cars				
Petrol driven	4,377	4,907	4,789	4,124
Diesel oil driven	1,383	760	681	991
Kerosene oil driven	—	—	—	—
Hiring Cars(1)				
Petrol driven	—	—	—	—
Diesel oil driven	—	—	—	—
Motor Car Trailers	—	—	—	—
Buses :				
Omnibuses—				
Diesel oil driven	24	555	521	325
Private Coaches				
Petrol driven	252	112	572	132
Diesel oil driven	2,078	2,421	3,176	3,794
Lorries and Vans				
Lorries Proper—				
Petrol driven	2,358	3,508	3,858	2,163
Diesel oil driven	5,427	2,834	4,267	5,922
Other Lorries (Tractors etc.) Petrol, Diesel, Kerosene	56	12	17	14
Lorry Tractors				
Diesel oil driven	01	02	04	—
Kerosene oil driven	—	—	—	—
Trailers (Non-Fuel)	194	103	58	128
Ambulances				
Petrol driven	31	18	17	12
Diesel driven	—	—	—	—
Hearses				
Petrol driven	05	09	10	05
Motor Cycles				
Petrol driven	17,160	10,847	14,431	16,873
Land Vehicle—Tractors				
Diesel oil driven	733	600	521	635
Kerosene oil driven	—	—	—	—
Land Vehicle Trailers (Non-Fuel)	941	503	711	718
Other Land Vehicles—				
Petrol driven	—	—	—	—
Diesel oil driven	2,335	2,269	3,548	3,011
Kerosene oil driven	36	21	08	16
All Vehicles—				
Petrol driven	24,183	19,401	23,677	23,310
Diesel oil driven	12,037	9,453	12,722	14,691
Kerosene oil driven	36	21	08	16
Non-Fuel	1,135	606	769	846

Source : Department of Motor Traffic.

(1) From 1981 Hiring Cars are inclued under Private Cars.

APPENDIX 8. Number of Traffic Accidents Reported to Police

Number of Road accidents Reported to Police

Number

Item	1980	1981	1982	1983	1984
Total Number of Road Accidents	23,711	24,656	24,002	24,162	24,534
Number of Casualties by degree of injury—					
Deaths	1,105	1,247	1,257	1,365	1,310
Injured	13,551	13,507	12,565	11,904	11,629

Source : Police Department

Road accidents Reported to Police in City of Colombo By Police Areas

Number

Police Station Area	1980	1981	1982	1983	1984
Total	5,991	5,720	5,746	5,995	6,112
Modera	140	140	109	108	106
Grandpass	359	437	340	358	307
Kotahena	346	236	200	256	210
Dematagoda	220	179	240	216	270
Borella	460	402	414	324	477
Maradana	492	487	417	592	437
Fort	543	515	550	648	489
Pettah	485	459	348	218	192
Slave Island	327	339	308	320	337
Colpetty	518	497	490	365	424
Cinnamon Gardens	652	549	737	929	1,014
Bambalapitiya	683	713	760	824	908
Wellawatta	431	387	386	343	423
Narahenpita	146	163	123	139	162
Foreshore Ports	—	60	52	82	43
Kirilapone	111	81	143	150	211
Harbour	78	76	73	82	67
Mallgawatta	—	—	56	41	35

Source : Police Department.

APPENDIX 9. Number of Persons Killed in Road Accidents

Number of Persons killed in road accidents

Number

Persons Killed	1980	1981	1982	1983	1984
Total	1,105	1,247	1,257	1,365	1,310
Drivers of vehicles	69	72	57	110	74
Passengers	237	283	287	299	281
Pedestrians	563	581	599	645	633
Pedal cyclists	110	165	176	193	203
Riders of Motor Cycles, Scooters or Pedal Cycles fitted with motors	114	137	130	115	111
Others	12	09	08	03	08

Source : Police Department

Number of Persons Injured in road accidents in City of Colombo

Number

Persons Injured	1980	1981	1982	1983	1984
Total	2,152	2,125	1,647	1,722	1,524
Drivers of vehicles	73	131	64	71	72
Passengers	271	216	219	195	137
Pedestrians	1,227	1,117	1,000	927	847
Pedal cyclists	210	641	263	233	211
Riders of Motor Cycles, Scooters or Pedal Cycles fitted with motors	361		283	280	247
Others	10	20	16	16	10

Source : Police Department

APPENDIX 10. Omnibus Services

Omnibus services (1)

