

9. 再訓練生派遣企業リスト

LIST OF COMPANIES DISPATCHING RE-TRAINEES

(from the first to the sixth course)

No	COMPANY NAME
1	CIENCO 8
2	Road Repair and Management Company No. 230
3	Truong Son Civil Engineering Corporation
4	Son La Road repair and Management Company No. 1
5	Transport Construction Company No. 120
6	Automobile Corporation No. 8
7	Thai Nguyen Trade Company No. 2
8	Transportation Construction Company No. 116
9	Bridge Company No. 5
10	Phan Me - Thai Nguyen Coal Mine
11	Transportation Materials and Construction Company
12	Road Company No. 122
13	Road Repair and Management Company No. 242
14	Phu tho Transport Construction Company
15	Lao Cai Infrastructure Construction and Investment Company
16	Son La Road Repair and Management Company No. 3
17	Road Repair and Management Company No. 232
18	Trade and Construction Company No. 423
19	Road Repair and Management Company No. 226
20	Thanh Hoa Railway Construction Company
21	Nghe An Lime Stone Exploitations Company
22	Ha Tay Road Management Company No. 2
23	Transportation Materials and Equipment Company No. 1
24	Transportation Construction Company No. 126
25	Transportation Construction Company No. 118
26	Transportation Construction Company No. 475
27	Van Xuan Joint Stock Company
28	VietNam Kavico Company
29	Road and Bridge Company No. 10
30	CIENCO 1
31	CIENCO 4
32	CIENCO 5

10. 再訓練コースカリキュラム

再訓練コースカリキュラム (オペレーター、シャーシ、エンジン)

**RETRAINING PURPOSE AND RETRAINING PLAN
OF
OPERATING WORKERS FOR ROAD CONSTRUCTION MACHINE**

Profession of retraining Operating workers of road-bed construction machine

Improve worker level to grade of 4/7

Training period: 2 months

Recruiting standards:

- Personal history record and family history record must be good
- Degree: Graduated from Middle High School upward (9 years study), have certificate of 3/7 grade.
- Experience: More than 2 years.
- Age: 20 years old upward

I. TRAINING PURPOSE.

1. To form professional morality and virtue.

- Really care about the job.
- Have high responsibility in work.
- Have high industrial working style.

2. Professional knowledge:

a) Knowledge:

- Can read the related technical drawing equivalent to the working level.
- General knowledge of structure principle and function of construction equipment.
- Classification and maintain of construction equipment lubricant.
- Content of periodical maintenance.
- Basic Construction methods equivalent with the working level.
- By recognition abnormal sound of machine can find out the damages or worn-out point.
- Safety in operation and maintenance of construction equipment.

b) Level:

- Operate fluently one kinds of construction machine and able to operate one more kind.
- Can do the grade II of daily maintenance for two kinds of trained construction equipment.
- Trouble shouting of the common break down.

II. TRAINING PLAN OF OPERATION COURSE (FROM GRADE 3 TO GRADE 4)

SUBJECT	Period allocated (hour)			Total
	Lecture	Practice In field	OST	
1 General Actions				
a. Opening Ceremony	3	-	-	3
b. Safety Regulation	3	-	-	3
2 General Knowledge				
a. Outline of modern type construction machinery	3	-	-	3
b. Characteristics of soil and rock	3	-	-	3
c. Civil engineering project	3	-	-	3
d. Hand tools and machine elements	3	-	-	3
3 Basic structure and function of each component				
a. Internal combustion engine	9	3	-	12
b. Fuel system	3	-	-	3
c. Lubrication system	2	-	-	2
d. Cooling system	1	-	-	1
e. Electric system	3	-	-	3
f. Air intake and exhaust system	3	-	-	3
g. Trouble shooting (for engine)	3	3	-	6
h. Direct clutch, torque converter & transmission	6	3	-	9
i. Steering mechanism & brake system	3	3	-	6
j. Final drive and differential	3	-	-	3
k. Undercarriage and tire	3	3	-	6
l. Hydraulic system	9	3	-	12
m. Trouble shooting (for chassis)	3	3	-	6
4 General idea for operator				
a. Tips of safety	1	1	-	2
b. Operating instructions	2	2	-	4
c. Daily and periodic maintenance	4	8	-	12
5 Operation review (1 kinds of machine)				
a. Structure and function, daily maintenance	6	6	-	12
b. Operation		24	-	24
6 Operation one additional machine				
a. Structure and function, daily maintenance	6	6	-	12
b. Operation		52	60	112
7 Test (written and practical)	3	9	-	12
	91	129	60	280
	(32.5%)	(46.1%)	(21.4%)	

Remark: 6 hours/day x 6 days/week x 4 weeks/month x 2 months = 280 hours

**RETRAINING PURPOSE AND PLAN
OF
MECHANIC FOR CHASSIS OF CONSTRUCTION MACHINERY**

- Aim: retraining mechanics for chassis.
- Foster workers up to 4/7 grade.
- Training period: 2 months.
- The entrance standard:
 - A good and clear curriculum vitae.
 - Lever: Graduated from Middle High School (9 years study) up, and have certificate of 3/7 grade.
 - Experience: More than 2 years.
 - Age: 20 years old upwards.

I. TRAINING PURPOSE:

1. Training professional morality and virtue.

- Be interested in the job.
- Have high responsibility in work.
- Have good industrial working style.

