

Annex-1 HRD for Manufacturing Industry

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## **Annex-1 HRD for Manufacturing Industry**

### **1 Framework of the Human Resource Development for Manufacturing Industry**

Manufacturing industry is one of the key issues of development policies of any country. Compared with other sectors, the importance of the manufacturing industry is interpreted by its impact to other sectors. The development of manufacturing industry is followed by other sectors by ripple effects. Human resource development or staff training is a common concern of the managers of SMEs. Various organizations, either of public or private, provide training programs to SMEs.

Regarding the ripple effect to other sectors, the supporting industry is worthy of special mention. The supporting industry is producing parts and components to the assemblers of motor vehicles, motorcycles, electric and electronics appliances, and general machineries. Most of the assemblers are players in the market under globalization. The situation of Indonesia is no exception. Almost all assemblers of final products of the relevant sectors are of foreign capital. Each of them is building his own supply-chain across the borders. In order to integrate into the supply-chain network as supporting industry, parts and components need to comply with the OEM standard. Uniform quality of the products is required regardless of the place where they are produced, that is, uniform level of technology for both production and management is requisite to supporting industry of any country as far as the target quality is of OEM standard.

Table 1 and 2 are the list of standard curriculums of the human resource development as industrial education for the manufacturing industry of management and production technologies. These tables are intended to serve as a reference for the formulation of the master plan of the Study.

Management technology is divided into “Basic”, “General” and “Business Tactics”. Production control technology is divided into “Basic” and “Applied”. Curriculums which have real relevance for the needs of the production sites are listed. Some of the modern management theories taken up in the universities or MBA courses are also included in the list of “Business Tactics”.

Table 1 for management technology was prepared referring to expertise of the Study Team experts who has experiences of more than 25 years as SME management consultant in Japan

and ASEAN region. Also they have long worked as instructors as well as planners of human resource development programs.

References for the curriculums of production technology of Table 2 are:

- (1) Curriculum of HRD programs by the Japanese ministries
- (2) Curriculum of HRD programs by the Japanese industrial associations
- (3) Handbook of Engineering Societies of Japan
- (4) JICA-UNICO Reports

The principal market of other manufacturing industries than the supporting industry, such as food, textile, furniture, is the local market. Curriculum of the human resource development for them needs to reflect the local conditions as to raw materials available, process, regulations, and actual market. Curriculum of production technology for local industries will be completed at a later stage of the Study.

Production technologies for supporting industry are divided into metal, plastic, rubber, IT, and assembly. Metal-related technology is subdivided into eight (8), namely, material, casting, forging, welding, press and die, machining, measurement and final treatment. Curriculums for each are grouped as curriculums for basic course, middle course and advanced course. Basic skills are not included in the Table but the items of basic course correspond partly with the curriculums of the vocational schools.

**Table 1 Standard Curriculums of Management Technology for Manufacturing Industry**

Curriculum of Soft Technology for Manufacturing Industry						
	Management Technology				Production Control	
	Administration	Market/Sales	Human Resource Development	Finance		
Basics	Entrepreneurship Company management Sector information Promotion policy information	Market information	OJT Working condition Security	Book-keeping	Basic production control	5S Material handling Measures against Muda, Muri, Mura ABC analysis Preventive maintenance KAIZEN ISO 9000 series Quality control and QC tools Production planning Inventory management
General management skills	Bench marking Strategy planning Organization Customer Satisfaction Management (CSM)	Sales policy Sales planning Marketing management Business contract Customer information	Business regulations Pay structure Recruitment Leadership/Motivation Morale survey Human resource management	Cash-flow management Balance sheet Profit and loss statement		
Business tactics development	Business planning Procurement management Procurement contract Compliance management Environmental Management System (EMS) Information system Project management Total Quality Management (TQM) Balance score management	Pricing Marketing strategy Marketing research International trade Logistics management Customer relationship management	Competency management Quality Control Circle (QCC) Management by objectives Empowerment	Break-even-point analysis Working capital planning Investment plan Fund raising	Applied production management	Industrial engineering Quality assurance Plant layout Total Preventive Maintenance (TPM) Material Requirement Planning (MRP) Value Analysis/Engineering (VA/VE) Flexible Automation (FA) Application of IT Environment Cost management

Source: JICA Study Team

**Table 2 Standard Curriculums of Production Technology for Supporting Industry (1/6)**

**1. Metal**

**1.1 Material**

Mechanical characteristic of metal	B_C
Metal testing	B_C
Carbon steel	B_C
Lower alloy steel	B_C
Cast iron	B_C
Cast steel	B_C
Nodular graphite cast iron	M_C
Stainless steel	M_C
Heat resisting steel	M_C
Bearing steel	M_C
Tool steel	M_C
Spring steel	M_C
Stellite	M_C
Drawing copper and copper alloyed cast	M_C
Aluminum alloy drawing and aluminum cast	M_C
Cemented carbide alloy	M_C
Nonferrous metal with Mg, Ti, Zn	M_C
Sintering metal	M_C
Metal alloy	M_C
Fusibility alloy	M_C
Transformation of metal	M_C
Constitutional diagram of metal	M_C
Structure of ferrous and steel	M_C
Heat treatment of steel	M_C
Hand facing of steel	M_C
New trend of hand facing	A_C
Coating technology	A_C
Fatigue destruction away of looking at surface	A_C
Magnesium materials	A_C
Improvement of casting defect in die casting	A_C

**1.2 Casting**

Characteristic of casting	B_C
Kind of casting	B_C
Design of casting goods	B_C
Casting plan	B_C
Selection of casting materials	B_C
Accuracy of castings	B_C
Equipment for casting	B_C
Mixing materials	B_C
Outline of mold making	B_C
Pattern making	B_C
How to make green sand mold	B_C
Pouring	B_C
Castings handling	B_C
Treatment of castings	B_C
Molding sand testing method	B_C
Centrifugal casting	M_C
Die cast	M_C
Investment casting	M_C
Shell mold casting	M_C
Self-hardened mold	M_C
Working environment	M_C
Waste treatment	M_C
Analysis of solidification and flow-analysis of molten metal	A_C
Model manufacture by CAD method	A_C
New technology of hard testing on metal	A_C
Heat treatment of newly raw materials	A_C
Cause and countermeasure of metal defect	A_C
Manufacturing technology of Al	A_C
Manufacturing technology of stainless steel	A_C
Manufacturing technology of Ti	A_C
Manufacturing technology of Mg	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course

**Table 2 Standard Curriculums of Production Technology for Supporting Industry (2/6)**

**1. Metal**

**1.3 Forging**

Characteristic of forging	B_C
Purpose of forging	B_C
Fundamental item of forging	B_C
Kind of forging works	B_C
Design of forgings	M_C
Hot forging	
Free forging	M_C
Die forging	M_C
Control of forging	M_C
Forging machine and equipment	M_C
Key point for forging works	M_C
Forging materials	M_C
Defect of forging	M_C
Cold forging technology	A_C
Metal flow analysis on the forging process	A_C
Forging simulation by computer	A_C
Theory and practice of forging die technology	A_C
CAE technology in forging process design	A_C
Cold forging technology on the plate forming	A_C

**1.4 Welding**

Welding phenomenon	B_C
Welding instrument	B_C
Heat transfer on the welding	B_C
Welding deformation and residual stress	B_C
Welding joint	B_C
Welding design	B_C
Extend elevation of plate	B_C
Fusion welding	
Welding by coated electrode	M_C
Welding by sub merged arc	M_C

