

For this reason, the working standards are taught in both classroom lessons and field practice as shown in the foregoing curriculum.

In addition, safety inspection, meetings on working safety, accident analysis, etc. are carried out in an effort to fight away accidents.

The fact that no serious accident has been developed in the past two years and a half will give credit to this safety education.

But there are seen critical cases which have been invited by cutting corners, failing to observe working standards or committing blunders.

These cases could have happened to be major accidents though they simply did not. Accordingly, these cases cannot be overlooked as minor.

In the future training courses, stepped-up efforts will be needed to beat safety consciousness into every trainee.

It is considered necessary that the Indonesian counterparts should drill every trainee in working safety as touched upon under paragraph (3)-(b).

(5) Employment of graduates

Of the first class graduated, three are employed in the District Forestry Offices as advisors to the logging companies producing pulp materials. It is favorable that two other graduates are expected to be assigned to the Project after training in Japan.

It is strongly hoped that the remaining graduates should be given right jobs as soon as possible so that their knowledge and skill will not rust from disuse.

3-4 Supply of Equipment

(1) Appropriateness of supplied materials and equipment (type, size, quantity, etc.)

From April, 1978 when the Project started till the end of 1979, the major materials and equipment provided to the Project include twelve yarders, two crawler type tractors, one wheel type tractor, two crane trucks, one truck, four micro buses, four four-wheeled cars, and four motorcycles as shown in Table 3-7. Others include 66,200 m of wire rope, four pieces of artificial tower, one unit of generator, one unit of air compressor, and one unit of steam cleaner as shown in Table 3-8.

Table 3-7 Planned vs. actual supply of equipment

Major equipment	Total quantity	1978	1979	1980	1981	Remarks
Machinery	19 (15)	4 (large size x 3; small size x 1)	7 (large size x 6; small size x 2)	6 ((large size x 3; medium size x 2))	2	Figures without parentheses refer to plan; those in parentheses to achievements; those in double parentheses to schedule.
	6 (2)	1 (1)	2 (1)	2 ((-))	1	
	6 (2)	1 (-)	2 (1)	2 ((1))	1	
	4 (1)		1 (-)	1 ((1))	2	
Vehicles	4 (-)		1 (-)	1 ((-))	2	
	4 (2)	1 (1)	1 (1)	1 ((-))	1	
	4 (2)		1 (1)	1 ((1))	2	
	1 (5)	1 (2)	- (2)	- ((1))		
	4 (4)	2 (1)	1 (1)	1 ((1))		
	- (4)	- (2)	- (2)			

Table 3-8 A comprehensive list of annual supplies

1978

Classification	Major equipment supplied	Q'ty
Machinery	Yarder, Y-32EA	3 units
	Yarder, Y-12EC	1 unit
Vehicle	Tractor, CT-35CAD	1 unit
	Tractor, TWD23, w/6-ton	1 unit
	Micro bus, KAD51ZYE, w/9 seats	2 units
	Station wagon, Subaru Leone	1 unit
	Motorcycle, DT-125, 125 cc	2 units
Auxiliary equipment	Wire rope (24 mm, 16 mm, 12 mm, 10 mm)	25,200 m
	Artificial tower, K60	4 pcs.
	Generator, 2 kW	1 unit
	Air compressor, 1.8 to 9.9 kg/cm ²	1 unit
	Steam cleaner	1 unit
	Chain block, 3 tons	2 units
	Garage jack, 5 tons	1 unit
Teaching materials	Video TV set, overhead projector	1 set each
	Movie camera, 8 mm, 16 mm	1 unit each
	Slide projector	1 unit
	Stereoscope	4 units
	Surveying instruments	4 sets
	Machine tools	-
Office supplies	Wet type electronic copying machine	1 unit
	Rotary mimeographer	1 unit
	Automatic stenciler	1 unit
	Filing cabinet	1 unit

1979

Classification	Major equipment supplied	Q'ty
Machinery	Yard, Y-32EA	8 units
	Chain saw, Dolmer	6 units
Vehicle	Tractor, CT-35DAD	1 unit
	Tractor, T-20	1 unit
	Truck, 4.5 tons	1 unit
	Truck, 3 tons. w/crane	1 unit
	Micro bus, w/15 seats	2 units
	Land cruiser, Mitsubishi Metal Top	1 unit
	Motorcycle	2 units
Auxiliary equipment	Wire rope (24 mm, 16 mm, 12 mm, 10 mm)	41,000 m
	Tool crib	3 units
Teching materials	Monitor TV set	1 set
	Machinist tools and jigs	-
	Drafting set	6 sets
	Surveying instruments	4 sets
	Electric washer	1 unit
Office supplies	Typewriter	1 unit
	Locker	2 units

In addition, wire clips, blocks and other subsidiaries for the logging operation, electric grinders, flat chisels, battery hydrometer and other servicing instruments, film projector, experimental apparatus, and other teaching materials and accessories have been furnished in proper quantities in keeping with the progress of training to keep the Project spinning round down.

As regards the yarders, the training will have to be promoted effectively by combined use of various sizes of yarders to meet site conditions for the purpose of amplified applications of logging techniques.

(2) Maintenance management of supplied equipment

In FY1978 and FY1979, the inspection of the supplied equipment had been carried out punctually before and after use under the guidance of the Japanese experts and Indonesian counterparts. Up until now, the supplied equipment has been running in order without serious trouble because of their newness and strict maintenance.