2. Professional knowledge:

a) Knowledge:

- Read the relative complicated drawings of machines.
- Use measurement tools like calipers, pane, gauges and technical exclusive ones for the steering and hydraulic systems test.
- Understand the structures and common operation of construction machine chassis modules.
- Disassemble and assemble the chassis and attachment panel of one or two popular machines.
- Understand the maintenance content for machines at the different grades.
- Master safety and industry hygiene rules.

b) Level:

- Can use the quality testing equipment for the chassis and attachment panel components and modules.
- Can assemble the complete module of more than one chassis systems of the popular machines.
- Can shoot the usual troubles of the popular machines.

II. TRAINING PLAN OF MECHANIC COURSE FOR CHASSIS (FROM GRADE 3 TO 4)

	SUBJECT	Period allocated (hour)		Total
		Lecture	Practice	
1	Common Activities			
1-1	Opening ceremony	3	-	3
1-2	Safety regulations	3	-	3
2	General Knowledge			
2-1	Reading the drawings and wall chart	3	6	9
2-2	Fitting tolerance	3	6	9
2-3	Fuel, oil and grease	3	-	3
2-4	The outline of the modern construction machine	3	-	3
2-5	The hand tools and test equipment	3	-	3
2-6	The instruction manual and part book	3	3	6
3	The structures and the functions of modules			
3-1	Principle and general structure of chassis	3	-	3
3-2	Clutches, torque converter	6	-	6
3-3	Transmission	6	-	6
3-4	Final drive and the differential	3	-	3
3-5	Brake system	3	-	3
3-6	Steering system	3	-	3
3-7	Undercarriage and tires	3	-	3
3-8	Hydraulic system	9	-	9
4	Disassembly and assembly			
4-1	Chassis and attachment	-	42	42
4-2	Engine	-	18	18
5	Testing and adjustment			
5-1	Testing and adjustment the steering system	-	6	6
5-2	Adjustment of clutch and transmission control lever	-	12	12
5-3	Brake test and adjustment	-	3	3
5-4	Testing and evaluation the quality of hydraulic system	3	21	24
5-5	Oil pump and hydraulic motor test	-	6	6
5-6	Hydraulic cylinder test	-	3	3
5-7	Distributor valves test	3	9	12
5-8	Tracks testing and adjustment	-	3	3
5-9	Testing and adjustment other components	-	3	3
6	Troubleshooting	3	15	18
7	Maintenance standard	3	6	9
8	Testing and evaluation the quality of chassis after repairing	6	12	18
9	Machine operation	3	15	18
10	Examination (written and practice)	3	9	12
11	Closing Ceremony	6	-	6
		90	198	288
		(31%)	(69%)	

Remark: 6hours/day x 6days/ week x 4weeks/ month x 2month = 288
Learn 2 or 3 kinds of popular machines.

Retraining purpose and plan
OF
MECHANIC FOR ENGINE OF CONSTRUCTION MACHINERY

- Profession of retraining mechanics for engine
- Improvement worker level to 4/7 grade.
- Training period: 2 months
- Recruiting standards:
 - Personal history record and family history record must be good
 - Degree: Graduated from Middle High School (9 years study) up, have certificate of 3/7 level.
 - Experience: More than 2 years.
 - Age: 20 years old upward

I. TRAINING PURPOSE.

1) To form professional morality and virtue.

- Really care about the job.
- Have high responsibility in work.
- Have good industrial working style.

2) Professional knowledge:

a) Knowledge:

- Can read the relative complicated technical drawings of machine.
- Can use the measurement tools such as calipers, panme, gauges, and the technical dedicated machine to inspect the fuel system, and electric system.
- General knowledge about structure and function principle of machine components.
- Can assembling and disassembling the whole engine components exactly follow the right order and technical demand.
- Can assemble, disassemble and repair the normal ignition system.
- Understand the content of all maintenance grades.
- Know the regulations of safety and industrial hygiene.

b) Level:

- Can inspect and evaluate the quality of all kinds of bush.
- Boring and grinding the valve seats, and valves.
- Filing and grinding the piston ring to install into piston.
- Mounting and adjustment the oil pump, and injection nozzles.
- Completely mounting the engine.
- Adjustments the fuel consumption rate correspond to the kind of machine.
- Assemble, disassemble and inspection, adjustment the generator, starting motor.
- By the abnormal sound can recognize the parts in bad order in engine and can do the regular trouble shooting.

II. TRAINING PLAN OF MECHANIC COURSE FOR ENGINE (FROM GRADE 3 TO 4).

SUBJECT	Period allocated		Total
	Lecture	Practice	
1 General Actions			
1-1 Opening Ceremony	3	-	3
1-2 Safety Regulation	3	-	3
2 General Knowledge			
2-1 Reading the drawing and wall chart	3	6	9
2-2 Fitting tolerance	3	6	9
2-3 Kinds of oil and grease	3	-	3
2-4 Outline of modern construction equipment	3	-	3
2-5 Hand tools and testing equipment	3	-	3
2-6 Manual and parts book	3	3	6
3 Basic structure and function of each component			
3-1 Principle and general structure of engine	3	-	3
3-2 Fixable system	3	-	3
3-3 Crankshaft and connecting rod mechanism	3	-	3
3-4 Fuel system	6	-	6
3-5 Lubrication system	3	-	3
3-6 Cooling system	3	-	3
3-7 Air intake and exhaust system (included turbocharger)	6	-	6
3-8 Electric system	9	-	9
4 Assemble and disassemble machine			
4-1 Engine	-	24	24
4-2 Electric system	-	18	18
4-3 Chassis and attachment	-	18	18
5 Inspection and adjustment			
5-1 Engine performance	3	-	3
5-2 Valve clearance adjustment	-	3	3
5-3 Compress pressure measurement	-	3	3
5-4 Measurement of blow-by pressure	-	3	3
5-5 Inspection and adjustment injection nozzle	-	6	6
5-6 Inspection and adjustment Injection pump	3	15	18
5-7 Exhaust gas colour determination	-	3	3
5-8 Measurement of supercharger pressure	-	3	3
5-9 Temperature of exhaust gas	-	3	3
5-10 Measurement of lubrication oil pressure	-	3	3
5-11 Measurement of engine speed (revolution)	-	3	3
5-12 Inspection and adjustment the belt	-	3	3
5-13 Inspection and adjustment electric devices	6	12	18
6 Trouble shooting			
	3	15	18
7 Maintenance standard			
	3	6	9
8 Engine testing and quality evaluation after repairing			
	6	12	18
9 Operation machine			
	3	15	18
10 Test (written and practical)			
	3	9	12
11 Closing ceremony			
	6	-	6
	96	168	288
	(33%)	(67%)	