Welding by gas sealed arc	M_C
Welding by plasma arc	M_C
Welding by self sealed arc	M_C
Welding by electro slug	M_C
Welding by electro beam	M_C
Gas welding	M_C
Thermit welding	M_C
Resistance welding	
Resistance welding	M_C
Lap welding	M_C
Buff welding	M_C
Brazing	M_C
Soldering	M_C
Heat cutting	M_C
Weld execution management	M_C
Environmental safety and hygiene	M_C
Welding test and inspection	M_C
Weldingness test	M_C
Non-destructive inspection	M_C
Defect and counter-measure by weld	M_C
Solid welding	
Cold weld	A_C
Diffusion weld	A_C
Explosion weld	A_C
Friction resistance weld	A_C
Hot resistance weld	A_C
Laser weld technology	A_C
3D processing by laser	A_C
Laser cutting	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course

**Table 2 Standard Curriculums of Production Technology for Supporting Industry (3/6)**

**1. Metal**

**1.5 Press and Die**

Specification of press machine	B_C
Shearing and punching	B_C
V bending and U bending	B_C
Cylindrical drawing	B_C
Square drawing	B_C
Forming	B_C
Press plant layout	B_C
Eccentric force of press machine	B_C
Die design	B_C
Material yield	B_C
Automation of press works	M_C
Design of transfer press die	M_C
Components of transfer die	M_C
Tandem die	M_C
Restriction for strip-layout	M_C
Mechanical test of material	M_C
Transfer die for bending	M_C
Transfer die for drawing	M_C
Press machine and product quality	M_C
Latest plasticity material working technology	A_C
Theory and practice of press working	A_C
Press working troubleshooting I (stamping/dies)	A_C
Press working troubleshooting II (production line)	A_C
Press working troubleshooting III (tribology)	A_C
Press dies design technology	A_C
Design of press parts (product design considering plastic working)	A_C
Designing and fabricating of dies by progressive dies CAD/CAM system	A_C
Promotion of standardization of press dies and parts utilizing technology	A_C
Future press production technology and dies designing/fabricating technology	A_C
CNC servo press working	A_C
Press working solutions (thought and practice of problem solutions)	A_C
Press forming simulation technology	A_C
Press forming simulation experiment and demonstration	A_C

**1.6 Machining**

Machining theory	B_C
Machinability	B_C
Roughness of surface and it's characteristic	B_C
Cutting condition	B_C
Grinding condition	B_C
Cutting fluid	B_C
Cutting	
Turning	M_C
Drilling, Reaming	M_C
Threading	M_C
Boring	M_C
Shaping, slotting, planing	M_C
Milling	M_C
Broaching	M_C
Gear, cutting shaving	M_C

Grinding	
Cylindrical grinding	M_C
Surface grinding	M_C
Profile grinding	M_C
Centerless grinding	M_C
Tool grinding	M_C
Machine tools	
Lathe	M_C
Drilling machine	M_C
Boring machine	M_C
Planer	M_C
Shaper, slotter	M_C
Milling machine	M_C
Grinding machine	M_C
Broach machine	M_C
Gear cutting machine	M_C
Electro discharge machine	M_C
Wire cut electro discharge machine	M_C
NC machine, general	M_C
NC machine, soft ware	M_C
NC machine, equipment	M_C
Assessment of machine tools	M_C
Cutting work problem solution	A_C
Theory and practice of cutting work	A_C
Practice of cost reduction in cutting work (tool technology and re-grinding)	A_C
Cutting technology of next generation	A_C
Latest cutting technology of hard-to-cutting material/new material	A_C
Efficient/accurate drilling technology	A_C
Selection and using method of cutting tools for dies	A_C
High-speed machining of dies and CAM technology (Power Mill)	A_C
Latest technology of high-speed machining by machining center	A_C
High-speed three-dimensional machining from product data (TOOLS)	A_C
high-value-added machining technology by means of small-diameter tools	A_C
Design/manufacturing technology I by means of integral CAD/CAM (solid modeling and two-dimensional CAM)	A_C
Design/manufacturing technology II by means of integral CAD/CAM (surface molding three-dimensional CAM)	A_C
Method of utilizing composite machining equipment (5-axis turning center)	A_C
Method of utilizing multi-spindle machining equipment (5-axis machining center)	A_C
General machining technology (practice of product-making)	A_C
Present situation of ultra-precision machining	A_C
Ultra-precision machining technology (aspherical lens machining technology)	A_C
Micro-machining (micro-machining technology)	A_C
Machining know-how data base technology	A_C
IT of process/jig design utilizing product 3D data (digitalization of cutting process setting)	A_C
Points of voluntary maintenance for NC machine tool operator	A_C
Practice; lubricating technology	A_C
Noise countermeasure parts utilizing technology	A_C
How to proceed with predictive maintenance (CBM)	A_C
Equipment diagnosis technology (practice of equipment diagnosis by vibration method)	A_C
MP (maintenance prevention) design introduction/examination technology (realization of life-cycle cost minimum (LCC))	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course

**Table 2 Standard Curriculums of Production Technology for Supporting Industry (4/6)**

**1. Metal**

**1.7 Measurement**

Fundamental measurement	B_C
Kind of units and standard	B_C
Cause of measurement error	B_C
Sensitivity and accuracy	B_C
General key point on the measurement	B_C
Abbe principle	B_C
Influence by thermal expansion	B_C
Deformation by force	B_C
Classification	M_C
Absolute measurement	
Scale	M_C
Vernier caliper	M_C
Height gauge	M_C
Depth gauge	M_C
Micrometer	M_C
Block gauge	M_C
Comparative measurement	
Pass	M_C
Dial gauge	M_C
Angle	
Angle gauge	M_C
Sine bar	M_C
Bevel square	M_C
Level	M_C
Gauge	
Limit gauge	M_C
Fixed dimensional gauge	M_C
Others	
Optical flat	M_C
Toolmaker's microscope	M_C
Projector	M_C
Method of measurements	
Flatness	M_C
Straightness	M_C
Quadrature accuracy	M_C
Parallelness	M_C
Cylindrical accuracy	M_C
Eccentricity	M_C
Surface roughness	M_C

High-precision shape measuring technology	A_C
Ultra-precision measuring technology	A_C
Accuracy control of precision measuring instruments	A_C
3D measuring instrument utilization technology	A_C
Non-contact measuring technology	A_C
Measured data utilization technology	A_C
<b>1.8 Final Treatment</b>	
General surface treatment	B_C
Chemical of aqueous solution	B_C
Basic electro chemical subject for plating	B_C
Corrosion and it's protect of metal	B_C
Observation of metal surface	B_C
Pretreatment technology for plating	B_C
Plating plant	B_C
Newly corrosion protect technology	M_C
Basic and applied technology of electronic plating	M_C
Basic and applied technology of non electrolysis Ni plating	M_C
Characteristic of chromium plating and it's application	M_C
Hunger jig for plating	M_C
Kinds of automatic plating plant and it's use	M_C
Quality test for plating	M_C
Washing and eliminate burr by barreling	M_C
Plant repairing and preventive control	M_C
Principle of instrument analysis	M_C
Chemical substance and environmental management	M_C
Waste water treatment of plating	M_C
Non electrolysis plating	M_C
Cu, Sn, Solder plating for electric industry	M_C
Nobel metal plating for electric instrument	M_C
Sulfuric acid copper plating for electronics	M_C
Vacuum deposition	M_C
Plasma	M_C
Electro-coating	M_C
Powder-coating	M_C
Electrostatic coating	M_C
Ion-plating	M_C
Sputtering	M_C
Surface treatment technology for electronics	A_C
Plating technology on the circuit assemblage	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course