The Training Institute, Demonstration Forest and Model Logging Operation Forest are provided with a store each where all the equipment has been locked in and kept in good working order.

It is worthy of note that a storekeeper is specially assigned to the store in the Model Logging Operation Forest who checks the quantities and damage before and after use in order to give a clear profile of materials and equipment stored.

In addition, the materials and accessories for the equipment installed at work site are also cared for properly in a fairly good state.

It should be noted however that periodic maintenance will be indispensable for keeping performance integrity of these supplies for an extended period. The maintenance procedures are different from equipment to equipment, and call for special techniques. The expert engineers should therefore undertake periodic maintenance not only for the purpose of keeping the integrity of machines, but also to reduce the time for maintenance. It is recommended to dispatch expert engineers of machine manufacturers to site at the earliest convenience for periodic maintenance in order to obviate major faults and keep the machines in good working order.

(3) Frequency in use, types of troubles, and repairs by machines

It is commendable that an operation diary (see Table 3-9) has been kept for the purpose of making clear the frequency in use of the machines by type. The frequency in use of the yarders in the Model Logging Operation Forest is as shown in Table 3-10. (See Fig. 3-1)

At present, the machines are in their new state and almost free from troubles. The types of troubles and the repairs made are taken notes of on a memo at best. But, it is desirable to keep operation diary daily, monthly and yearly following the samples shown in Tables 3-11, 3-12, 3-13 and 3-14, in order to record the troubles in full detail. These diary will become highly instrumental in future as a reference for the procurement of spare parts and for the scheduling of periodic maintenance.

(4) Equipment in need, and countermeasure (local procurement, etc.)

While the equipment supplied till 1979 and the equipment scheduled to be supplied by 1981 have already been listed, the following materials and equipment should preferably be supplied for smooth implementation of the Project. It is desirable to procure those machines locally, if at all possible, which need after-sale service.

(a) Land cruiser van

The land cruiser van is urgently needed for the commutation of the Japanese experts to and back from the Model Logging Operation Forest.

(b) Wire ropes (skyline, 24 mm; operating line, 12 mm; operating line, 10 mm)

In order that the supplied yarders will be operated smoothly even after the end of the cooperation period of the Project, it is necessary to provide a required quantity of wire ropes which are hard to obtain in Indonesia.

(c) Oil seals for yarders

In the periodic maintenance and overhaul of the yarders, the oil seals must be renewed. Thus, the oil seals must always be kept in stock as required.

- (d) Yarder parts, springs, fuse boxes, terminal caps, and other small parts (as required)

The accessory parts for the yarders installed at site get worn or lost easily. These small parts must always be kept enough at hand as their shortage will hamper the normal machine operations.

- (e) Tractor parts (oil seals, etc.), crane truck parts (chassis-related parts), micro bus parts (differential gear, etc.) (as required)

All these are special, and are hard to purchased in Indonesia. They should be kept amply.

- (f) Engine parts (as required)

The engine parts used are special, and are difficult to procure in Indonesia.

These parts should be kept in stock to provide immediate repairment.

Table 3-9 An inventory of supplies

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
FY1978 Heavy machinery	Yarder	Y-32EA	Pekalongan Operation Forest	3	Practice of skyline logging	Site management	
	Yarder	Y-12EC	Training Center	1	Model skyline	Site management	
Vehicle	Tractor	CT-35CAD	Pekalongan Operation Forest	1	Practice of logging	Site management	
	Truck	TWD23, w/6t crane	Training Center	1	Transportation of materials and equipment	Training Institute	Distance run, 20,000 km
	Micro bus	KAD51ZVE, w/9 seats	Pekalongan Operation Forest	2	Transportation of trainees to and back from practice site	Before dormitory	Distance run, 75,000 km
	Station wagon	Subaru 1600	Training Center	1	Transportation of experts and materials	Garage at Training Center	Distance run, 95,000 km
	Motorcycle	DT-125	Training Center, Operation Forest	2	Emergency liaison service	Garage at Training Center; shed at Operation Forest	Distance run, 15,000 km
	Jeep	Land cruiser	Training Center	1	Transportation of experts, materials	Garage at Training Center	Procured locally. Distance run, 100,000 km

FY1978

MLP-1980

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks	
Light machinery	Wire rope	24 mm, 16 mm, 12 mm, 10 mm	Pekalongan Operation Forest	25,200 m	Practice at Training Center, Demonstration Forest, and Model Logging Operation Forest	Those other than installed are kept in shed and maintained by jagirdar.		
	Artificial tower	K60	ditto	2	Practice	ditto		
	Generator	2 kW	ditto	2	Pekalongan Operation Forest lodgings for experts and trainees	by jagirdar employed in the lodgings		
	Air compressor	1.8 to 9.9 kg/cm ²	Training Center	1	For machine maintenance	Work shop in the Training Center		
	Steam cleaner		ditto	1	ditto	ditto		
	Chain block	3 tons, 3 m	ditto	2	ditto	ditto		
	Garage jack	5 tons, 1,420 mm	ditto	1	ditto	ditto		
	Teaching materials	Video TV set		Training Center	1	For education	Training Center	Out of order.
		Overhead projector		ditto	1	ditto	ditto	
		Movie camera	8 mm, 16 mm	ditto	1 each	ditto	ditto	
Slide projector			ditto	1	ditto	ditto		
	Stereoscope		ditto	4	ditto	ditto		