Remark: 6 hours/day x 6 days/week x 4 weeks/month x 2 months = 288 hours
Learn 2 or 3 kinds of normal machine.

11. 教材リスト

For Operator Course

2003/1/22

No.	Title of Training Materials	Prepared date	Revised Date	Re-training Course
1	Safety Operation and Maintenance Construction Machine	Mar. 2001		1st ~ 5th
2	Reference Materials	Mar. 2001		1st & 2nd
3	Reference Materials revised	Dec. 2001		3rd~5th
4	Basic knowledge of Mechatronics and Trouble Shooting	Mar. 2002		3rd~5th
5	Basic of Torque Converter, Torque Divider, Transmission and Hydraulic System	Mar. 2001		1st~4th

For Chassis

No.	Title of Training Materials	Prepared date	Revised Date	Re-training Course
1	Power shift transmission	Sep. 2002		
2	System operation of 320 hydraulic system	Sep. 2002		
3	System operation of 320 Electronic system	Sep. 2002		
4	Disassembly & assembly D6H machine system	Jul. 2002		
5	Disassembly & assembly D6H differential steering	Jun. 2002		
6	Specifications, systems operation, testing & adjusting D6H differential steering	Jun. 2002		
7	Reference material on disassembly & assembly of D6H track	Oct. 2002		
8	D6H & D6H series II differential steering operation	Jul. 2002		
9	System operation of 950F power train	Oct. 2002		
10	Systems operation D6R Power train	Oct. 2002		
11	Power train structure & function of PC200-3	Sep. 2001		
12	Hydraulic system structure & function of PC200-3	Sep. 2001		
13	Systems operation 311B Engine and hydraulic pump	Feb. 2002		
14	Troubleshooting 311B Engine and hydraulic pump	Mar. 2002		
15	Testing & adjusting 311B Engine and hydraulic pump	Mar. 2002		
16	Testing and adjusting PC200-5	Jan. 2002		
17	Reference on hydraulic system for construction machine	Aug. 2001		
18	Operators instruction manual (Maruma's guide book)	Oct. 2001		
19	Maintenance standard for D65A, E chassis	Aug. 2001		
20	Hydraulic system testing & adjusting of D65	Aug. 2001		

For Engine Course

No.	Title of Training Materials	Prepared date	Revised Date	Re-training Course
1	Shop Manual on Disassemble and Assemble for 6D125-1 Engine	Oct., 2001		1st & 2nd
2	Shop Manual on Trouble Shooting for Caterpillar 3114, 3116	Oct., 2001		1st & 2nd
3	Shop Manual on Maintenance Standard for 6D125 - 1 Engine	Oct., 2001		1st & 2nd
4	*1 Basic knowledge of Electricity	Mar. 2002	Jul. 2002	1st & 2nd
5	*1 Answers to questions in self-test on basic knowledge of electric for construction machine	Mar. 2002	Jul. 2002	1st & 2nd
6	*1 Knowledge of Trouble Shooting for Mechatronics	Mar. 2002	Sep. 2002	1st & 2nd
7	*1 Mechatronics (Structure and Function of electricity)	Mar. 2002	Sep. 2002	1st & 2nd
8	Shop Manual on Testing and Adjusting for 6D125-1 Engine	May, 2002		1st & 2nd
9	Summary of Trouble Shooting for Komatsu Engine	May, 2002		1st & 2nd
10	Periodic Maintenance for Komatsu Engine	May, 2002		1st & 2nd
11	Turbocharger	Jun. 2002		1st & 2nd
12	*2 Operation Manual on Engine Dynamometer and Diesel Injection Pump Tester	Jun. 2002		1st & 2nd
13	System for Komatsu Engine	Jan. 2003		1st & 2nd
14	Service Manual on Injection Pump	Jan. 2003		Will be used for 3rd
15	Shop Manual on Disassemble and Assemble for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
16	Shop Manual on Testing and Adjusting for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
17	Shop Manual on Maintenance Standard for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
18	Shop Manual on Trouble Shooting S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
19	Shop Manual on Repair and Replacement for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
20	Shop Manual on General for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
21	Shop Manual on Structure and Function for S6D95L-1 Engine	Jan. 2003		Will be used for 3rd
22	Shop Manual on Assembly and disassembly for 3306 Engine	Jan. 2003		Will be used for 4th
23	*3 Textbook on Structure, Function and Repair of Road Construction Machinery (Engine)	Jan. 2001		1st & 2nd
24	*3 Textbook on Structure, Function and Repair of Road Construction Machinery (Chassis)	Jan. 2001		1st & 2nd

Note: *1 were used for Mechatronics training to all C/Ps by a short term Expert.