**Table 2 Standard Curriculum of Production Technology for Supporting Industry (5/6)**

<b>2. Plastic Molding and Mold</b>			Utilization of resin fluidity for injection molding (CAE)	A_C
Plastic material	B_C		Utilization of resin heat and PVT characteristics for injection molding (CAE)	A_C
Material handling	B_C		Mold temperature control and cooling circuit design	A_C
Classification of moldings	B_C		Deciphering and utilization method of resin pressure profile	A_C
Injection molding	B_C		Flow analysis technology for mold design	A_C
Blow molding	B_C		Flow analysis utilization technology in injection molding	A_C
Extrusion molding	B_C		Clarification of injection molding phenomena by visualizing	A_C
Foam molding	B_C		Magnesium alloy melting/molding technology (thixotropic mold method)	A_C
Specification and measurement	B_C		<b>3. Rubber</b>	
Defects (silver streaks, flow mark)	M_C		Fundamental macromolecule chemical	B_C
Defects (sink mark, bending)	M_C		Natural rubber	B_C
Defects (blank point, burr)	M_C		Synthetic rubber	B_C
Defects (short shot, burr, etc.)	M_C		Rubber compound	B_C
Injection machine	M_C		Laboratorium test	B_C
Machine maintenance	M_C		<hr/>	
Design of molds	M_C		Processing	
Construction and accessories of molds	M_C		Mixing	M_C
Defects of molds	M_C		Calendaring	M_C
Maintenance of molds	M_C		Frictioning	M_C
<hr/>			Soaking	M_C
Construction of hot runner	A_C		Spreading	M_C
Mold making by laminate forming	A_C		Curing	M_C
Theory and practice of injection mold	A_C		Extrusion process	M_C
Theory and practice of die cast mold technology	A_C		Molding process	M_C
Design of plastic parts (design of injection molded parts)	A_C		Continuous extrusion vulcanizing	M_C
Plastic material utilization technology	A_C		Characteristic and test method of rubber	M_C
Injection molding technology	A_C		Manufacturing use (tyre, hose, belt, pacing, gasket, sponge rubber, roller, marine, sports)	M_C
Hot runner utilization technology in injection molding	A_C		Civil engineering and construction	M_C
Injection molding mold design/fabricating technology utilizing CAD/CAM	A_C		<hr/>	
Plastic mold design technology	A_C		Next generation prospect of elastomer	A_C
Hot runner mold design technology	A_C		Rubber industries and globe environment	A_C
			Rubber industries and judicial regulation	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course

**Table 2 Standard Curriculums of Production Technology for Supporting Industry (6/6)**

<b>4. IT Technology</b>		Shaft and coupling	B_C
PC arrangement	B_C	Bearing	B_C
How to operate PC	B_C	Journal of metal	B_C
Word technique	B_C	Driver instrument by pulley and belt	B_C
Excel technique	B_C	Spring	B_C
Draw-up and practical use of power point	B_C	Brake	B_C
Visual basic language	M_C	Pipe coupling	B_C
C language	M_C	Value and cock	B_C
Practical use of Internet and E-mail	M_C	Sealing instrument	B_C
Fundamental and it's application of JAVA programming	M_C	All kinds of taper	B_C
IT method of production site	A_C	Marking-off works	B_C
Information sharing technology utilizing display at production site	A_C	Hand finishing	B_C
Communication program I (serial port, TCP/IP communications) in measuring/controlling	A_C	Electronic manufacturing	M_C
Communication program II (socket interface) in measuring/controlling	A_C	Electronic measurement	M_C
Measuring/controlling through Windows real-time extension	A_C	Assembly of electronic circuit	M_C
Theory and application of image processing algorism	A_C	Winding and insulating works	M_C
Image analysis technology for measuring	A_C	Handling with arrangement equipment	M_C
Practical image processing method for machine vision system development	A_C	Internal-combustion engine overhaul	M_C
Moving image processing development method and practice of incorporated system construction	A_C	Tool for assembly works	M_C
Image processing system development technology	A_C	Adjustment of assembly works	M_C
Industrial application image processing technology	A_C	Key point of assembling	M_C
Image processing application technology learned through examples	A_C	Jig and fixture	M_C
Interface development technology for image processing	A_C	Automation system element selection technology	A_C
<b>5. Assembly</b>		Automation system construction for parts supply work	A_C
Element of assembly		Positioning charging technology in automatic assembling	A_C
Thread	B_C	Process dividing method and mechanism	A_C
Bolt and nut	B_C	Troubleshooting in automatic assembling	A_C
Locking of thread parts	B_C	Sensor application and measuring technology	A_C
Key	B_C	Line construction technology (assembling automation/mechanism)	A_C
Cotter	B_C	Line construction technology (assembling automation/control)	A_C
Pin	B_C	Line construction technology (assembling automation/higher speed)	A_C
Rivet	B_C	Automatic assembling machine fabrication I for line design and plan personnel (preparation and flow in machine fabrication in line)	A_C
Rivet joint	B_C	Automatic assembling machine fabrication II for line design and plan personnel (machine design plan in line)	A_C
Gear and it's use	B_C	Automatic assembling machine fabrication III for line design and plan personnel (process improvement referring to line evaluation and QC method)	A_C

Note: B\_C: Basic Course M\_C: Middle Course A\_C: Advanced Course

## **4.2 Syllabus for Management and Production Control Technologies**

Standard syllabus for each of standard curriculums of management and production control technologies which is listed on the Table 2 is presented in Table 3 with the target personnel of the SMEs. For preparation of syllabus for actual programs adjustment need to be made to suit the program to the particular needs of the trainees.

**Table 3 Syllabus of Curriculums of Management Technology (1/16)**

Administration

No.	Item	Target	Aim	Key Points	Remarks
A-1	Entrepreneurship	<ul style="list-style-type: none"> <li>· Would-be entrepreneurs</li> <li>· Planners</li> </ul>	To have people who are interested in starting, or who are planning to start, their own businesses understand the business environment and basic knowledge concerning starting a company.	<ul style="list-style-type: none"> <li>· Points for successfully starting a business</li> <li>· Drafting plans for starting a business</li> <li>· Presenting business establishment planning</li> <li>· Procedures for establishing a corporation, and preparation for starting a company</li> </ul>	
A-2	Company Management	<ul style="list-style-type: none"> <li>· Manager</li> </ul>	To have trainees from developing small and medium-sized enterprises understand the basic doctrine of management activities.	<p>Analyze and consider management functions in terms of the following 3 points.</p> <ol style="list-style-type: none"> <li>1. Essential elements</li> <li>2. Processes</li> <li>3. Functions</li> </ol>	
A-3	Sector Information	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees acquire a broad understanding of business, including circumstances of the industry in which the company is involved.	<ul style="list-style-type: none"> <li>· The methods by which information is compiled</li> <li>· Analysis and synthesis of information</li> <li>· Feedback to management, etc.</li> </ul>	
A-4	Promotion Policy Information	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Trainees will gain an understanding of policies for small- and medium-sized enterprises, such as support systems for such enterprises, and through that understanding will learn methods for utilizing those policies to further their own development and growth.	<ul style="list-style-type: none"> <li>· Basic doctrine and goals of policies for small- and medium-sized enterprises</li> <li>· Systems for policies for small- and medium-sized enterprises, and their contents</li> <li>· Dealing with and utilizing policies for small- and medium-sized enterprises</li> </ul>	
A-5	Bench Marking	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees learn bench marking methods for improvement, by surveying and analyzing the best work practices used by companies both inside and outside of the industry, and incorporating them into their own current work processes.	<ul style="list-style-type: none"> <li>· What is bench marking?</li> <li>· Bench marking procedures</li> </ul> <ol style="list-style-type: none"> <li>1. Deciding areas in which bench marking will be carried out</li> <li>2. Selecting companies to be compared</li> <li>3. Comparison research in order to achieve improvement</li> <li>4. Formulation and execution of improvement planning</li> </ol>	This is a systematic management technique aimed at achieving a sharp improvement in the work processes of one's own company, by comparing the best practices of companies both inside and outside of the industry with the company's own methods, and analyzing the gaps between them.