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
	Surveying instruments		Training Center, Pekalongan Operation Forest	4	For training	Shed in the Training Center and Forest	
	Machine tools and jigs		ditto	-	For training and machine maintenance	ditto	
Office supplies	Wet type electronic copying machine		Training Center	1	For copying training texts, etc.	Training Center	Out of order.
	Dry type electronic copying machine		ditto	1	ditto	ditto	Procured locally. Out of order.
	Rotary mimeo-grapher		ditto	1	ditto	ditto	
	Automatic steciler		ditto	1	ditto	ditto	
	Filing cabinet		ditto	1	For filing documents	ditto	

FY1979

MLP-1980

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
Machine	Yarder	Y-32EA	Pekalongan Operation Forest	6	Skyline logging practice	Site management	
	Chain saw		ditto	6	Bucking, felling	Shed in the Forest	
Vehicle	Tractor	CT-35DAD	Training Center	1	Logging practice in Lawu Demonstration Forest	Training Center	
	Tractor	T-20	Pekalongan Operation Forest	1	Logging practice	ditto	
	Truck	FK103F, 4 tons	Training Center	1	Transportation of materials and equipment	Garage in Training Center	Distance run, 10,000 km
	Truck	w/3-ton crane	ditto	1	ditto	Training Center	Delivered to Madiun in Sep., 1980.
	Micro bus	Tourne-S, w/15 seats	ditto	2	Transportation of experts and trainees	Garage in Training Center	Distance run, 35,000 km
	Jeep	Mitsubishi J-26H	Pekalongan Operation Forest	1	Transportation of counterparts, experts; liaison service; transportation of goods	In front of Forest lodgings for trainees	Distance run, 50,000 km
	Motorcycle	DT-125		2	Liaison service		Not yet at hand. (Surabaya)

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
Materials, etc.	Wire rope	24 mm, 18 mm, 16 mm, 12 mm, 10 mm, 8 mm	Pekalongan Operation Forest	41,000 m	Skyline yarding practice at Training Center, Demonstration Forest, and Model Logging Operation Forest	Those other than installed are kept in a shed.	
	Store		ditto	3	For storing materials and equipment		
Teaching materials	Monitor TV set		Training Center	1	For training	Training Center	
	Machine tools and jigs		Training Center, Operation Forest	-	For training and machine maintenance	Sheds in the Training Center and Operation Forest	
	Drafting set		Training Center	6	For training	Sheds in the Training Center	
	Surveying instruments		Training Center, Operation Forest	4	ditto	Sheds in the Training Center and Operation Forest	
	Electric washer		Training Center	1	Experts lodgings in Lawu Demonstration Forest	Training Center	
	Kerosene-fired refrigeration		ditto	3	Experts lodgings in the Demonstration Forest and Model Logging Operation Forest	ditto	Delivered to Madiun in Sep., 1980.

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
Office supplies	Typewriter		Training Center	1	For preparation of documents	Locker in the Training Center	
	Locker		ditto	2			
	Filter		ditto	4	For water purification	Shed in the Training Center	
	Dry type electronic copying machine		ditto	1	For preparation of documents and teaching materials	Training Center Leader Room	
	Generator			1	For experts lodgings	Shed in the Training Center	
	Welder generator, and welder set			1	For repairing equipment	Shed in the Training Institute	

FY1980

MLP-1980

Classification	Name	Specification	Local	Q'ty	Use	Keeping	Remarks
Machinery	Yarder	Y-32EA		3			Not delivered yet.
	Yarder	Y-252E		2			(for use for the third class.)
	Yarder	Y-12ECY-18	Training Center	2	Training in skyline logging operation		
Vehicle	Tractor	T-50		1			
	Shovel dozer	D50S-6		1			
	Truck	BV20R-RVT, 2 tons		1			
	Land cruiser	FJRV-KC		1			Upon additional requisite.
	Micro bus	BB10-R-MDR, w/26 seats		1			
Materials, etc.	Wire rope	24 mm, 22 mm, 12 mm, 10 mm		64,000 m			18 mm x 1,000 m, 10 mm x 1,000 m, 8 mm x 2,000 m (incl. those requested additionally.)

Classification	Name	Specification	Location	Q'ty	Use	Keeping	Remarks
Teaching materials	Tranceiver Machine tools and jigs for disassembling and re-assembling	0.5 W		2 -			
	Drafting set			6			
	Surveying instruments			5			
Office supplies	Dry type electronic copying machine			1			
	Typewriter			1			

An inventory of supplies (incl. those
for FY1980 and additionally requested)