*2 was used for Engine Dynamo Meter and Injection Pump Tester, 2 times training to all CPs by short-term experts

*3 were made by Mr. Kinoshita and are used for Re-training courses in each courses every times.

12. 再訓練コース修正カリキュラム：メカニック(エンジン・シャーシ)

再訓練コースカリキュラム —メカニック (シャーシ・エンジン)

TRAINING PLAN OF 3 MONTHS MECHANIC COURSE (FROM GRADE 3 TO 4)

G3-4: 1/2

	SUBJECT	Period allocated (hour)		Total
		Lecture	Practice	
1	Common Activities			
	1-1 Opening ceremony	3		3
	1-2 Safety regulations	3		3
2	General Knowledge for Construction Machine			
	2-1 Reading the drawing and wall chart	3	6	9
	2-2 Fitting tolerance	3	3	6
	2-3 Fuel, oil and grease	6		6
	2-4 The outline of the modern construction machine	3		3
	2-5 Hand tools and test equipment	3		3
	2-6 The instruction manual and parts book	3	3	6
		27	12	39
3	Basic Structure and Function of Engine components			
	3-1 Principle and general structure of Engine	3		3
	3-2 Fixable system	3		3
	3-3 Crankshaft and connection rod mechanism	3		3
	3-4 Fuel system	6		6
	3-5 Lubrication system	3		3
	3-6 Cooling system	3		3
	3-7 Air intake and exhaust system (included turbocharger)	6		6
	3-8 Electric system	6		6
4	Assembly and Disassembly of Engine			
	4-1 Engine		39	39
	4-2 Electric system		18	18
5	Testing and Adjustment of Engine			
	5-1 Engine performance	6	9	15
	5-2 Adjustment of valve clearance		3	3
	5-3 Measurement of compression pressure		3	3
	5-4 Measurement of blow-by pressure		3	3
	5-5 Testing and adjustment of injection nozzle		3	3
	5-6 Testing and adjustment of injection pump	1	5	6
	5-7 Determination of exhaust gas color		1.5	1.5
	5-8 Measurement of supercharger pressure		1.5	1.5
	5-9 Measurement of exhaust gas temperature		1.5	1.5
	5-10 Measurement of lubrication oil pressure		3	3
	5-11 Measurement of engine speed (revolution)		1.5	1.5
	5-12 Testing and adjustment of belt		3	3
	5-13 Testing and adjustment of electric devices	2	4	6
6	Trouble Shooting of Engine	6	6	12
7	Maintenance Standard of Engine	2	4	6
8	Testing and Quality Evaluation of Engine after repairing	6	6	12
		56	115	171

	SUBJECT	Period allocated (hour)		G3-4: 2/2 Total
		Lecture	Practice	
9	Structure and Function of module on Chassis			
	9-1 Principle and general structure of Chassis	3		3
	9-2 Clutches, torque convertor	5	1	6
	9-3 Transmission	5	1	6
	9-4 Final drive and differential	3		3
	9-5 Brake system	3		3
	9-6 Steering system	3		3
	9-7 Undercarriage and tires	3		3
	9-8 Hydraulic system	18	3	21
10	Assembly and Disassembly of Chassis			
	10-1 Chassis and attachment		45	45
11	Testing and Adjustment of Chassis			
	11-1 Testing and Adjustment of steering system		6	6
	11-2 Adjustment of clutch and transmission control lever		9	9
	11-3 Testing and adjustment of brake		3	3
	11-4 Testing and evaluation for quality of hydraulic system	3	12	15
	11-5 Testing of oil pump and hydraulic motor		6	6
	11-6 Testing of hydraulic cylinder		3	3
	11-7 Testing and adjustment of tracks		3	3
	11-8 Testing and adjustment of other components		3	3
12	Trouble Shooting of Chassis	6	6	12
13	Maintenance standard of Chassis	4	5	9
14	Testing and Evaluation for Quality of Chassis after repairing	3	9	12
		59	115	174
15	Mechatronics System			
	15-1 Knowledge of electricity	2	1	3
	15-2 Constitution element of MECHATRONICS	2		2
	15-3 Caution in using MECHATRONICS vehicle	1		1
	15-4 Machine control system diagram by hydraulics	3		3
	15-5 Electrical components	12	6	18
	15-6 Electrical circuit and equipment location	6	3	9
	15-7 Monitor	3		3
	15-8 Special function of monitor panel	3	3	6
	15-9 Control system by electricity and hydraulics	3		3
	15-10 Trouble shooting	4	2	6
		39	15	54
16	Machine Operation of Construction Machine	3	12	15
17	Examination (written and practice)	15	4	19
18	Closing Ceremony	8		8
	Total	207	273	480
		(43%)	(57%)	(100%)

Remark: 8 hours x 5 days/week x 12 weeks = 480 hours
Learn 2 or 3 kinds of normal machines

Grade 3 to 4

Common (Practice 35%)	53	28	81
Engine (Practice 68%)	56	115	171
Chassis (Practice 66%)	59	115	174
Mechatronics (Practice 28%)	39	15	54
	207	273	480
	(43%)	(57%)	(100%)

TRAINING PLAN OF 3 MONTHS MECHANIC COURSE (FROM GRADE 4 TO 5)