**Table 3 Syllabus of Curriculums of Management Technology (2/16)**

Administration

No.	Item	Target	Aim	Key Points	Remarks
A-6	Strategy Planning	· Manager	To have trainees learn what kinds of strategies to formulate and put into practice, in order to achieve the vision towards which the company is striving.	<ul style="list-style-type: none"> <li>· What is a business strategy?</li> <li>· Procedures for formulating a business strategy</li> <li>Setting values and missions, clarifying business domain, analyzing the current situation of the business environment and predicting changes, conducting SWOT analysis, formulating strategic concepts, setting strategy issues, etc.</li> <li>· Drafting medium- and long-term, and short-term business planning</li> </ul>	
A-7	Organization	· Manager · Staff	With respect to business management, it is important to approach the organization to be managed from two directions, the work and the individual. To have trainees consider the optimum organization in which these are compatible.	<ul style="list-style-type: none"> <li>· Clarification of jobs</li> <li>· Organization and regulations</li> <li>· The significance of authority and power</li> <li>· Qualifications system</li> </ul>	
A-8	Customer Satisfaction Management (CSM)	· Manager	To have trainees learn about a new concept of customer satisfaction, which calls for strategic and systematic involvement of the company as a whole in tackling CS.	<ul style="list-style-type: none"> <li>· The essential elements of customer satisfaction</li> <li>· Maintaining a grasp of customer needs</li> <li>· Grasping the degree of customer satisfaction and putting it into practical application</li> <li>· A mature model of the degree of customer satisfaction</li> <li>· Categories of information pertaining to the degree of customer satisfaction</li> <li>· Building a system for handling complaints and a system for controlling the degree of customer satisfaction</li> </ul>	
A-9	Business Planning	· Manager · Staff	Trainees will learn about business planning that specifies the direction to be taken in order to assure the continued existence and growth of the company as the environment changes, and how planning is formulated to realize that direction.	<ul style="list-style-type: none"> <li>· The role of business planning</li> <li>· Types of business planning</li> <li>· Contents of business planning</li> <li>· Ways of formulating business planning</li> </ul>	

**Table 3 Syllabus of Curriculums of Management Technology (3/16)**

Administration

No.	Item	Target	Aim	Key Points	Remarks
A-10	Procurement Management	· Manager · Staff	Of the three production elements (labor strength, capital equipment, and materials) that comprise the principal input to production systems, trainees will learn about one of them, materials, and will learn about procurement management for procuring materials and parts from external sources.	<ul style="list-style-type: none"> <li>· Compositional elements of procurement management</li> <li>· Categories of materials</li> <li>· Purchasing cycles and management of those cycles</li> <li>· Selecting raw materials and parts makers</li> <li>· Standards for deciding to where orders will be placed</li> <li>· VA and VE</li> <li>· Management of costs, deadlines, quantities and quality with respect to purchasing</li> </ul>	Procurement management refers to the management of materials and services procured from external sources. Under the strict definition, this can be divided into "purchasing", which consists of buying commercially available products, and "ordering", which means having them custom-made by subcontractor plants, but here both are referred to as "purchasing".
A-11	Procurement Contract	· Manager · Staff	When various procedures based on purchasing policies have been completed and a supplier has been selected, a purchasing contract is signed. Trainees will learn basic knowledge concerning that process.	<ul style="list-style-type: none"> <li>· Key points involved in procurement contracts</li> <li>· "Basic contracts" and "Individual contracts" with respect to purchasing contracts</li> <li>· Methods for drafting basic business contracts</li> </ul>	
A-12	Compliance Management	· Manager · Staff	Trainees will learn to recognize the importance of compliance management in maintaining confidence and trust in the company and assuring the continuing existence of the company, and will obtain knowledge in actively engaging in compliance management.	<ul style="list-style-type: none"> <li>· What compliance management strives for</li> <li>· The effects of compliance management</li> <li>· Related laws and regulations, and anticipated risks</li> </ul>	Compliance management refers to management in which the company observes laws and social theories and models in its activities and behavior.
A-13	Environment Management System (EMS)	· Manager · Supervisor	To have trainees understand the essential elements of the environmental ISO14001 series (environmental management system, or EMS).	<ul style="list-style-type: none"> <li>· What is the ISO14001 series?</li> <li>· Environmental management systems called for by ISO14001</li> <li>· The advantages of introducing ISO14001</li> <li>· Ways of building an environmental management system</li> <li>· Preparation for acquiring ISO14001 certification</li> <li>· The audits processes of certifying organizations</li> <li>· Acquiring a grasp of side aspects of the environment and evaluating environmental influences</li> </ul>	

**Table 3 Syllabus of Curriculums of Management Technology (4/16)**

Administration

No.	Item	Target	Aim	Key Points	Remarks
A-14	Information System	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn about information and information systems, which are increasingly important in production activities where the business environment changes abruptly and is becoming more and more complex.	<ul style="list-style-type: none"> <li>· The involvement between production activities and information / information systems</li> <li>· The role of information and information systems</li> <li>· An overview of production information systems</li> <li>· Individual information systems in the manufacturing industry</li> <li>· Integrated production information systems</li> </ul>	
A-15	Project Management (PM)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	In order to promote corporate restructuring, project-type activities have been surging. To have trainees learn about project management, which guides the company to success.	<ul style="list-style-type: none"> <li>· What is a "project"?</li> <li>· International standards ISO10006 for PM</li> <li>· Introduction of PM methods, PMBOK and EVMS</li> <li>· PM processes</li> <li>· The fundamental organization of projects</li> </ul>	Project Management refers to integrated control and accomplishment in order to implement projects smoothly and reach goals.
A-16	Total Quality Management (TQM)	Manager	To have trainees learn about TQM, the goal of which is to boost the quality of all of the products, services, and management in order to heighten values that will satisfy all stakeholders, including customers.	<ul style="list-style-type: none"> <li>· TQM concepts: the flow from QC and TQC to TQM</li> <li>· The three main pillars in promoting work in terms of TQM</li> </ul> <ol style="list-style-type: none"> <li>1. Policy control and policy development</li> <li>2. Process management</li> <li>3. Continuous improvement</li> </ol>	
A-17	Balance Score Management	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn how to put their vision and business strategies into practice, and to master balance score management, which is a management system that guides the company to success.	<ul style="list-style-type: none"> <li>· What is balance score management?</li> <li>· The four focal points of balance score management</li> <li>· The flow of balance score cards</li> </ul> <ol style="list-style-type: none"> <li>1. Setting strategy topics</li> <li>2. Setting the goals to be reached</li> <li>3. The configuration of balance score cards</li> </ol>	Balance score management is a technique in which multiple evaluation indices that are in balance with each other are used to evaluate business figures.