Total			MLP-1980
Classification	Name	Specification	Q'ty
Machinery	Yarder	Y-32EA	12
	Yarder	Y-252E	2
	Yarder	Y12EC	3
	Chain saw		6
Vehicle	Tractor	CT-35CAD	1
	Tractor	CT-35DAD	1
	Tractor	T-20	1
	Tractor	T-50	1
	Shovel dozer	D50S-6	1
	Truck	TND23, w/6-ton crane	1
	Truck	w/3-ton crane	1
	Truck	FK103F, 4 tons	1
	Truck	BU20R-RVT, 2 tons	1
	Micro bus	KAD51ZVE, w/9 seats	2
	Micro bus	Tourne-S, w/15 seats	2
	Micro bus	BB10R-MDR	1
	Station wagon	Subaru 1600	1
	Jeep	Land cruiser	1
	Jeep	Mitsubishi J-26H	1
	Jeep	Land cruiser F155RV-KC	1
Motorcycle	DT-125	4	
Materials, etc.	Wire rope	24 mm, 22 mm, 18 mm, 16 mm, 12 mm, 10 mm, 8 mm	130,200 m
	Artificial tower	K60	2
	Generator	2 kW	3
	Welder generator, welding set		1
	Air compressor	1.8 to 9.9 kg/cm ²	1
	Steam cleaner		1
	Chain block	3 tons, 3 m	2
	Garage jack	5 tons, 1,420 mm	1
	Store		3

Classification	Name	Specification	Q'ty
Teaching materials	Video TV set		1
	Overhead projector		1
	Movie camera	8 mm	1
	Movie camera	16 mm	1
	Slide projector		1
	Stereoscope		4
	Monitor TV set		1
	Electric washer		1
	Kerosene-fired refrigerator		3
	Filter		4
	Drafting set		12
	Surveying instruments		9
	Tools and jigs for disassembling and reassembling		-
Office supplies	Wet type electronic copying machine		1
	Dry type electronic copying machine		3
	Rotary mimeographer		1
	Automatic stenciler		1
	Filing cabinet		1
	Locker		2
	Typewriter		2

Table 3-10

Hari:

Tanggal:

DATA-DATA KEGIATAN OPERASI SKYLINE

Jarak bentang/1° m

Rit	Waktu		Kapasitas Angkut			Bahan Bakar lt	Oli lt	Keterangan
	Berangkat	Datang	Batang	Panjang	φ			
								Jumlah Angkutan m ³ Waktu Bahan Bakar lt Oli SAE 3° 1t SAE 4° 1t SAE 9° 1t

Group

Driver:

Bagian Platform

Loading:

()

Table 3-11 Work achievements in the Model Logging Operation Forest

Item Sky-Line No.	Compartment	Skyline system	Group	Logging time (H)	Volume logged (m ³)	Work done per hour (m ³)	Work done per day (m ³)	Fuel consumption (ℓ)	Fuel consumption per m ³ (ℓ)	Logging period	Remarks
No. 1	45K	Endless Tyler	All trainees	82	115,899	1.41	8.46	155	1.3	Jul.-Sep., 1979	
No. 2	45B	Endless Tyler	All trainees	85	132,258	1.56	9.36	103	0.8	Aug.-Sep., 1979	
No. 3	45B	Endless Tyler	B	219	489,446	2.23	13.38	430	0.9	Oct.-Dec., 1979	
No. 4	45K	Endless Tyler	A	325	817,483	2.52	15.12	865	1.1	Oct., 1979 - Mar., 1980	
No. 5	45K	Endless Tyler	C	191	526,039	2.75	16.50	400	0.8	Nov., 1979 - Feb., 1980	
No. 6	45C	Endless Tyler	B	165	378,374	2.29	13.74	435	1.1	Feb.-May, 1980	
No. 7	45D	Falling block	C	112	269,497	2.41	14.46	240	0.9	Apr.-May, 1980	
No. 8	45F	Hoisting carriage	A	42	88,120	2.10	12.60	120	1.4	May, 1980	
Total				1,221	2,817,116	2.31	13.86	2,723	1.0		
Tractor	45B	-	All trainees	96	240,162	2.50	15.00	450	1.9	Jul.-Sep., 1979	

Note 1: Work done per day is calculated on assumption that the number of working hours per day is 6.

Fig. 3-1 Location of skyline logging systems in the Model Logging Operation Forest



Table 3-12 Inspection list (for wheeled construction machinery and wheeled cargo handling equipment (excl. trucks))

Model: Type: Property inventory No.:
 Forestry Office: Work Site:

Classification	Subject of inspection		Inspection item
Engine	Cooling water		Quantity, leakage
	o Fan belt		Tension, damage
	Oil		Quantity, leakage
Operator's cabin	Engine condition		Start-up condition, noise, exhaust color
	Steering handle or lever		Excess play, abnormal oscillation, swerving tendency, heavy handling
	Forward/backward control lever		Play, slack, shake, operating condition
	Clutch	Main	Disengaging condition, play, footing stroke, sliding condition
		Steering	Disengaging condition, play, footing stroke, sliding condition
	Brake	Foot	Footing stroke, braking condition, uneven braking
		Side or parking	Pulling stroke, ratchet pawl condition, braking condition
	Brake oil		Quantity, leakage
	Air pressure, brake valve exhaust noise		Pressurizing condition (on pressure gage, etc.), pressure reading, abnormal exhaust noise
	Instruments	Fuel gage, thermometer, oil pressure gage	Working order (Check by starting the engine or running the equipment)
		Ammeter, speedmeter, alarm light	Working order (Check by starting the engine or running the equipment)
	Hooter		Working order
	Window wiper		Working order
Rear-viewing mirror		Field of vision	
Door lock		Locking condition	