G4-5: 1/2

	SUBJECT	Period allocated		Total
		(hour)		
		Lecture	Practice	
1	Common Activities			
	1-1 Opening ceremony	3		3
	1-2 Safety regulations	3		3
2	General Knowledge for Construction Machine			
	2-1 Reading the drawing and wall chart	3	6	9
	2-2 Fitting tolerance	3	3	6
	2-3 Fuel, oil and grease	6		6
	2-4 The outline of the modern construction machine	3		3
	2-5 Hand tools and test equipment	3		3
	2-6 The instruction manual and parts book	3	3	6
		27	12	39
3	Basic Structure and Function of Engine components			
	3-1 Principle and general structure of Engine	3		3
	3-2 Fixable system	3		3
	3-3 Crankshaft and connection rod mechanism	3		3
	3-4 Fuel system	6		6
	3-5 Lubrication system	3		3
	3-6 Cooling system	3		3
	3-7 Air intake and exhaust system (included turbocharger)	6		6
	3-8 Electric system	3		3
4	Assembly and Disassembly of Engine			
	4-1 Engine		39	39
	4-2 Electric system		15	15
	4-3 Testing and evaluation for quality of components		6	6
5	Testing and Adjustment of Engine			
	5-1 Engine performance	6	9	15
	5-2 Adjustment of valve clearance		3	3
	5-3 Measurement of compression pressure		3	3
	5-4 Measurement of blow-by pressure		3	3
	5-5 Testing and adjustment of injection nozzle		3	3
	5-6 Testing and adjustment of injection pump	3	6	9
	5-7 Determination of exhaust gas color		1.5	1.5
	5-8 Measurement of supercharger pressure		1.5	1.5
	5-9 Measurement of exhaust gas temperature		1.5	1.5
	5-10 Measurement of lubrication oil pressure		3	3
	5-11 Measurement of engine speed (revolution)		1.5	1.5
	5-12 Testing and adjustment of belt		3	3
	5-13 Testing and adjustment of electric devices	2	1	3
6	Trouble Shooting of Engine	6	6	12
7	Maintenance Standard of Engine	2	4	6
8	Testing and Quality Evaluation of Engine after repairing	6	6	12
		55	116	171

	SUBJECT	Period allocated (hour)		G4-5: 2/2 Total
		Lecture	Practice	
9	Structure and Function of module on Chassis			
	9-1 Principle and general structure of Chassis	3		3
	9-2 Clutches, torque convertor	5	1	6
	9-3 Transmission	5	1	6
	9-4 Final drive and differential	3		3
	9-5 Brake system	3		3
	9-6 Steering system	3		3
	9-7 Undercarriage and tires	3		3
	9-8 Hydraulic system	15	6	21
10	Assembly and Disassembly of Chassis			
	10-1 Chassis and attachment		36	36
	10-2 Testing and evaluation for quality of components		12	12
11	Testing and Adjustment of Chassis			
	11-1 Testing and Adjustment of steering system		6	6
	11-2 Adjustment of clutch and transmission control lever		6	6
	11-3 Testing and adjustment of brake		3	3
	11-4 Testing and evaluation for quality of hydraulic system	3	12	15
	11-5 Testing of oil pump and hydraulic motor		6	6
	11-6 Testing of hydraulic cylinder		3	3
	11-7 Testing and adjustment of tracks		3	3
	11-8 Testing and adjustment of other components		3	3
12	Trouble Shooting of Chassis	6	6	12
13	Maintenance Standard of Chassis	6	3	9
14	Testing and Quality Evaluation of Chassis after repairing	3	9	12
		58	116	174
15	Mechatronics System			
	15-1 Knowledge of electricity	2	1	3
	15-2 Constitution element of MECHATRONICS	1		1
	15-3 Caution in using MECHATRONICS vehicle	1		1
	15-4 Machine control system diagram by hydraulics	3	1	4
	15-5 Electrical components	6	6	12
	15-6 Electrical circuit and equipment location	6	3	9
	15-7 Monitor	3		3
	15-8 Special function of monitor panel	3	3	6
	15-9 Control system by electricity and hydraulics	2	1	3
	15-10 Trouble shooting	3	6	9
	15-11 Testing and adjustment	2	1	3
		32	22	54
16	Machine Operation of Construction Machine	3	12	15
17	Examination (written and practice)	15	4	19
18	Closing Ceremony	8		8
	Total	198	282	480
		(41%)	(59%)	(100%)
Remark:	8 hours x 5 days/week x 12 weeks = 480 hours			
	Learn 2 or 3 kinds of normal machines			
	Grade 4 to 5			
	Common (Practice 35%)	53	28	81
	Engine (Practice 68%)	55	116	171
	Chassis (Practice 67%)	58	116	174
	Mechatronics (Practice 41%)	32	22	54
	Total	198	282	480
		(41%)	(59%)	(100%)

TRAINING PLAN OF 3 MONTHS MECHANIC COURSE (FROM GRADE 5 TO 6)