**Table 3 Syllabus of Curriculums of Management Technology (5/16)**

Market/Sales

No.	Item	Target	Aim	Key Points	Remarks
M-1	Market Information	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Trainees will learn about the market information necessary in order to develop and expand markets with which business has to be carried out and products that have to be provided, and, in some cases, necessary in order to withdraw from the above.	<ul style="list-style-type: none"> <li>· Contents of market information</li> <li>· Categories and characteristics of target markets</li> <li>· Methods for compiling and analyzing market information</li> <li>· Utilizing market information</li> </ul>	
M-2	Sales Policy	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	These can be generally classified into categories such as product strategies, sales channels, and sales promotion. To have trainees understand these from the macro field of view.	<ul style="list-style-type: none"> <li>· Product strategies</li> <li>· Sales channels</li> <li>· Sales promotion</li> <li>· Characteristics of products for the people and for industrial use</li> </ul>	
M-3	Sales Planning	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Considering ways of getting products and services to the market ahead of other companies, and techniques for making them successful.	<ul style="list-style-type: none"> <li>· From research to development</li> <li>· Development procedures</li> <li>· Supplying products to the market</li> <li>· Allocating responsibilities within the company</li> </ul>	
M-4	Marketing Management	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn marketing management skills that will allow them to identify what customers want and how to provide it, and then to create a means for selling and implement it.	<ul style="list-style-type: none"> <li>· The role of marketing</li> <li>· Analysis of market opportunities</li> <li>· Selection of target markets</li> <li>· Market segmentation</li> <li>· Marketing mixes</li> <li>· Positioning</li> </ul>	Marketing management is a system of management by which marketing planning, organization, and activity policies are determined and put into play so that marketing activities can be carried out in a rational, efficient manner.
M-5	Business Contract	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Trainees will learn fundamental knowledge relating to practical procedures such as business laws and contracts between companies.	<ul style="list-style-type: none"> <li>· Fundamental knowledge about contracts</li> <li>· Types and contents of contracts</li> <li>· Business account settlements</li> <li>· Debt management and recovery</li> <li>· Knowledge of laws pertaining to business with foreign countries</li> </ul>	



**Table 3 Syllabus of Curriculums of Management Technology (6/16)**

Market/Sales

No.	Item	Target	Aim	Key Points	Remarks
M-6	Customer Information	· Manager · Staff	It is no exaggeration to say that complaints provide the incentive for a company to grow. To have trainees think of dealing with customers based on this as a central tenet.	<ul style="list-style-type: none"> <li>· Information based on complaints</li> <li>· Processing procedures</li> <li>· Links with sales activities</li> <li>· Customer management</li> </ul>	
M-7	Pricing	· Manager · Staff	The pricing strategy is an important key to the management results of the company. Trainee learning should center on pricing planning.	<ul style="list-style-type: none"> <li>· Agenda and factors to be studied</li> <li>· Ways of deciding prices</li> <li>· Pricing strategies</li> </ul>	
M-8	Marketing Strategies	· Manager · Staff	To have trainees learn about methods for formulating strategies for carrying out marketing on a planned basis, in order to deal with environmental changes and win over harsh competition.	<ul style="list-style-type: none"> <li>· The purpose and an overview of marketing strategies</li> <li>· Marketing segmentation</li> <li>· Marketing mixes</li> <li>· Target marketing</li> <li>· Product distinction</li> <li>· Positioning</li> <li>· Area marketing</li> </ul>	A marketing strategy is a comprehensive and long-term marketing policy aimed at expanding the company's own market and achieving corporate growth amidst constantly changing environmental conditions and harsh competition.
M-9	Marketing Research	· Manager · Staff	To have trainees learn about marketing research, in which data is compiled and analyzed concerning the various problems relating to the marketing of products and services, and is then provided in order to make management decisions.	<ul style="list-style-type: none"> <li>· The differences between marketing research and market research</li> <li>· The categories of marketing research</li> <li>· Contents of marketing research</li> <li>· Types of questioning methods for data compilation</li> <li>· Marketing research procedures</li> </ul> <ol style="list-style-type: none"> <li>1. Clarification of problems, and goals</li> <li>2. Survey planning design</li> <li>3. Preliminary surveys and main surveys</li> <li>4. Analyzing data and drafting information reports</li> </ol>	Marketing research refers to the process of designing systematic surveys to address specific situations faced by the company, compile and analyze data, and report on the results.  —Philippe Cotler

**Table 3 Syllabus of Curriculums of Management Technology (7/16)**

Market/Sales

No.	Item	Target	Aim	Key Points	Remarks
M-10	International Trade	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Trainees will learn practical knowledge necessary in order to order parts manufactured by overseas companies, and to procure raw materials from overseas, also in order to sell products to overseas.	<ul style="list-style-type: none"> <li>· Surveys of and methods for selecting overseas markets and commodities</li> <li>· Methods for establishing solid, secure contracts</li> <li>· Methods for conducting credit checks and for collecting payments</li> </ul>	
M-11	Logistics Management	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Trainees will learn about logistics management, which is becoming increasingly important as customer deadlines become shorter and deliveries comprise smaller financial sums and are sent with increasing frequency.	<ul style="list-style-type: none"> <li>· What is logistics management?</li> <li>· The importance of logistics management, and key control points</li> <li>· Internal logistics and external logistics</li> <li>· Management of logistics costs</li> </ul>	Logistics management refers to integrated management of the overall flow of items such as semi-finished products and final products, starting from the parts and materials.
M-12	Customer Relation Management (CRM)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn about CRM, which creates good relationships with customers by having them use the supplied products and services and being sufficiently satisfied with them.	<ul style="list-style-type: none"> <li>· What is "Customer Creation", the CRM objective?</li> <li>· Frameworks for customer strategies and actualizing those strategies</li> <li>· Coordination of customer information</li> <li>1. Understanding customers</li> <li>2. Providing value</li> <li>3. Pursuing efficiency</li> </ul>	CRM aims at maintaining and improving long-term relationships with customers, by using sales personnel, call centers, the Internet and other means to compile and control customer information.