Classification	Subject of inspection		Inspection item
Body	Fuel		Quantity, leakage
	Working fluid		Quantity
	o Battery		Electrolyte quantity, terminals
	Lighting device	Front, back, and tail	On-off condition, dirt, damage
	Direction indicator		Working order
	Air tank		Draining of condensate
	Tire (incl. spares)		Air pressure, crack, damage, abnormal wear, slackened clip bolts
	o Tire		Groove depth; metal pieces, stone chips and other foreign objects lodged into tire
	Caterpillar	Caterpillar belt	Tension, damage, wear
		Driving wheel, trailing wheel	Damage, wear
	Chassis spring		Breakage
	Earthmoving tool	Blade, bucket	Damage, mounting condition, abnormalities
	Winch (incl. fairlead)		Damage, fitting condition, abnormalities
	Cargo handling equipment	Forked gripper	Damage, fitting condition, operating condition
		Forklift (most, backrest, lift chain)	Damage, fitting condition, operating condition
	Attachments	(incl. trailer)	Damage, fitting condition, operating condition
	Fiber rope, wire rope, block, hook, shackle		Damage, wear
	Hydraulic equipment	Working fluid tank, hose, pipe	Leakage, damage
		Hydraulic cylinder	Leakage
		Hydraulic pump, valves	Leakage
Others	Coupler	Abnormalities	

Classification	Subject of inspection	Inspection item
Inspection after use	Fuel inspection	Inspection supply
	Air tank	Draining
	Cleaning	
Those places found abnormal during operation or work the day before.		No abnormalities to be found.

- Notes:
1. For the purpose of inspection, refer to the manual prepared by the manufacturer. Those which are listed in this table, but not stated in the manual may be omitted.
 2. Those which have been inspected at the time of start according to the Law concerning the Vehicles for Road Transportation may be omitted.
 3. The inspection subjects marked with a circle should be inspected once a week.
 4. The results of inspection should be taken notes of on the column "Servicing" in the machine operation diary.

Table 3-13 Inspection list (for ordinary truck, small truck, light van, ordinary dump car, and small 4-wheeled dump car)

Model: _____ Type: _____ Property inventory No.: _____
 Forestry Office: _____ Work Site: _____

Classification	Subject of inspection		Inspection item
Steering device	Steering handle		Excessive play, slack, excessive oscillation, swerving tendency, heavy handling
Braking device	Brake	Foot brake	Footing stroke, braking effect, uneven braking
		Side brake	Pulling stroke, pawl condition, braking effect
		Brake oil	Quantity, leakage
		Air pressure, brake valve exhaust noise	Pressurizing condition (on pressure gage, etc.), pressure reading, abnormal exhaust noise
Hydraulic equipment	Dump cylinder		Operating condition
	Other hydraulic devices		Operating condition
Wheel	Tire (incl. spares)		Air pressure, crack, damage, abnormal wear
	o Tire		Groove depth; metal pieces, stone chips and other foreign objects lodged into tires
Lighting device	Front light, tail light		On-off condition, pollution, damage
Direction indicator	Direction indicator		Operating condition
Hooter	Hooter		Operating condition
Those found to be faulty the day before.			No abnormalities to be found.

- Notes:
1. For the purpose of inspection, refer to the manual prepared by the manufacturer. Those appearing in the above table, but not specified in the manual may be omitted.
 2. Those marked with a circle may be omitted if it is not scheduled to run on a road which permits a running speed of 80 km/h or higher.
 3. Those which have been inspected before start according to the Law concerning the Vehicles for Road Transportation may be omitted.
 4. The results of inspection should be taken notes of on the column "Servicing" in the machine operation log.

Table 3-14 Inspection list (for yarder)

Model: Type: Property inventory No.:
 Forestry Office: Work Site:

Classification		Subject of inspection		Inspection item	
Inspection before and after use (daily)	Inspection before start-up	Engine oil		Quantity, leakage	
		Injection pump oil		Quantity, leakage	
		Fuel		Quantity, leakage	
		Cooling water		Quantity, leakage	
		o Fan belt		Tension, damage	
		o Battery		Electrolyte level	
		Interphone		Connection, operating condition	
		Hooter		Operating condition	
		Transmission oil		Quantity, leakage	
		Drum oil		Quantity, leakage	
		*Air compressor tank oil		Quantity, leakage (as per engine oil) inspection	
	Inspection after start-up	Instru-ments	Pressure gage		Operating condition
			Thermometer		Operating condition
			Ammeter		Operating condition
*Air pressure gage for air compressor			Operating condition		
Engine running condition		Start-up condition, noise, exhaust gas color			
Brake		Operating condition			
Others		Sling rope		Abnormalities	
Inspection after use (daily)		Fuel		Level check, make-up	
		Disconnection of interphone terminal			
		*Air tank filter		Draining	
		Cleaning			
Inspection after overhaul, modification or trial run (occasional)		Spar tree		Working order	
		Anchor		Working order	
		Yarder		Working order (Check for abnormalities.)	
		Yarder installation		Working order	
		Skyline		Fitting condition, abnormalities	

Classification	Subject of inspection	Inspection item
	Operating ropes	Fitting condition, abnormalities
	Guy line	Fitting condition, abnormalities
	Bucket line	Fitting condition, abnormalities
	Carriage	} Wire rope connection
	Loading block	
		Telephone and bell
Inspection after storm, heavy rain, heavy snow, and other bad weather or after earthquake of medium or heavier degree	Spar tree	Working order
	Anchor	Working order
	Yarder	Abnormalities
	Yarder installation	Working order
	Skyline	Fitting condition
	Operating ropes	Fitting condition
	Guy line	Fitting condition
	Bucket line	Fitting condition
	Telephone and bell	Abnormalities

- Notes:
1. For the purpose of inspection, refer to the manual prepared by the manufacturer. Those appearing in the table above, but not specified in the manual may be omitted.
 2. The occasional inspection is to be carried out only when overhaul, modification or trial run is made.
 3. The subjects marked with a circle should be inspected once a week. An asterisk refers to a yarder with an air compressor.
 4. For the occasional inspection, the subjects which have been inspected according to the final inspection sheet for skyline yarding system (No. 10 dated Jan. 24, 1978) may be omitted.
 5. The results of the inspection should be taken notes of on the column "Servicing" in the machine operation log.