Item	Unit	1981*	1982	1983	1984
Number of routes (2)	Number	1,364	1,401	1,420	1,420
Route Kilometres covered	Kms	59,488	59,620	60,420	60,420
Number of Bus kilometres operated	Km '000	494,026	481,855	457,449	416,814
Buses Licensed	Number	7,725	7,453	7,686	8,005
Average No. of buses operated per day	Number	5,496	5,512	5,541	5,062
Average Vehicle Utilization	Number	249	239	226	225
Number of Passengers carried	Number '000	1,104,813	1,423,552	1,298,428	1,050,672*
Passenger kilometres	Number '000	13,800,531	18,260,062	16,118,966	14,722,389*
Seat kilometres	Number '000	26,513,160	26,010,280	24,658,112	22,507,956*
Load Factor	Percentage	52.1	70.2	65.3	65.4
Average Passenger Journey	Kms.	12.5	12.8	12.4	14.0
Passenger Revenue	Rupees '000	..	1,568,466	1,677,373	1,706,999*
Revenue from Season Tickets	Rupees '000	..	192,259	244,388	278,560
Revenue from other sources	Rupees '000	..	..	12,002	11,801
Total Revenue	Rupees '000	1,661,604	..	1,933,713	1,997,360
Revenue per Bus Kilometre	Rupees	3.36	..	4.22	4.79

Source : Sri Lanka Central Transport Board.

(1) The services cover the entire Island.
(2) Short services not included.
* Estimated

APPENDIX 11. Length of Railway Track

Length of Railway track

Kilometres

Item	1980	1981	1982	1983	1984
Length of Railway open for traffic					
Total (all gauges)	1,453	1,453	1,453	1,453	1,453
Total (broad gauge)	1,394	1,394	1,394	1,394	1,394
Single line	1,293	1,293	1,293	1,293	1,293
Double line	101	101	101	101	101
Total (narrow gauge)	59	59	59	59	59
Single line	59	59	59	59	59

Source : Ceylon Government Railway.

APPENDIX 12. Locomotives and Rolling Stock

Locomotives and rolling stock

Number

Item	1981	1982	1983	1984
Total				
Broad gauge Total	5,475	5,960	5,651	5,212
Locomotives, steam	5,193	5,662	5,450	5,011
Locomotives, Diesel	03	10	07	06
Diesel Rail Cars	180	198	184	169
Diesel Hydraulic Power coaches	15	04	04	04
Motor inspection trolleys	63	62	48	50
Coaching bogie stock	07	16	16	16
Coaching 4 wheel stock	1,054	1,389	1,357	1,276
Goods bogie stock	01	05	05	03
Goods 6 wheel stock	899	1,006	993	975
Goods 4 wheel stock	01	01	01	01
Service bogie stock	2,484	2,506	2,387	2,088
Service 6 wheel stock	101	97	81	76
Service 4 wheel stock	30	29	29	23
Narrow gauge Total (K. V. and U. P. R.)	355	341	338	324
Locomotives, steam	282	298	201	201
Locomotives, Diesel	11	11	08	08
Motor inspection trolleys	08	12	10	10
Coaching bogie stock	01	—	—	—
Coaching 4 wheel stock	73	75	70	70
Goods bogie stock	—	—	—	—
Goods 6 wheel stock	172	183	100	100
Goods 4 wheel stock	—	—	—	—
Service bogie stock	17	—	—	—
	—	17	13	13

Source : Ceylon Government Railway

APPENDIX 13. Passengers and Goods Traffic by Railway

Passenger and goods traffic

Item	1980	1981*	1982	1983	1984
Passenger traffic :					
Passengers conveyed (number) :					
1st Class	207,737	186,825	196,063	145,430	134,136
2nd Class	1,894,390	1,451,419	1,602,433	1,273,335	1,208,820
3rd Class	35,810,570	24,952,580	25,342,278	20,878,009	21,920,705
Season ticket holders (number)					
1st Class	—	173	173	169	152
2nd Class	1,561	574	468	265	160
3rd Class	1,169,617	1,146,482	1,284,558	1,077,805	860,677
Goods traffic (1)					
Goods conveyed (Metric Tons)	894,200	1,670,800	1,501,394	1,568,281	1,582,588

Source : Ceylon Government Railway.

(1) Excludes livestock.
(*) Estimated figures.

APPENDIX 14. Statistical Data Related to Education

Number of schools, pupils, teachers and pupil-teacher ratios classified by type of school — 1982

Type of School	Total No. of Schools	Total No. of pupils	Total No. of teachers	No. of Pupils per Teacher
Government Schools	9,544	3,398,056	129,210 (1)	26.2
Private Fee-Levying Schools	12	59,383	2,364	25.1
Private Non-Fee-Levying Schools	25			
Pirivenas	291	24,712	2,183	11.3
Estate Schools	29	2,510	45	55.9
Total ..	9,901	3,484,661	133,802	26.04

Number of schools, pupils, teachers and pupil-teacher ratios classified by type of school — 1983

(Contd.)