**Table 3 Syllabus of Curriculums of Management Technology (8/16)**

Human Resource Development

No.	Item	Target	Aim	Key Points	Remarks
H-1	OJT	<ul style="list-style-type: none"> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	To have trainees learn specific approaches and methods to on-the-job training (OJT), which is a core technique in cultivating subordinates, through actual experience.	<ul style="list-style-type: none"> <li>· Objectives of and approaches to subordinate cultivation</li> <li>· Three skills used in OJT</li> <li>· Ways of promoting OJT effectively</li> <li>· Drafting subordinate cultivation plans</li> <li>· Work (work process) analysis</li> <li>· Four stages of teaching methods</li> </ul>	
H-2	Working Conditions	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	The workplace conditions govern the enthusiasm of the workers with regard to their work, and contribute to the establishment of that enthusiasm. Trainees will look back over related conditions.	<ul style="list-style-type: none"> <li>· Knowledge and understanding of the work</li> <li>· Protective equipment</li> <li>· Training in recognizing hazards(KYT)</li> <li>· Building good health, etc.</li> </ul>	
H-3	Security	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees figure out how to handle emergency situations that hit the company suddenly, by analyzing case studies.	<ul style="list-style-type: none"> <li>· Case study analysis</li> <li>· Specific methods of application</li> <li>· Corporate crisis management, etc.</li> </ul>	
H-4	Business Regulations	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn what regulations should ideally be like in terms of work management, and how to make use of them.	<ul style="list-style-type: none"> <li>· Work regulations and the responsibility for them</li> <li>· Execution of the work</li> <li>· Items relating to duty, authority and power, and responsibility</li> </ul>	
H-5	Pay Structure	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	Wage payment and treatment are important conditions in sustaining the enthusiasm of the workers. Having trainees understand the configuration of these elements.	<ul style="list-style-type: none"> <li>· Modernization of the wage payment system</li> <li>· Wage payment system</li> <li>· Welfare facilities</li> <li>· Labor inspections</li> </ul>	
H-6	Recruitment	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	It is no exaggeration to say that the fate of the company depends on people. To have trainees understand recruitment as a part of human resources management.	<ul style="list-style-type: none"> <li>· Labor standards laws</li> <li>· Social insurance and labor insurance</li> <li>· Laws governing the dispatch of employees, etc.</li> </ul>	

**Table 3 Syllabus of Curriculums of Management Technology (9/16)**

Human Resource Development

No.	Item	Target	Aim	Key Points	Remarks
H-7	Leadership and Motivation	<ul style="list-style-type: none"> <li>· Engineer/Supervisor</li> <li>· Foreman</li> </ul>	Planning to boost leadership in order to heighten production efficiency and quality, and to realize a workplace full of energy and vitality	<ul style="list-style-type: none"> <li>· The role of the leader in the workplace</li> <li>· Methods for demonstrating leadership</li> <li>· Leadership self-diagnosis</li> <li>· Herzberg's theory of motivation, etc.</li> </ul>	
H-8	Morale Survey	<ul style="list-style-type: none"> <li>· Manager</li> </ul>	Listening to the dissatisfactions and hopes of employees, and responding to them, are linked to improving employee morale.	<ul style="list-style-type: none"> <li>· The purpose and an overview of morale surveys</li> <li>· Contents of question sheets for employee opinion surveys</li> <li>· Methods of providing feedback to relevant persons</li> <li>· Key points in interview surveys</li> </ul>	A morale survey is a way of using question sheets and interviews to survey and analyze what employees are thinking, and is a technique that provides basic documentation for management control policies.
H-9	Human Resource Management	<ul style="list-style-type: none"> <li>· Manage</li> <li>· Staff</li> </ul>	Trainees will learn human resource management, which is a technique for boosting the incentive of employees and drawing out their vigor and vitality.	<ul style="list-style-type: none"> <li>· The purpose of human resource management</li> <li>· Human planning</li> <li>· Recruiting and choosing employees</li> <li>· Performance evaluation</li> <li>· Compensation management</li> <li>· Education and training, and skill development</li> <li>· Relationship among employees</li> </ul>	Human resource management refers to personnel management that acknowledges the skills of employees as an important business resource of the company, and maintains a comprehensive grasp of the overall employee situation, including the results of business activities conducted by the various employees and skill improvement based on human resource development.
H-10	Competency Management	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn techniques for developing human resources, using evaluation standards created with competency as the base element.	<ul style="list-style-type: none"> <li>· An overview of competency</li> <li>· Identifying people who produce good work results</li> <li>· Analyzing competency</li> <li>· Setting competency models</li> <li>· Putting competency into practice</li> </ul>	Competency management is a control technique that works by analyzing the activities of employees with respect to high work results, for each section and level, extracting characteristics such as knowledge, skills and attitudes, and indicating them as evaluation criteria to enable human resources to be put to effective use.

**Table 3 Syllabus of Curriculums of Management Technology (10/16)**

Human Resource Development

No.	Item	Target	Aim	Key Points	Remarks
H-11	Quality Control Circle (QCC)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees learn the effects of small-group activities, such as boosting the productivity of small groups, solving problems, skills development through mutual education and enlightenment, and shaping teamwork, and then ways to put those into active practice.	<ul style="list-style-type: none"> <li>· The purpose and an overview of small-group activities</li> <li>· Ways of running QC circle activities</li> <li>· Division of role between leaders and members</li> <li>· Ways of deciding themes</li> <li>· Various techniques involving small-group activities</li> <li>· Support activities for small groups</li> </ul>	Small-group activities are activities in which employees form small groups and work on their own initiative, with managers and with guidance from managers, to stimulate the workplace and solve problems.
H-12	Management by Objectives (MBO)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Staff</li> </ul>	To have trainees learn techniques for management by objectives that will be effective creating systems for boosting overall management strength and enthusiastically using it in the work.	<ul style="list-style-type: none"> <li>· The aim of introducing MBO</li> <li>· Selecting target persons</li> <li>· The role of managers who will be making the objectives management function, and the management itself</li> <li>· Ways of promoting MBO that will produce effects, and points to be considered</li> <li>· Ways of setting objectives</li> <li>· Control of work using MBO</li> <li>· Ways of evaluating the results</li> </ul>	MBO is a results-oriented evaluation system in which objectives are set for individuals or a group for a certain period of time (for example, one year), and the results achieved during that period are evaluated.
H-13	Empowerment	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	Trainees will learn to boost the capabilities and morale of each individual member of the organization by transferring broad-ranging authority to them, and will also learn the art of prompt decision-making.	<ul style="list-style-type: none"> <li>· The results of empowerment</li> <li>· Creating an organizational structure for empowerment</li> <li>1) Clarification of business and common aims</li> <li>2) Providing shared information</li> <li>3) Providing a shared sense of values</li> <li>· Key points in implementing empowerment</li> </ul>	Empowerment refers to the process of transferring broad-ranging authority to members of the organization and encouraging core activities based on the discretionary powers of the individual. The effects, in addition to speeding up the decision-making process, include increased strength for the individual members of the organization and higher morale levels because the decisions of the individuals are respected.