G5-6: 1/2

	SUBJECT	Period allocated (hour)		Total
		Lecture	Practice	
1	Common Activities			
	1-1 Opening ceremony	3		3
	1-2 Safety regulations	3		3
2	General Knowledge for Construction Machine			
	2-1 Reading the drawing and wall chart	3	6	9
	2-2 Fitting tolerance	3	3	6
	2-3 Fuel, oil and grease	6		6
	2-4 The outline of the modern construction machine	3		3
	2-5 Hand tools and test equipment	3		3
	2-6 The instruction manual and parts book	3	3	6
		27	12	39
3	Basic Structure and Function of Engine components			
	3-1 Principle and general structure of Engine	3		3
	3-2 Fixable system	3		3
	3-3 Crankshaft and connection rod mechanism	3		3
	3-4 Fuel system	6		6
	3-5 Lubrication system	3		3
	3-6 Cooling system	3		3
	3-7 Air intake and exhaust system (included turbocharger)	6		6
	3-8 Electric system	3		3
4	Assembly and Disassembly of Engine			
	4-1 Engine		36	36
	4-2 Electric system		9	9
	4-3 Testing and evaluation for quality of components		9	9
5	Testing and Adjustment of Engine			
	5-1 Engine performance	6	9	15
	5-2 Adjustment of valve clearance		3	3
	5-3 Measurement of compression pressure		3	3
	5-4 Measurement of blow-by pressure		3	3
	5-5 Testing and adjustment of injection nozzle		1.5	1.5
	5-6 Testing and adjustment of injection pump	3	6	9
	5-7 Determination of exhaust gas color		1.5	1.5
	5-8 Measurement of supercharger pressure		1.5	1.5
	5-9 Measurement of exhaust gas temperature		1.5	1.5
	5-10 Measurement of lubrication oil pressure		3	3
	5-11 Measurement of engine speed (revolution)		1.5	1.5
	5-12 Testing and adjustment of belt		1.5	1.5
	5-13 Testing and adjustment of electric devices	2	1	3
6	Trouble Shooting of Engine	5	7	12
7	Maintenance Standard of Engine	3	12	15
8	Testing and Quality Evaluation of Engine after repairing	6	6	12
		55	116	171

SUBJECT	Period allocated (hour)		G5-6: 2/2 Total	
	Lecture	Practice		
9	Structure and Function of module on Chassis			
9-1	Principle and general structure of Chassis	3	3	
9-2	Clutches, torque convertor	4	2	6
9-3	Transmission	3	3	6
9-4	Final drive and differential	3		3
9-5	Brake system	3		3
9-6	Steering system	3		3
9-7	Undercarriage and tires	3		3
9-8	Hydraulic system	15	6	21
10	Assembly and Disassembly of Chassis			
10-1	Chassis and attachment		33	33
10-2	Testing and evaluation for quality of components		15	15
11	Testing and Adjustment of Chassis			
11-1	Testing and Adjustment of steering system		6	6
11-2	Adjustment of clutch and transmission control lever		6	6
11-3	Testing and adjustment of brake		3	3
11-4	Testing and evaluation for quality of hydraulic system	6	9	15
11-5	Testing of oil pump and hydraulic motor		6	6
11-6	Testing of hydraulic cylinder		3	3
11-7	Testing and adjustment of tracks		3	3
11-8	Testing and adjustment of other components		3	3
12	Trouble Shooting of Chassis	5	7	12
13	Maintenance Standard of Chassis	4	2	6
14	Testing and Quality Evaluation of Chassis after repairing	6	9	15
		58	116	174
15	Mechatronics System			
15-1	Knowledge of electricity	2		2
15-2	Constitution element of MECHATRONICS	0.5		0.5
15-3	Caution in using MECHATRONICS vehicle	0.5		0.5
15-4	Machine control system diagram by hydraulics	3	3	6
15-5	Electrical components	3	6	9
15-6	Electrical circuit and equipment location	5	4	9
15-7	Monitor	3		3
15-8	Special function of monitor panel	1	2	3
15-9	Control system by electricity and hydraulics	2	1	3
15-10	Trouble shooting	3	9	12
15-11	Testing and adjustment	2	4	6
		25	29	54
16	Machine Operation of Construction Machine	3	12	15
17	Examination (written and practice)	15	4	19
18	Closing Ceremony	8		8
	Total	26	16	42
		191	289	480
Remark:	8 hours x 5 days/week x 12 weeks = 480 hours	(40%)	(60%)	(100%)
	Learn 2 or 3 kinds of normal machines			
	Grade 5 to 6			
	Common (Practice 35%)	53	28	81
	Engine (Practice 68%)	55	116	171
	Chassis (Practice 67%)	58	116	174
	Mechatronics (Practice 55%)	25	29	54
	Total	191	289	480
		(40%)	(60%)	(100%)

TRAINING PLAN OF 3 MONTHS MECHANIC COURSE (FROM GRADE 6 TO 7)

G6-7: 1/2

	SUBJECT	Period allocated (hour)		Total
		Lecture	Practice	
1	Common Activities			
	1-1 Opening ceremony	3		3
	1-2 Safety regulations	3		3
2	General Knowledge for Construction Machine			
	2-1 Reading the drawing and wall chart	3	6	9
	2-2 Fitting tolerance	3	3	6
	2-3 Fuel, oil and grease	6		6
	2-4 The outline of the modern construction machine	3		3
	2-5 Hand tools and test equipment	3		3
	2-6 The instruction manual and parts book	3	3	6
		27	12	39
3	Basic Structure and Function of Engine components			
	3-1 Principle and general structure of Engine	3		3
	3-2 Fixable system	3		3
	3-3 Crankshaft and connection rod mechanism	3		3
	3-4 Fuel system	6		6
	3-5 Lubrication system	3		3
	3-6 Cooling system	3		3
	3-7 Air intake and exhaust system (included turbocharger)	6		6
	3-8 Electric system	3		3
4	Assembly and Disassembly of Engine			
	4-1 Engine		33	33
	4-2 Electric system		6	6
	4-3 Testing and evaluation for quality of components		12	12
5	Testing and Adjustment of Engine			
	5-1 Engine performance	6	9	15
	5-2 Adjustment of valve clearance		3	3
	5-3 Measurement of compression pressure		3	3
	5-4 Measurement of blow-by pressure		3	3
	5-5 Testing and adjustment of injecton nozzle		1.5	1.5
	5-6 Testing and adjustment of injection pump	3	6	9
	5-7 Determination of exhaust gas color		1.5	1.5
	5-8 Measurement of supercharger pressure		1.5	1.5
	5-9 Measurement of exhaust gas temperature		1.5	1.5
	5-10 Measurement of lubrivcation oil pressure		3	3
	5-11 Measurement of lengine speed (revolution)		1.5	1.5
	5-12 Testing and adjustment of belt		1.5	1.5
	5-13 Testing and adjustment of electric devices	2	1	3
6	Trouble Shooting of Engine	3	12	15
7	Maintenance Standard of Engine	3	12	15
8	Testing and Quality Evaluation of Engine after repairing	6	6	12
		53	118	171