Type of School	Total No. of Schools	Total No. of Pupils	Total No. of teachers	No. of Pupils per Teacher
Government Schools	9,575	3,460,375	129,480 (2)	26.7
Private Fee-Levying Schools	12	62,704	2,361	26.6
Private Non-Fee-Levying Schools	25			
Pirivenas	314	28,079	2,426	11.6
Estate Schools	21	1,869	32	58.4
Total ..	9,947	3,553,027	134,299	26.5

Number of schools, pupils, teachers and pupil-teacher ratios classified by type of school — 1984*

(Contd.)

Type of School	Total No. of Schools	Total No. of pupils	Total No. of teachers	No. of Pupils per Teacher
Government Schools	9,556	3,539,096	135,514 (3)	26.1
Private Fee-Levying Schools	12	58,658	2,315	25.4
Private Non-Fee Levying Schools	25			
Pirivenas	307	26,925	2,344	11.5
Estate Schools (3)	14	1,218	19	64.1
Total ..	9,914	3,625,897	140,192	25.9

Source : Ministry of Education.

(1) Excluding teachers in teacher - training colleges. Total enrolment of teacher training college is 8130

(2) Excluding teachers in teacher training colleges. Total enrolment of teacher training colleges is 8332

(3) Excluding teachers in teacher training colleges. Total enrolment of teacher training colleges is 7144

*Provisional.

Classification of Government Schools by Status — 1981-84

Number

Status	1981	1982	1983	1984*
1 A	107	106	109	432
1 B	363	347	324	
1 C	1,383	1,334	1,344	1,328
Grade 2	3,754	3,750	3,815	3,796
Grade 3	3,914	4,007	3,983	4,000
Total ..	9,521	9,544	9,575	9,556

*Provisional.

Source : Ministry of Education.

1 A–Schools having G.C.E. (A/L) Science classes and Hostel facilities.

1 B–Same as above but without Hostel facilities.

1 C–Schools having G.C.E. (A/L) Arts and Commerce Classes.

Grade 2–Schools having classes upto to Grade 10.

Grade 3–Schools having classes from K. G. to Grade 5.

(K.G.–Kindergarten)

Number of pupils on register classified by type of school attended — 1980-84

Type of School	1980	1981	1982	1983	1984*
Government					
Males	3,280,787	3,369,694	1,708,900	3,460,375	3,539,096
Females			1,689,156		
Private (1)					
Males	30,220	29,745	31,664	33,953	58,658
Females	24,758	26,370	27,719	28,751	
Estate (2)					
Males	31,664	2,814	1,437	1,869	1,218
Females			1,073		
Pirivenas	22,347	22,735	24,712	28,079	26,925
Grand Total ..	3,389,776	3,451,358	3,484,661	3,553,027	3,625,897

Source : Ministry of Education.

*Provisional.

(1) Includes fee-Levying and Non-Fee Levying.

(2) 324 Schools were vested during the year 1981.

UNIVERSITIES : DEGREES AND DIPLOMAS OBTAINED BY STUDENTS

(Number of Students)