Table 3-15 Voluntary periodic inspection list (for wheeled construction machinery and wheeled cargo handling machinery (excl. trucks))

Model: _____ Type: _____ Property inventory No.: _____
 Forestry Office: _____ Work Site: _____

Classification	Inspection subject	Inspection item	Monthly	Yearly
Steering gear	Handle	Play, slack, shake, operation condition	o	o
	Gearbox (handle box)	Oil leakage, slackened connections	o	o
	Power steering gear	Oil leakage, slackened connections	o	o
	King pin, center arm pin (forklift)	Play	-	o
	Pitman arm, drag link, cotter pin (forklift)	Fitting condition, damage, play	o	o
	Articulated steering gear, articulated center pin	Oil leakage, operating condition, slack and play of connections	o	o
Engine	Engine	Starting performance, exhaust gas color, noise	o	o
	Oil	Contamination, leakage, loaded filter	o	o
	Fuel	Leakage, fouling, loaded filter	o	o
	Air cleaner	Soil	o	o
	Radiator	Cooling water level, leakage, soil, leakage, fouling, damage	o	o
	Fan belt	Slack, damage	o	o
	Exhaust pipe, muffler	Slackened connections, damage	o	o
Electric system	Battery	Electrolyte level, specific gravity, damage, fouled terminal	o	o
	Wiring	Loosened connections, damage	o	o
	Starter, generator (forklift)	Operating condition, brush wear	-	o

Classification	Inspection subject	Inspection item	Monthly	Yearly	
Power transmission	Clutch	Disengaging condition, sliding condition	o	o	
	Clutch pedal	Play, footing stroke	o	o	
	Transmission	Play in operating mechanism, oil leakage, oil contamination, fouled oil filter	o	o	
	Torque converter	Play in operating mechanism, oil leakage, oil contamination, fouled oil filter	o	o	
	Change lever, acceleration pedal	Operating condition, damage	o	o	
	Inertia brake (crawler)	Operating condition	o	o	
	Housing, final reduction gear	Oil contamination, oil leakage	o	o	
	Propeller shaft	Loosened coupling, whipping	o	o	
		Play in spline	-	o	
Differential gear	Oil leakage	o	o		
Braking system	Brake pedal or lever	Play, footing stroke, braking effect	o	o	
	Parking brake	Pulling stroke, braking effect	o	o	
	Hose, pipe	Leakage, damage	o	o	
	Brake oil	Contamination	o	o	
	Brake booster, master cylinder, wheel cylinder	Operating condition	-	o	
	Drum/lining, disc/pad	Clearance	o	o	
Running gear	Tire	Tire	Air pressure, crack, damage, abnormal wear	o	o
		Clip bolt, hub nut, rim, side link, wheel disc	Slack, damage	o	o
		Wheel bearing	Play	o	o

Classification	Inspection subject		Inspection item	Monthly	Yearly
Running gear	Caterpillar	Caterpillar shoe, shoe bolt	Slack, wear, loss	o	o
		Link pitch, link bush	Elongation, crack, wear		
		Idle wheel, driving wheel, upper and lower rollers	Crack, wear, slackened connections	o	o
Hydraulic system	Working fluid, tank, pipe, hose		Contamination, filter clogging, slack, oil leakage	o	o
	Hydraulic pump, hydraulic cylinder, valves		Oil leakage, operating condition	o	o
Working implement	Earth-moving implement	Blade, bucket	Damage, loosened connections, play, lost bolts	o	o
	Winch (incl. fairlead)		Damage, loosened connections, play, lost bolts	o	o
	Cargo handling equipment	Fork, clamp	Fitting condition, bend, crack, damage	o	o
		(Forklift) Mast, backrest, lift chain, side roller	Fitting condition, crack, damage	o	o
	Attachments		Damage, slackened connections, play, lost bolts	o	o
	Arm link mechanism		Damage, slackened connections, play, lost bolts	o	o
	Wire rope, chain		Wear, kink, strand breaks, corrosion, damage	o	o

Classification	Inspection subject	Inspection item	Monthly	Yearly
Body, etc.	Body components	Fitting condition, slack, crack, damage	o	o
	Head guard	Damage, deformation	o	o
	Cabin	Fitting condition, slack, crack, damage	o	o
	Lighting devices (Headlight, backlight)	Operating condition	o	o
	Hooter	Operating condition	o	o
	Direction indicator	Operating condition	o	o
	Rear-view mirror	Field of vision	o	o
	Instruments (fuel gage, thermometer, voltmeter, ammeter, speedometer, alarm light)	Operating condition	o	o
	Ladder, steps	Fitting condition, damage	o	o
Lubrication	Those requiring greasing or oiling	o	o	
Cleaning	Every part	o	o	

- Notes: 1. For the purpose of voluntary periodic inspection, refer to the manual prepared by the manufacturer. Those appearing in this table, but not specified in the manual, may be omitted.
2. Those which have been inspected according to the Law concerning the Vehicles for Road Transportation may be omitted.
3. The results of inspection should be taken notes of on the column "Servicing" in the machine operation dairy,

3-5 Indonesian Readiness to Receive the Project

- (1) Equipment and facilities of Training Center and training site Perum Perhutani's Training Center in Madiun, which is well equipped and has been used as a place of lecture-centered basic training of the Project, seems to have contributed much toward smooth and effective training of the trainees.