**Table 3 Syllabus of Curriculums of Management Technology (11/16)**

Finance

No.	Item	Target	Aim	Key Points	Remarks
F-1	Book-keeping	· Manager · Staff	Learning the basics of bookkeeping and accounting	<ul style="list-style-type: none"> <li>· Bookkeeping register methods</li> <li>· Journalizing of expenses</li> <li>· Items relating to depreciation costs</li> <li>· Account settlement</li> </ul>	
F-2	Cash Flow Management	· Manager · Staff	To have trainees learn about cash flow management, in which the goal is not to evaluate the worth of the company by maximizing past sales and profits, but rather by maximizing the cash flow.	<ul style="list-style-type: none"> <li>· An overview of cash flow management</li> <li>· Why cash flow management is necessary</li> <li>· Setting up cash flow statements</li> <li>· Maximizing cash flow</li> <li>· Indices for measuring cash flow</li> </ul>	Cash-flow management is a management technique that aims at strengthening a company's earning capability by focusing on cash flow and dealing with the movements of cash.
F-3	Balance Sheet	· Manager · Staff	The balance sheet shows the capital procurement situation of the company and the state of asset management, and indicates the financial situation of the company.	<ul style="list-style-type: none"> <li>· What is a balance sheet?</li> <li>· Asset items</li> <li>· Debt items</li> <li>· Reading and analyzing balance sheets</li> </ul>	
F-4	Profit and Loss Statement	· Manager · Staff	Companies have to produce profits. The profit and loss statement is what shows the process through which these profits are added up, and is a way for the company to know its business performance results.	<ul style="list-style-type: none"> <li>· The format of the profit and loss statement</li> <li>· An explanation of the items</li> <li>· Items relating to manufacturing costs</li> <li>· Reading and analyzing profit and loss statements</li> </ul>	
F-5	Break-even Point Analysis	· Manager · Staff	This is an important element in analyzing financial statements. To have trainees learn basic rules and apply them in actual examples.	<ul style="list-style-type: none"> <li>· Significance</li> <li>· Determining the break-even point from profit diagrams and charts</li> <li>· Calculation using formulas</li> <li>· Practical usage methods</li> </ul>	
F-6	Working Capital Planning	· Manager · Staff	To have trainees understand the importance of working capital planning, and practice it based on exercises.	<ul style="list-style-type: none"> <li>· Planning procedures</li> <li>· Estimating the necessary working capital</li> <li>· Calculating cash balances</li> <li>· Cash receipts and disbursements planning</li> </ul>	
F-7	Investment Plan	· Manager · Staff	Equipment investment estimates are an indispensable part of mid- and long-term business planning. Trainees will learn a series of procedures covering everything from investment planning to capital recovery.	<ul style="list-style-type: none"> <li>· Capital planning procedures</li> <li>· Estimating investment values</li> <li>· Adopting an investment plan and term capital planning, etc.</li> </ul>	

**Table 3 Syllabus of Curriculums of Management Technology (12/16)**

Human Resource Development

No.	Item	Target	Aim	Key Points	Remarks
F-8	Fund-raising	· Manager · Staff	Procuring the necessary capital is an indispensable element in equipment investments and working capital. Trainees will learn how to formulate capital procurement planning for this purpose.	<ul style="list-style-type: none"> <li>· Capital planning procedures</li> <li>· Estimating the necessary working capital</li> <li>· Cash receipts and disbursements planning</li> </ul>	

**Table 3 Syllabus of Curriculum of Management Technology (13/16)**

Production Control

No.	Item	Target	Aim	Key Points	Remarks
PC-1	5S	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	The basics of manufacturing plant management start with organization, keeping the workplace neat, and keeping things clean. Trainees will learn the significance of these and tricks for putting them into practice.	The "5S" refer to elements such as organization (Seiri), keeping things in order (Seiton), cleanliness (Seiso), discipline (Shitsuke) and neatness (Seiketsu). Trainees will examine case studies.	
PC-2	Material Handling	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	To have trainees understand the importance of material handling as a production control technology in the plant.	<ul style="list-style-type: none"> <li>· Activity indices</li> <li>· Material handling process analysis</li> <li>· How equipment for material handling is selected</li> <li>· Positioning with respect to cost prices, etc.</li> </ul>	
PC-3	Measures against Muda, Muri, Mura	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	With respect to improving production technology, to have trainees learn from experience techniques that can be pointed out from observing the work in the workplace.	Trainees will learn what Muda (waste), Muri (unreasonableness or excessive burden), and Mura (unevenness) mean, and will tie these to work improvement.	
PC-4	ABC Analysis	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	This is a technique that is used in material inventory control systems, and the system can be made more efficient by giving priority to control.	Techniques will be introduced for dividing all items in inventory into the three classes of A, B, and C, based on elements such as financial sums, quantities, and other indices, and the methods of control appropriate to each of those classes will be covered.	
PC-5	Preventive Maintenance	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	Companies want to make sure the equipment they have operates as effectively as possible. Trainees will learn preventive maintenance systems in order to do this.	<ul style="list-style-type: none"> <li>· Production activities and equipment</li> <li>· Life cycles of equipment</li> <li>· Equipment preservation</li> <li>· Basics of mechanical elements</li> </ul>	
PC-6	KAIZEN	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	To have trainees break improvement procedures down into 7 steps and learn items to be examined at each step, along with techniques for incorporating them into conclusions.	<ul style="list-style-type: none"> <li>· The purpose of improvement (KAIZEN)</li> <li>· Analysis procedures</li> <li>· Undergoing training in conceptual techniques</li> <li>· Obtaining specific outcomes</li> </ul>	



**Table 3 Syllabus of Curriculum of Management Technology (14/16)**

Production Control

No.	Item	Target	Aim	Key Points	Remarks
PC-7	ISO 9000 Series	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees understand the ISO9000 series, a quality management system that is required of suppliers from the customer's standpoint.	<ul style="list-style-type: none"> <li>· What is the ISO9000 series?</li> <li>· The advantages of acquiring ISO9001 certification</li> <li>· Certification system and certifying organizations</li> <li>· Ways to promote activities to acquire certification</li> <li>· An explanation of ISO9001 standards</li> <li>· An explanation of the items required by the quality management system</li> </ul>	
PC-8	Quality Control and QC Tools	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	To have trainees consider the basics of quality and approaches to quality design, and learn to apply the 7 tools necessary for these.	<p>Trainees will learn from experience, through exercises that use the following as QC tools:</p> <ol style="list-style-type: none"> <li>1. Control diagrams</li> <li>2. Histograms</li> <li>3. Stratification</li> <li>4. Pareto diagrams</li> <li>5. Check sheets</li> <li>6. Cause and effect diagrams</li> <li>7. Scatter diagrams</li> </ol>	
PC-9	Production Planning	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	Improving productivity is indispensable in carrying out production control. Trainees will carry out development for that purpose.	<p>To have trainees understand the significance of production planning, through elements such as those noted below:</p> <ol style="list-style-type: none"> <li>1. Production systems</li> <li>2. Process control</li> <li>3. Production management</li> </ol>	
P-10	Inventory Management	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees learn about inventory control in which the appropriate level of inventory is maintained, and an accurate grasp is maintained of the contents of the inventory.	<ul style="list-style-type: none"> <li>· Basics of inventory control</li> <li>· The rate of inventory turnover as the barometer of profits</li> <li>· Key points in taking stock in, inventorying it, and taking it out</li> <li>· The purpose of taking inventory, and how it is done</li> <li>· Appropriate inventory levels and how orders are received and issued</li> <li>· Know-how relating to reducing inventory</li> <li>· Ways of shortening production periods</li> </ul>	