Type of Degree	University of Colombo			University of Peradeniya			University of Sri Jayawardenapura			University of Kelaniya			University of Moratuwa			University of Jaffna			Ruhuna University College (1)		
	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84	1981/82	1982/83	1983/84
M. B. B. S.	156	140	150	88	79	95	—	—	—	—	—	—	—	—	—	—	52	67	—	77	76
B. D. S.	—	—	—	48	37	42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B. V. Sc.	—	—	—	20	25	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B. Sc. Engineering	—	—	—	138	114	158	—	—	—	—	—	—	103	139	182	—	—	—	—	—	—
B. Sc. Applied Science	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B. Sc. Built Environment	—	—	—	—	—	—	—	—	—	—	—	—	16	29	22	—	—	—	—	—	—
B. Sc. Agriculture	—	—	—	106	83	120	—	—	—	—	—	—	—	—	—	—	—	—	14	23	24
B. Sc. (Science General)	134	117	127	104	108	110	60	61	99	72	72	109	—	—	—	49	96	93	52	18	35
B. Sc. (Science Special)	37	37	42	64	47	55	11	04	—	25	17	16	—	—	—	20	25	N.A.	—	—	—
B. Sc. (Public Finance & Taxation)	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B. Sc. (Estate Management & Valuation)	—	—	—	—	—	—	18	15	26	—	—	—	—	—	—	—	—	—	—	—	—
B. Sc. (Public /Business Administration)	—	—	—	—	—	—	177	132	202	—	—	—	—	—	—	—	—	—	—	—	—
B. Sc. (Statistics Special)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	02	06	N.A.	—	—	—
B. Com.	77	96	78	65	48	120	63	56	69	339	182	109	—	—	—	78	70	54	21	46	48
B. Development Studies	08	02	—	—	—	—	140	87	23	—	—	—	—	—	—	—	—	—	—	—	—
L. L. B.	125 (1)	71(1)	103(1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
B. A. (General)	148	188	201	373	283	371	86	200	401	371	276	321	—	—	—	85	77	84	51	63	47
B. A. (Special)	148	98	88	299	145	187	116	149	129	142	155	199	—	—	—	66	118	81	21	22	11
B. Ed.	59	09	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ph. D.	02	01	01	06	02	08	02	02	03	—	—	—	—	—	—	—	—	—	—	—	—
M. A.	01	02	—	12	20	03	14	06	05	03	04	03	—	—	—	01	—	01	—	—	—
M.BA /M.PA	—	—	15	—	—	—	—	—	24	—	—	—	—	—	—	—	—	—	—	—	—
M. A. Education	03	01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. D.	18	32	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Ed.	11	11	07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Sc.	09	04	10	03	—	—	03	04	12	—	—	03	—	—	—	—	—	—	—	—	—
M. Sc. (Agriculture)	—	—	—	18	17	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Sc. (Architecture)	—	—	—	—	—	—	—	—	—	—	—	—	12	09	13	—	—	—	—	—	—
M. Sc. (Engineering)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Phill (Science)	01	01	—	04	07	03	—	—	—	01	02	—	—	—	—	—	—	—	—	—	—
M. Phill (Education)	16	12	16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Phill (Engineering)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M. Phill (Agriculture)	—	—	—	05	09	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma in Education (General)	252	239	170	—	—	—	—	—	—	—	—	—	—	—	—	42	N.A	50	—	—	—
Post Graduate Diploma in Education (TESL)	26	20	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma in Education (Drama)	20	24	08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma (Rural Area Development))	03	02	01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma (Land Settlement Development)	—	—	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma (Population Studies)	05	04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma (Mathematics)	—	—	—	06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma (Applied Statistics)	02	05	07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma in Statistics	—	—	—	—	—	—	09	11	N.A.	—	—	—	—	—	—	—	—	—	—	—	—
Post Graduate Diploma in Urban planing	—	—	—	—	—	—	—	—	—	—	—	—	10	13	—	—	—	—	—	—	—
Post Graduate Diploma in Advance Hydrology	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Library Science	—	—	—	—	—	—	—	—	—	04	—	01	—	—	—	—	—	—	—	—	—

(1) Includes External Graduate

Source: (Division of Planning and Research) University Grants Commission

Sri Lanka Law College

Number

Year	Admissions	Proctor's Final (1)		Advocate's Final		Lecturers	Expenditure Rs.	Receipts (Fees) Rs.
		Entered	Successful	Entered	Successful			
1971	213	145	67	161	69	23	443,706	398,737
1972	167	168	81	146	74	32	404,915	303,541
1973	222	200	87	144	60	26	407,373	389,849
1974(1)	223	493	176	—	—	44	434,918	81,408
1975	223	562	249	—	—	35	295,709	399,141
1976	249	435	216	—	—	41	490,400	565,980
1977	229	415	204	—	—	45	509,232	477,417
1978	229	418	217	—	—	44	633,794	551,417
1979	301	443	227	—	—	43	612,800	573,592
1980	264	471	266	—	—	43	663,132	693,970
1981	277	442	260	—	—	42	739,446	738,912
1982	352	438	98	—	..	45	1,029,463	825,797
1983	381	574	203	—	—	45	1,074,011	943,268
1984	..	..	..	..	..	..	..	..

Source : Sri Lanka Law College.

(1) Since attorney's at law examination was introduced instead of proctor's final and advocates final, the figures from 1974 onwards relate to the attorney's at law final examination.

Technical Education

	1981/82	Academic Year	
		1982/83	1983/84
1. Total No. of Technical Schools	21	22	22
2. Total No. of Pupils	18,460	19,733	21,690
3. Total No. of Staff	899	916	N.A
3.1 Teaching Staff (1)	461	465	N.A
3.2 Others	438	451	N.A
4. New Admissions	12,175	12,778	15,724
5. Enrolment by Courses			
5.1 Higher National Diploma and Professional Courses	3,776	4,059	3,920
5.2 Diploma Courses	1,178	1,176	923
5.3 Certificate Courses	9,280	10,105	9,412
5.4 Trade Courses	2,947	1,880	1,885
5.5 Others	1,279	2,513	5,570
6. Total Expenditure on Technical Education (in Rs.) (2)	22,087,454	38,481,252	50,151,342
6.1 Recurrent Expenditure	15,528,192	18,969,263	25,858,847
6.2 Capital Expenditure[2]	6,559,262	19,511,989	24,292,495

Source : Technical Education Unit, Ministry of Higher Education.

(1) Excluding visiting staff

(2) Expenditure refers to Calendar Year.

APPENDIX 15. Technical Education System of the Ministry of Higher Education

COURSE INDEX

Higher National Diploma Courses – (H. N. D.)

A3 – H.N.D. in Accountancy
A4 – H.N.D. in Commerce

National Diploma Courses – (N. D.)