The major facilities for the Project include the following.

- ① Office room for Japanese experts and Indonesian counterparts
- ② Warehouse
- ③ Workshop, pit for maintenance and inspection
- ④ Classroom and lodgings for trainees

From the viewpoint of chorology and stand conditions, the Demonstration Forest and Model Logging Operation Forest fill the bill as places of education and training in logging operations.

The Demonstration Forest is located in Ngebel in the jurisdiction of Lawu Forestry Office, about 45 km from Madiun. Its area is about 200 ha, and the major facilities are as follows.

- ① Forest road, 6.5 km
- ② Warehouse
- ③ Rest house
- ④ Oil storeroom
- ⑤ Lodgings for instructors and trainees

The Model Logging Operation Forest is located in Bumi Jawa in the precinct of the West Pekalongan District Forestry Office, about 550 km away from Madiun. Its area is about 2,000 ha, and the major facilities include the following.

- ① Forest road, 5 km
- ② Warehouse
- ③ Rest house
- ④ Oil storeroom
- ⑤ Warden house
- ⑥ Lodgings rented for instructors and trainees

The facilities have been improved since 1978, and have not been an impediment to the progress of the Project activities.

(2) Staff in the Training Center

Except for the Indonesian counterparts, the number of the staff in the Training Center who dedicate themselves to the Project is nine at present. They are: one project manager, one clerk, six drivers and one assistant driver. In addition, local workers are hired seasonally to meet labor needs at site.

Whenever the training is carried out in the Demonstration Forest or the Model Logging Operation Forest, frequent arrangements with jurisdictional forestry offices are necessary to overwork the staff. Thus, the staff should be rewarded properly.

(3) Budget for the Project

The costs and expenses for the implementation of the Project have been estimated in the preliminary survey report. According to this report, it was estimated that the Project would necessitate some 24 million Rp. for four years from 1978 and about 150 million Rp. for additional three years till 1980.

On the other hand, the amount outlaid for the Project from April, 1978 to July, 1980 was about 101 million Rp. It included equipment costs, training expenses, administration and other costs.

The budgeting thus far has not been problem in the smooth implementation of the Project, and should be allocated properly for smooth progress of the Project in future.

3-6 Effect of the Construction of Model Infrastructure

The Project started April, 1978, and in November of the same year, the training got started. But, the Training Center and Demonstration Forest were far from being equipped. According to a model infrastructure construction project, Japan completed its first phase, improving the demonstration grounds in the Training Center and constructing an approach road with an aggregate length of 1,000 m to the Demonstration Forest.

As a result, the demonstration grounds were put in condition from marshy to well-drained ones, ensuring the trainees all-season practice of yarder and tractor operations using model equipment.

The training in the Demonstration Forest has been conducted successfully by making use of approach road and yarder.

Without this model infrastructure, the training would not have been carried out as scheduled. Following this example, the Indonesian Government undertook the second phase construction to install an additional 2,500 m road to pave the way toward smooth training operations in the Demonstration Forest. The lodgings and other facilities have already been furnished by the Indonesian Government so that the Demonstration Forest allows a well-equipped training.

CHAPTER 4. IMPACT OF THE PROJECT

4-1 Contribution to Forestry Promoted by Perum Perhutani

The principal purpose of the Project is to transfer mechanical logging techniques to Indonesia in order to crop pine trees to supply a paper and pulp mill to be constructed in future. Namely, it lies in the training of field engineers to basic technology.

The conventional logging in Java has been by man or animal, and the mechanical logging is still in a stage of research and development at universities, experimental stations, etc.

Two years and a half have passed since the start of the Project. By now, twelve field engineers have already been graduated. In future, the Project will give birth to additional forty-eight engineers of whom twenty-four are currently being trained. In addition, several leaders who can bring up field engineers are being trained as well.

The progress of the Project has been playing an important part in the development of logging and yarding techniques in Perum Perhutani, and will provide a strong toehold for the furtherance of mountain logging technology in Indonesia.

In addition, the model infrastructure construction project has already opened an access road to the Demonstration Forest, Perum Purhutani-invested logging roads and mechanical logging operations for OJT. It is inferred that all these have brought about multiplied effects in the form of the promotion of the logging of *Pinus Merkusii*, production of lengthy trees for electric poles, collection of rosin, transportation of forest products, and use of roads by local inhabitants, etc.

The mechanical logging techniques introduced through the Project will make it possible to supply the planned paper and pulp mill with volumes of material wood at a constant rate to the extent the rich forests permit.

It is considered that the skyline logging techniques will benefit Perum Perhutani even in the following points.

- (1) Usually, the skyline logging system is able to collect logs from spots about 1,000 m away from the logging road. Accordingly, the need for construction of logging roads is far less than in any other method.