	SUBJECT	Period allocated (hour)		G6-7: 2/2 Total
		Lecture	Practice	
9	Structure and Function of module on Chassis			
	9-1 Principle and general structure of Chassis	3		3
	9-2 Clutches, torque convertor	4	2	6
	9-3 Transmission	3	3	6
	9-4 Final drive and differential	3		3
	9-5 Brake system	3		3
	9-6 Steering system	3		3
	9-7 Undercarriage and tires	3		3
	9-8 Hydraulic system	15	6	21
10	Assembly and Disassembly of Chassis			
	10-1 Chassis and attachment		30	30
	10-2 Testing and evaluation for quality of components		18	18
11	Testing and Adjustment of Chassis			
	11-1 Testing and Adjustment of steering system		6	6
	11-2 Adjustment of clutch and transmission control lever		6	6
	11-3 Testing and adjustment of brake		3	3
	11-4 Testing and evaluation for quality of hydraulic system	6	9	15
	11-5 Testing of oil pump and hydraulic motor		6	6
	11-6 Testing of hydraulic cylinder		3	3
	11-7 Testing and adjustment of tracks		3	3
	11-8 Testing and adjustment of other components		3	3
12	Trouble Shooting of Chassis	3	9	12
13	Maintenance Standard of Chassis	4	2	6
14	Testing and Quality Evaluation of Chassis after repairing	6	9	15
		56	118	174
15	Mechatronics System			
	15-1 Knowledge of electricity	1		1
	15-2 Constitution element of MECHATRONICS	0.5		0.5
	15-3 Caution in using MECHATRONICS vehicle	0.5		0.5
	15-4 Machine control system diagram by hydraulics	3	1	4
	15-5 Electrical components	3	6	9
	15-6 Electrical circuit and equipment location	5	4	9
	15-7 Monitor	3		3
	15-8 Special function of monitor panel	1	2	3
	15-9 Control system by electricity and hydraulics	2	1	3
	15-10 Trouble shooting	3	12	15
	15-11 Testing and adjustment	2	4	6
		24	30	54
16	Machine Operation of Construction Machine	3	12	15
17	Examination (written and practice)	15	4	19
18	Closing Ceremony	8		8
		26	16	42
	Total	186	294	480
		(39%)	(61%)	(100%)
Remark:	8 hours x 5 days/week x 12 weeks = 480 hours			
	Learn 2 or 3 kinds of normal machines			
	Grader 6 to 7			
	Common (Practice 35%)	53	28	81
	Engine (Practice 69%)	53	118	171
	Chassis (Practice 68%)	56	118	174
	Mechatronics (Practice 56%)	24	30	54
	Total	186	294	480
		(39%)	(61%)	(100%)

13. 一般訓練参加者に対するアンケート結果

本評価調査期間中に、一般訓練参加者42名に対して質問票を配布し、一般訓練に対するコメントを抽出した。

EVALUATION QUESTIONNAIRE for the PARTICIPANTS of PRE-SERVICE TRAINING COURSES conducted by JICA-TTPS1 Project

#	Focus	Questions	Grades			
			Less than 30%	50%	70%	More than 90%
1	Usefulness (Practicality) of training program	1.1 Are you satisfied with the pre-service training courses at TTPS1?		3%	84%	13%
		1.2 Do you think that the skills/knowledge learned at the pre-service training course useful?	Not at all	Rarely	Sometimes	Quite Often
2	Training course instructor	2.1 Was the instructor knowledgeable about the subject?	Not at all	More or less	Some	Very much
		2.2 Did the instructor adequately answer any student questions?			41%	59%
		2.3 How do you grade the instructor?	Poor	Acceptable	Good	Very Good
3	Equipment, Machine you learned to operate at the training course	3.1 Do you think that the practice hour for equipment / machines at the course is sufficient enough for you to acquire the skills?	Too short	A little short	Fair	Sufficient
		3.2 Do you think that you can operate the machine by yourself?	Not at all	still need some help	Can do it by myself	Quite Good
		3.3 Please list up any equipment / machines you want to learn how to operate?	Excavator (42名のうちの52%が操縦方法を習得したいと希望した。), Bulldozer (38%), Wheel loader (30%), Crane (12%), Motor grader (10%), Roller (7%), Asphalt Finisher (7%)			
4	Operating Manual, Handouts	4.1 Was the operating manual of equipment/machine provided at the training useful?	Not at all	More or less	Some	Very much
		4.2 Were the handouts adequate and easy to read?	Not at all	More or less	Some	Very much
5	Class Environment	5.1 Were the classroom facilities adequate?	Not at all	More or less	Fair	Very much
6	Future	6.1 Do you want to introduce the course at TTPS1 to your colleagues / friends ?	Not at all	More or less	Fair	Very much
7	Overall course evaluation	7.1 How do you evaluate the pre-service training course as a whole compared with other courses you had participated before?	Poor	Acceptable	Good	Very Good
8	Suggestion on:	8.1 Please give any suggestions for further improvement of the course.				
	a. Course Program	- The curriculum is so helpful that we can widen knowledge. - The curriculum is good and it fits 18 months' time. - Need to arrange more machines for practice. - Need to instruct the operation of the machines and hydraulic system. - Students are crowded with a little for practice. - Teachers need to get stricter, check previous lecture more regularly and take care of his/her students. - The curriculum need to be longer and more practical/.				
	b. Instructor	- Teachers need to have more knowledge. - Teachers are enthusiastic and have good knowledge. - Teachers need to teach more practically. - Teachers need to manage the students better. - Teachers need to explain in more detail about components.				
	c. Others	- The curriculum is good and suitable. - The increase in practice time should be considered.				
9	Any comments	9.1 Please give any comments on the pre-service training course or on this questionnaire. - Doing the survey is good way to know the student's opinions. - The school's students are more skillful at operation than others. - Although the quality of previous C21 course was high. The increase of the number of students results lower in quality.				