B1 – National Diploma in Technology – N.D.T.
B1.1 N.D.T. – Civil Engineering Technology
B1.2 N.D.T. – Mechanical Engineering Technology (General)
B1.3 N.D.T. – Mechanical Engineering Technology (Automotive)
B1.4 N.D.T. – Electrical Power Engineering Technology
B1.5 N.D.T. – Electronics and Telecommunication Engineering Technology
B1.6 N.D.T. – Chemical Engineering Technology
B1.7 N.D.T. – Textile Technology
B1.8 N.D.T. – Rubber Technology
B1.9 N.D.T. – Marine Engineering Technology
B2 N.D. in Agriculture
B3 N.D. in Business Studies
B4 N.D. in Home Economics
B5 N.D. in English
B9 N.D. in Jewellery Design and Manufacture

National Certificate Courses (N.C.)

C1 – N.C. in Business Studies
C1.1 – N.C. in Business Studies – Part time-Evening
C2 – Stenographers Certificate – Full time-Day
C3.1 – Stenographers Certificate – Part time-Evening
C4 – Salesmanship – Sales Management
C5 – N.C. in Technology
C5.1 – N.C. in Civil Engineering Technology
C5.2 – N.C. in Mechanical Engineering Technology
C5.3 – N.C. in Electrical and Electronic Engineering Technology
C5.4 – N.C. in Quantity Surveying
C7 – Draughtsman Apprentices Certificate
C8 – N.C. in Gem Industry
C14 – N.C. for Labour and Tax Return Clerks
C18 – N.C. for Junior Supervisors in Building Trades
C20 – N.C. in English for Commerce, Industry and further Education – Full-time –Day
C20.1 – N.C. in English for Commerce, Industry and further Education – Part-time – Evening
C21 – N.C. in Secretarial Practice
PC – Preliminary Engineering Science Certificate

National Craft (Trade) Certificate Courses (N.C.C.)

D1 – N.C.C. in Machine Shop Practice
D2 – N.C.C. in General Fitting
D3 – N.C.C. in Automotive Mechanics
D3.1 – N.C.C. in Automotive Mechanics
D4 – N.C.C. in Electrical Installation in Buildings
D5 – N.C.C. in Electrical Mechanics
D6 – N.C.C. in Wood-work
D7 – N.C.C. in Building Trade
D8 – N.C.C. in Radio and Electronic Mechanics
D9 – Basic Electronics
D11 – Carpenters Drawing
D12 – Plumbing
D13 – Electrical Wiring
D14 – Radio Servicing
D15 – Refrigeration and Air Conditioning
D18 – General Fitting – Part-time – Evening
D19 – Machine Shop Practice – Part-time–Evening
D23 – Tractor Mechanics
D26 – Motor Vehicle Electrical Course
D27 – Welding Practice
D29.1 – Agriculture and Animal Husbandry
D33 – Sheet Metal Work
D34 – Textile and Furnishing Manufacture