This means that the skyline logging is very effective in protecting the forests.

- (2) The mechanical logging system makes it possible to collect logs of larger diameters and longer lengths; namely, it can produce logs of higher commercial value.
- (3) The mechanical logging system makes it possible to collect lengthy or heavy logs from steep slopes or valleys which defy logging by man or animal.

4-2 Impact on Regional Forestry, etc.

The Project, and particularly its logging roads, have contributed much toward the development of infrastructure in the local communities concerned. In addition, the Project has its effects on the following.

- (1) Present and future expansion of employment opportunities due to increase in the felling volume thanks to the implementation of the Project, and the nurturing of engineers skilled in mechanical logging through on-the-job training.
- (2) Contribution toward the development of wood-processing industry through increased output of logs, and also toward the development of local economy.
- (3) Contribution toward the transportation of forestry goods (logs, gum, rosin) and agricultural products by the logging roads opened for the Project.
- (4) Application of wire rope processing techniques to the conventional logging operations in teak forests, etc.
- (5) Improved forest management by making use of logging roads.

The logging roads contribute to silvicultural operations, such as felling, logging, afforestation, and care for young stands. The logging roads make these operations easy.

In turn, increases in these operations lead to the expansion of employment opportunities, and at the same time to advanced husbandry of forest resources.

In addition, the public is given easy access to forests for recreation purposes, and will get familiar with forests and forestry. Public acquaintance with forests and forestry will be beneficial to the future of the forests and forestry.

(6) Reduced labor accidents

As Japan's forestry suggests, the mechanical logging not only increases production, but reduces labor accidents as well. Further, the mechanical logging unfetters the workers from heavy chores.

CHAPTER 5. WHAT IS TO BE DONE BY THE PROJECT IN FUTURE

Standing behind the Project is a plan to construct a paper and pulp mill in Central Java.

Namely, the Project was designed to transfer logging techniques to Indonesia for the purpose of supplying the mill with volumes of Pinus Merksii stably and promoting the exploitation of the mountain forests in Indonesia.

Namely, the Project is intended to transfer the mountain logging techniques through to the Indonesian counterparts, and may be said to be an education and training project.

From this viewpoint, the following discusses the matters left for future in relation to the remaining cooperation period of this Project and the achievements of on-going mechanical logging training comparing the training plan with the achievements made so far.

So far, the Project has been assessed in detail from various angles, it is generally judged that the Project has nearly achieved the purpose as originally planned.

The twelve trainees in the first class have already been graduated, and the twenty-four trainees in the second class are under training, and are expected to be graduated in June, 1981.

But, the Project has its problems as follows.

- (1) According to the existing R/D, the Project is scheduled to be terminated in April, 1981, and it is difficult to educate and train the third class (24 trainees) expected to be enlisted in November, 1980, since their training will require eighteen months and will lap till June, 1982. Thus it is desired to extend the period of the Project to meet the training program.

While it is judged from the training achievements so far that the trainees have mastered basic logging and yarding techniques to an acceptable degree, they still need much to be desired in the following points, and the training should be even more amplified accordingly.

- (2) Transfer of management-related techniques as represented by work planning and process control.

- (3) Cultivation of abilities to amplify learned logging and yarding techniques, and formation of safety-conscious working habits.

Without these the technology transfer may end in a flash in the pan.

The training in the Project emphasizes on the transfer of mechanical logging techniques, and the felling and transportation processes lying before and after the mechanical logging process are neglected. For the purpose of efficient mechanical logging, however, all the processes must be operated in step with each other.

The production control, selection of skyline logging system, manning and work plan should reflect site conditions and the requirements of each process so that the felling gait may not fall behind the logging tempo or tardy trucking may not paralyze the timber yard.

Namely, it is required to educate and train the trainees in these advanced managerial techniques through on-the-job training.

In this context, it may be recommended to open refresher courses intended for the graduates and counterpart personnel for the purpose of making the technical transfer more rewarding to Indonesia. The skyline logging involves hazards, and the importance of working safety must be driven home to every worker.

It may be suggested that use of audio-visual teaching aids and case study to demonstrate miseries of victims and safety practice to avoid them will be highly effective in the prevention of labor accidents.

While the textbooks written in English and Indonesian have been helping the trainees understand their jobs, it will be necessary to prepare manuals or standards concerning the planning, engineering and practical way of logging and yarding in order to disseminate the mountain logging techniques throughout Indonesia.

Although it is indispensable for smooth promotion of the Project to promote mutual understanding between the Project personnel and the forestry offices concerned, there have seen cases arguing that the ties between the officials of the related forestry offices and the counterpart personnel are fragile. It is therefore desired to promote conversations between them for the purpose of deepening mutual understanding and building up cooperative efforts.

Finally, as to the matters of the fixation and dissemination of the mountain logging techniques which the Project aims at, these functions should of course be undertaken by Indonesian. Considering, however, that the construction of paper and pulp mill is overdue, it will be necessary to provide some buffer measures until the completion of the paper and pulp mill or full dissemination of the mountain logging techniques so that the integrity of the transferred technology will be maintained.

There are propounded problems such as the balancing of mechanized logging in the densely populated Java with the creation of employment opportunities and the production costs of mechanized logging, and the impact of the Project in relation to these problems may have to be studied carefully in future.