14. 訓練結果の推移

TTPS1での研修結果の推移

一般訓練コース (Pre-Service Training)

コース名	計画数	入学者数の実績	資格取得実績	%	教員数	教員あたりの生徒数
No. 30 graduated in 2000						
Operator	500	478	469	98%	35	13.7
Mechanics		238	183	77%	35	6.8
Material Testing		42	42	100%	4	10.5
合計		758	694	92%	74	10.2
No. 31 graduated in 2001						
Operator	540	395	358	91%	37	10.7
Mechanics		374	315	84%	35	10.7
Material Testing		32	31	97%	4	8.0
合計		801	704	88%	76	10.5
No. 32 graduated in 2002						
Operator	700	479	409	85%	38	12.6
Mechanics		485	391	81%	34	14.3
Material Testing		43	37	86%	4	10.8
合計		1,007	837	83%	76	13.3
No. 33 enrolled in 2001, will graduate in 2003						
Operator	1,100	708	コース継続中	NA	38	18.6
Mechanics		425	コース継続中	NA	34	12.5
Material Testing		41	コース継続中	NA	4	10.3
合計		1,174	コース継続中	NA	76	15.4
No. 34 enrolled in 2002, will graduate in 2004						
Operator	1,200	1,442	コース継続中	NA	38	37.9
Mechanics		385	コース継続中	NA	34	11.3
Material Testing		78	コース継続中	NA	4	19.5
合計		1,905	コース継続中	NA	76	25.1

再訓練コース (Retraining Course)

コース名	計画	入学者数の実績	資格取得実績	%	教員数	教員あたりの生徒数
2001年						
Operator		60	60	100%	6	10.0
Mechanics		23	23	100%	11	2.1
合計		83	83	100%	17	4.9
2002年						
Operator		215	215	100%	6	35.8
Mechanics		52	52	100%	11	4.7
Material Testing		7	7	100%	3	2.3
合計		274	274	100%	20	13.7

出所：TTPS1からの提出資料

15. 教員の能力向上アンケート調査表

教員の能力向上 アンケート調査表 (自己採点 %)

各カウンターパートにより記入

名前：

グループ：

日付：

1 リトレーニングコースの訓練計画(カリキュラム・シラバス)立案

(1) 訓練計画の制作能力

- カリキュラム

100-90%	90-70%	70-50%	50-30%	30-0%

- シラバス

100-90%	90-70%	70-50%	50-30%	30-0%

(2) ユーザの新規要望や状況変化に対応出来る改訂能力

100-90%	90-70%	70-50%	50-30%	30-0%

2 教材の開発能力

(1) 既開発教材の理解力

100-90%	90-70%	70-50%	50-30%	30-0%

(2) 既開発教材の改訂・再編等の能力

100-90%	90-70%	70-50%	50-30%	30-0%

(3) 新規教材の開発能力

100-90%	90-70%	70-50%	50-30%	30-0%

(4) 建設機械のショップマニュアル・パーツブックの理解能力

100-90%	90-70%	70-50%	50-30%	30-0%

3 機材の機能・構造についての指導能力(各担当分野の既開発教材について)

(1) 建機の理論的指導能力(機能・構造)

100-90%	90-70%	70-50%	50-30%	30-0%

(2) 建機の毎日及び定期点検の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(3) 建機の試験と調整の指導能力(理論と実習)

100-90%	90-70%	70-50%	50-30%	30-0%

(4) 建機の分解と組立の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(5) 建機の故障診断の指導能力(故障発生時の対応)

100-90%	90-70%	70-50%	50-30%	30-0%

(6) 測定機器の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(7) 測定装置の指導能力（エンジンダイナモメータ、油圧ユニバーサルテスタ、スタータテスタ等）

100-90%	90-70%	70-50%	50-30%	30-0%

4 教育機器の使用及びプレゼンテーション実施能力

(1) パソコン（CD-ROM）

100-90%	90-70%	70-50%	50-30%	30-0%

(2) オーバーヘッド・プロジェクタ

100-90%	90-70%	70-50%	50-30%	30-0%

(3) ビデオデッキ

100-90%	90-70%	70-50%	50-30%	30-0%

(4) コンポーネント（建機の各装置）

100-90%	90-70%	70-50%	50-30%	30-0%

(5) カット・モデル

100-90%	90-70%	70-50%	50-30%	30-0%

5 メカトロ

(1) 理論の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(2) 実習の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(3) 試験と調整の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

(4) 故障診断の指導能力

100-90%	90-70%	70-50%	50-30%	30-0%

6 その他

(1) 英語の理解能力（読む能力）

100-90%	90-70%	70-50%	50-30%	30-0%

(2) 試験作成の能力

100-90%	90-70%	70-50%	50-30%	30-0%