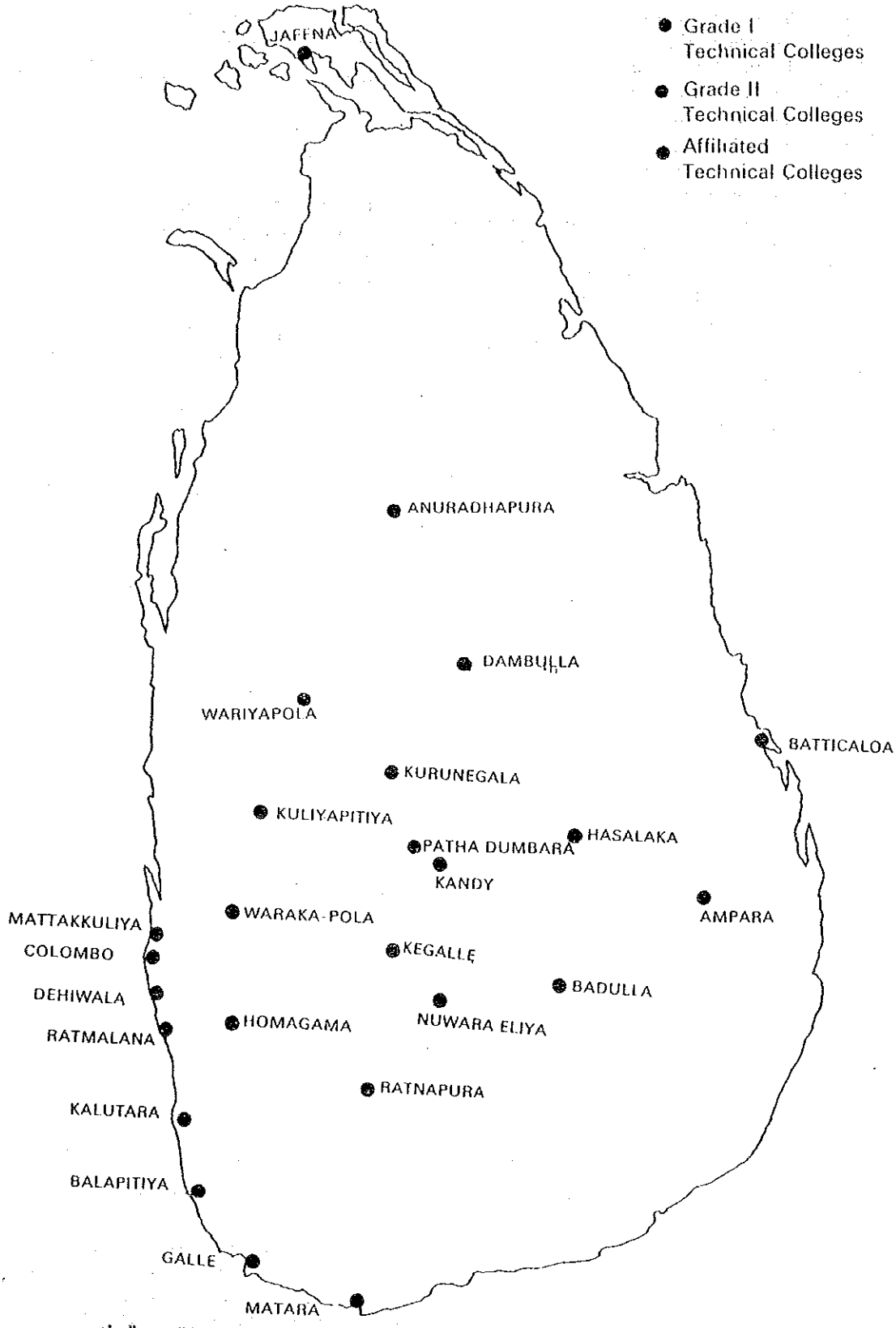
Short Courses (3 months to 1 year) – mainly intended for Self-employment

E1 – Wood Carving
E8 – Electrical Wiring
E10 – Radio Servicing
E13 – Blacksmithy Work
E14 – Welding Practice – Evening
E15 – Toy Making
E16 – Tailoring (Gents).
E17 – Machine Embroidery
E20 – Batiks and Textile Printing – One Year
E21 – Artificial Flower and Doll Making
E22 – Motor Vehicle Electrical Work
E23 – Motor Cycle and Scooter Maintenance/Repair
E32 – Anthurium and Orchid Culture
E33 – Rubber Planting and Processing
E36 – Ceramics
E38 – Kandyan Arts (Brass and Copper Foundry)
E40 – Maintenance and Repair of Motor Vehicles
E43 – Owner Drivers
E45 – Handicraft Course
E46 – Production of Leather Goods
E47 – T. V. Installation
E48 – Dress Making

Short Courses offered to other organizations

F1 – Six months basic training programme provided to the National Apprenticeship Board
F1.01 – Wood work
F1.02 – Electrical Wiring
F1.03 – Automotive Mechanics
F1.05 – Machining
F1.06 – Fitting
F2 – Ten weeks Artisian Training Programmes provided for the Construction Industry Training Project.
F2.01 – Wood work
F2.02 – Masonry
F2.03 – Electrical Wiring
F2.04 – Plumbing
F3 – Supervisory Training

LOCATION OF TECHNICAL COLLEGES



出典： DIRECTORY OF TECHNICAL EDUCATION 86-87

MINISTRY OF HIGHER EDUCATION

APPENDIX 16. Training Course Provided by NAB

Categorised Trades for Craft Apprenticeship Training:
A-1 Category

Code No:	TRADE	Period of Training
A-1-1	Fitter (General)	4 years
A-1-2	Fitter (Structural)	4 years
A-1-3	Fitter (Weaving)	3 years
A-1-4	Fitter (Spinning)	3 years
A-1-5	Machinery Fitter (Millwright) (preference a pass in Mech. Drawing)	4 years
A-1-6	Marine Fitter	4 years
A-1-8	Sheet Metal Worker (preferably a pass in Mech. Drawing and Metal Work)	4 years
A-1-9	Pattern Maker (Wood)	4 years
A-1-10	Machinist (General)	4 years
A-1-11	Automobile Mechanic	4 years
A-1-12	Automobile Electrician	4 years
A-1-15	Electrical Wireman	3 years
A-1-16	Radio Mechanic (G.C.E. (O.L.) Science with Physics)	3 years
A-1-17	Lift Mechanic	4 years
A-1-18	Precision Instrument Repairer (passes in Physics and Pure Mathematics	4 years
A-1-19	Refrigeration & Air Conditioning Mechanic (G.C.E. (O.L.) Science- (Preferably with Physics)	4 years
A-1-20	Electroplater	3 years
A-1-22	Cook	3 years
A-1-23	Waiter	1 years
A-1-24	Book Binder	2 years
A-1-26	Litho Machine Minder	4 years
A-1-30	Monotype Caster Attendant (a pass in second Language)	3 years
A-1-31	Letterpress Machine Minder	3 years
A-1-32	Camera Operator (Block Making)	4 years
A-1-34	Monotype Keyboard Operator	3 years
A-1-35	Roller	3 years
A-1-36	Turner	3 years
A-1-37	Milling Machinist	3 years
A-1-42	Gem Cutter (G.C.E. (O.L) Science)	1½ years
A-1-43	Armature Winder	3 years
A-1-47	Fitter (pump)	3 years
A-1-48	Agriculture Equipment & Machinery Mechanic	4 years
A-1-49	Transformer & Coil Winder (Telecommunication)	2 years
A-1-51	Refinery Operator (G.C.E. O/L Science with credit passes in Chemistry, Physics and Mathematics)	4 years
A-1-52	Engraver	2 years
A-1-53	Telephone & Switchboard Mechanic	3 years
A-1-54	Telecommunication Cableman (Jointing & Laying)	3 years
A-1-57	Garment Cutter	1 year
A-1-58	Pattern Maker (Garment)	1 year
A-1-59	Sewing Machine Mechanic	2 years
A-1-60	Lino Type Operator G.C.E. (O/L) with a credit pass in medium of instruction)	3 years
A-1-61	Jewellery Maker	3 years
A-1-62	Plant Operator	2 years
A-1-64	Fitter (Wagon BodyBuilder)	4 years
A-1-65	Cable Jointer (Power)	4 years
A-1-67	Plant Operator (Flour Milling)	2 years
A-1-68	Electronic Equipment Assembler	3 years
A-1-69	Electrical Linesman	3 years
A-1-70	Heavy Duty Mechanic	4 years
A-1-71	Retoucher (Printing) (G.C.E. O/L with a pass in Art)	3 years
A-1-72	Printing Machinery Mechanic	3 years
A-1-73	Grinding Machine Operator	1½ years
A-1-74	Stenographer (Credit pass in English)	1 year
A-1-75	Office Machine Repairer (Credit pass in Physics & Mathematics)	4 years
A-1-76	Printer-Down/Etcher (Photo Engraving) A pass in Mathematics and Credit pass in Physics and Chemistry	4 years
A-1-77	Accounts Clerk	1 year
A-1-78	General Office Clerk	1 year
A-1-79	Stores Clerk	1 year
A-1-80	Export & Import Clerk	1 year
A-1-81	Tool Maker	4 years
A-1-82	Stereo Typer	3 years
A-1-83	Compositer (Hand) (a pass in Second Language)	3 years
A-1-84	Boiler Attendant	3 years
A-1-85	Electrician (Power)	4 years
A-1-86	Television Mechanic	4 years
A-1-87	Personal/Private/Confidential Secretary	1 year
A-1-88	Tourist Guide Driver	6 months
A-1-89	Fitter (Railway carriages & Wagons)	4 years
A-1-90	Roller Operator	2 years

A-2 Category

A-2-1	Mason	4 years
A-2-3	Cabinet Maker	4 years
A-2-4	Boat Builder (Wood)	4 years
A-2-5	Coach Body Builder	4 years
A-2-6	Machanist (Wood Working)	3 years
A-2-7	Blacksmith	2½ years
A-2-8	Welder	3 years
A-2-11	Moulder	4 years
A-2-12	Plumber	3 years
A-2-13	Pipe Fitter (General)	2 years
A-2-14	Tinker (Vehicle sheet metal worker)	4 years
A-2-18	Automobile Painter	3 years
A-2-19	Weaver	1 year
A-2-22	Farm Machinery Machanic	2½ years
A-2-23	Furnance Operator (Cupola)	1½ years
A-2-27	Painter/Sign Writer	3 years
A-2-28	Watch Repairer	3 years
A-2-33	Bicycle Repairer	1½ years
A-2-34	Cutter Tailoring	2 years
A-2-35	Tailor	2½ years
A-2-36	Upholsterer	2 years
A-2-37	Hand Screen Printer	1 year
A-2-38	Machine Screen Printer	1 year
A-2-39	Roller Printer	1 year
A-2-40	Batik Artist	1 year
A-2-41	Coconut Fibre Twine Making Machine Operator	1 year
A-2-42	Telecommunication Lineman	3 years
A-2-43	Sewing Machine Operator	1 year
A-2-44	Crane and Hoist Operator	2 years
A-2-48	Laster	1½ years
A-2-49	Sole Fitter	1 year

Code No:	TRADE	Period of Training
A-2-51	Knitting Machine Operator (Garments)	1 year
A-2-52	Knitted Garments Sewer	1 year
A-2-53	Glass Rainforced Plastic Moulder	2 years
A-2-54	Furnace Operator (Crucible)	1 year
A-2-55	Seaman (Fishing Vessels)	2 years
A-2-56	Tinker / Welder	2 years
A-2-57	Diamond Administrator	1 year
A-2-58	Diamond Cutter (Bruter)	1½ years
A-2-59	Diamond Cutter (Table Smoother)	1½ years
A-2-60	Diamond Cutter (Fixer)	1½ years
A-2-61	Diamond Cutter (Blocker)	1½ years
A-2-62	Diamond Cutter (Bottom Facet Cutter)	1½ years
A-2-63	Diamond Cutter (Top Facet Cutter)	1½ years
A-2-64	Diamond Cutter (Star Facet Cutter)	1½ years
A-2-65	Diamond Cutter (Last Pavilion Facet Cutter)	1½ years
A-2-66	Saw Doctor (Sharpner)	1½ years
A-2-67	Foot Wear Component Cutter	1½ years
A-2-68	Foot Wear Sewer	1 year
A-2-69	Foot Wear Finisher	1 year
A-2-70	Driver (Light Private Cars)	6 months
A-2-71	Driver (All Private Cars)	6 months
A-2-72	Driver (Light Lorries)	6 months
A-2-73	Driver (All Lorries)	6 months
A-2-74	Driver (Light Motor Coaches)	6 months
A-2-75	Driver (All motor Coaches)	6 months
A-2-76	Driver (Motor Tricycle Vans)	6 months

A-3- Category

A-3-1	Carpenter (Building)	3 years
A-3-8	Welder	3 years

Categorized fields for Technician Apprenticeship Training:

B-1	Civil Engineering	1 year
B-2	Mechanical (Production) Engineering	1 year
B-3	Mechanical (Automotive) Engineering	1 year
B-4	Electrical (Power) Engineering	1 year
B-5	Electrical (Electronic and Telecom.) Engineering	1 year
B-6	Chemical Engineering	1 year
B-7	Agriculture	1 year
B-8	Rubber Technology	1 year
B-9	Textile Technology	1 year
B-10	Marine Engineering Technology	1 year

Categorised Fields for Special Apprenticeship Training:

C-1	Mechanical Engineering	4 years
C-2	Electrical Engineering	4 years
C-3	Electronic Engineering	4 years
C-4	Civil Engineering	4 years
C-5	Automobile Engineering	4 years
C-6	Refrigeration and Air Conditioning Engineering	4 years
C-7	General Engineering	4 years
C-8	Marine Engineering	4 year
C-9	Marine Engineering Officer Apprentice (for G.C.E. A/L & NDT Apprentices)	4 years
	(for B.Sc. Engineering Apprentices)	2 years
C-10	Mechanical Draftsmanship	4 years

Categorised fields for Engineering Undergraduate Apprentices of the Moratuwa University:

D-1	Mechanical Engineering Undergraduate Apprentice	9 months
D-2	Electrical Engineering Undergraduate Apprentice	9 months
D-3	Civil Engineering Undergraduate Apprentice	9 months
D-4	Electronic Engineering Undergraduate Apprentice	9 months
D-5	Telecommunication Engineering Undergraduate Apprentice	9 months

E Craft (Situational) Apprentices

Categorised fields for Engineering Undergraduate Apprentices of the Peradeniya University:

F-1	Mechanical Engineering Undergraduate Apprentice	2½ months
F-2	Electrical Engineering Undergraduate Apprentice	2½ months
F-3	Civil Engineering Undergraduate Apprentice	2½ months
F-4	Chemical Engineering Undergraduate Apprentice	2½ months
F-5	Production Engineering Undergraduate Apprentice	2½ months
F-6	General Engineering Undergraduate Apprentice	2½ months

Categorized Trades for Artisan Apprenticeship G - Category.

G-1	Artisan - Carpenter (Roof work)	9 months
G-2	Artisan - Carpenter (Doors & Windows)	9 months
G-3	Artisan - Carpenter (Concrete Form Work)	9 months
G-4	Artisan - Carpenter (Ceiling & Partitions)	9 months
G-5	Artisan - Rubble and Brick Layer	9 months
G-6	Artisan - Plasterer	9 months
G-7	Artisan - Concretor	9 months
G-8	Artisan - Barbender	9 months
G-9	Artisan - Plumber	9 months
G-10	Artisan - Wireman (House Wiring)	9 months
G-11	Artisan - Painter (Building)	9 months

H - Category- Sub-Technician Apprenticeship.

H-1	Construction Supervisor	1 year

I - Category- Special (Situational) Apprenticeship

出典： INTRODUCTION TO APPRENTICESHIP

NATIONAL APPRENTICE BOARD