**Table 3 Syllabus of Curriculum of Management Technology (15/16)**

Production Control

No.	Item	Target	Aim	Key Points	Remarks
PC-11	Industrial Engineering	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	"I.E." refers to activities aimed at establishing and improving systems that integrate people, materials, and equipment. Trainees will learn various types of techniques to use.	<p>To have trainees consider quality assurance at the following three stages of:</p> <ol style="list-style-type: none"> <li>1. Design</li> <li>2. Manufacturing</li> <li>3. Use</li> </ol>	
PC-12	Quality Assurance	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	To have trainees understand the concept of Quality Assurance, which is to "guarantee the quality and performance of a product to meet predetermined specifications," as well as the check and action system necessary for QA.	<p>Consider QA in the following 3 processes:</p> <ol style="list-style-type: none"> <li>1. Design</li> <li>2. Production</li> <li>3. Use/operation</li> </ol>	
PC-13	Plant Layout	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	Trainees will learn techniques for systematic layout planning (SLP).	<p>SLP procedures</p> <ol style="list-style-type: none"> <li>1. PQ analysis</li> <li>2. Interrelated activities</li> <li>3. Drafting diagrams</li> <li>4. Investigating alternative solutions</li> </ol>	
PC-14	Total Preventive Maintenance (TPM)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> <li>· Foreman</li> </ul>	This involves having everyone take part in productive maintenance in the plant, and work towards boosting overall efficiency.	<ul style="list-style-type: none"> <li>· Concepts of equipment efficiency</li> <li>· The meaning of "life cycle"</li> <li>· Equipment maintenance functions</li> <li>· Promoting PM through small-group activities</li> </ul>	
PC-15	Material Requirement Planning (MRP)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	This is a system in which the materials required for production are calculated and arranged in the necessary volumes, and is a planned type of control. To have trainees understand this concept.	<ul style="list-style-type: none"> <li>· Drafting of bills of materials</li> <li>· Calculating the required volumes of materials</li> <li>· Investigating time periods for arrangement of materials</li> <li>· Various problems involved in introducing MRP, etc.</li> </ul>	
PC-16	Value Analysis/ Engineering (VA/VE)	<ul style="list-style-type: none"> <li>· Manager</li> <li>· Engineer/ Supervisor</li> </ul>	VA is a technique for reducing material costs. The approach that aims at significant cost reductions starting from the design development stage is called VE. Trainees will learn these techniques.	<ul style="list-style-type: none"> <li>· Basic approach to VA</li> <li>· Problem-solving systems</li> <li>· Ways of promoting the technique</li> </ul>	

**Table 3 Syllabus of Curriculums of Management Technology (16/16)**

Production Control

No.	Item	Target	Aim	Key Points	Remarks
PC-17	Flexible Automation	·Manager ·Engineer/Supervisor	FA is the technology that determines the direction of production automation of the manufacturing plant. To have trainees understand the elemental technologies that makes up FA.	· Essential technology · Software · Monitoring technology · Robot technology · Material handling systems, etc.	
PC-18	Application of IT	·Manager ·Engineer/Supervisor	IT is currently under development, and is not an established science. To have trainees consider future prospects, learning through case studies, based on this premise.	· IT in relation to the manufacturing plant · IT in relation to the service industry · IT in relation to fields involving the general public, etc.	
PC-19	Environment	·Manager ·Engineer/Supervisor	The various problems concerning environmental conservation that companies are dealing with will be examined. To have trainees learn basic knowledge about plant management.	The following will be explained, along with other items: 1. Water quality 2. Atmosphere 3. Industrial waste 4. Laws and regulations	
PC-20	Cost Management	·Manager ·Staff	To have trainees learn methods for cost planning and control at each production stage, in order to reduce costs and improve profit figures.	·What is cost management? ·Methods for calculating cost prices ·Standard cost price control ·CVP analysis and management ·Cost price improvement	

Annex-2      TOT (Training of Trainers) on Production Control  
Implementation Report

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## Annex-2 TOT (Training of Trainers) on Production Control Implementation Report

### 1. Training Period

From February 9 to February 28, 2004 (3 weeks except for Sundays and national holidays)

### 2. Training Hours

1st week: 58 hours

2nd week 52 hours

3rd week 40 hours

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Total 150 hours

### 3. Training Location/Facility

PUSDIKLAT-INDAG, Jl. Widya Chandra VIII/34, Kebayoran Baru, JAKARTA

### 4. Host Organizations

Jointly held by IDKM, PUSDIKLAT-INDAG, and JICA

### 5. Participants and Their Key Profiles

1	No. of participants	29			
2	Current position	IDKM or related organizations (13)	PUSDIKLAT-INDAG (13)		Other (3)
		(Breakdown)	(Breakdown)		(Breakdown)
		Extension Officer 3	PUSDIKLAT instructors 8	MOMT 1	
		IDKM staffs 4	PUSDIKLAT Surabaya 1	MONE 1	
		MIDC 4	PUSDIKLAT school instructors 4	IETC 1	
ITI 2					
3	Age	Average - 48.28 (ranging between 60 and 36)			
4	Sex	Male – 21; female – 8			
5	Educational background	Master's degree – 20 (one completed master program at University of Pittsburgh, U.S.)			
		Undergraduate degree – 9			
		Science and engineering – 25; Liberal arts – 4			
6	Work experience in the private sector	Little or none			

## 6. Curriculum

### Curriculum for the TOT Program

#### 1<sup>st</sup> Week

	Morning (8:00 ~ 12:00)	Afternoon (13:30 ~ 17:30)	Night (19:00 ~ 21:00)	Remarks
2/9 MON	<u>Opening Speech</u> Mr. Agus (Director General of IDKM) Mr. Moriguchi (Leader of JICA Team) <hr/> General guidance on field tour: Mr. Hata, Mr. Izuhu	<u>Factory tour</u> <ul style="list-style-type: none"> <li>● CV. Dua Sekawan (Automotive Battery)</li> <li>● PT GALIH SEKAR SAKTI (PLASTIC MOLDING)</li> </ul>	<u>Discussion and review</u>	
2/10 TUE	<u>Factory tour</u> <ul style="list-style-type: none"> <li>● PT. NANDYA KARYA PERKASA (AUTOMOTIVE PARTS, PRESS)</li> <li>● PT. CHUHATSU INDONESIA (AUTOMOTIVE SPRING)</li> </ul>	<u>Group discussion</u> “Major issues relating to the factories visited and proposed solutions”	<u>Presentation on the results of group discussion and feedback from instructors</u>  <ul style="list-style-type: none"> <li>● Questionnaire survey</li> </ul>	Coffee break (15 minutes per every two hours)
2/11 WED	<u>Lecture (Mr. HATA)</u> Basic Production Control -- QC, QC Tools --	<u>Lecture (Mr. IZUHO)</u> Basic Production Control -- ISO 9000 SERIES ---	<u>Supplemental lecture for BPC</u> <u>(Mr. HATA)</u> <ul style="list-style-type: none"> <li>● Questionnaire survey</li> </ul>	
2/12 THU	<u>Lecture (Mr. HATA)</u> Basic Production Control -- Production Planning --	<u>Lecture (Mr. ITOH)</u> Management strategy, with emphasis on SWOT analysis  <hr/> <u>Lecture (Mr. IMO)</u> Accounting and Finance	<u>Supplemental lecture for BPC</u> <u>(Mr. HATA)</u> Including Q&A session <ul style="list-style-type: none"> <li>● Questionnaire survey</li> </ul>	
2/13 FRI	<u>Lecture (Mr. IMO)</u> Administration -- Budget Control --  <ul style="list-style-type: none"> <li>● <u>General guidance on an assembly plant tour to be conducted in the 2nd week</u> (Mr. Hata, Mr. Izuhu)</li> <li>● Questionnaire survey</li> </ul>	<u>Lecture (Mr. IZUHO)</u> Basic Production Control  -- Cost Management --	<u>Case study “Keys to Our Success”</u> Mr. Y. SAKAI (PT. HARMONICS TECHINDO AGUNG) <ul style="list-style-type: none"> <li>● Questionnaire survey</li> </ul>	The Friday morning session started at 7:30 and end at 11:30.
2/14 SAT	<u>Lecture (Mr. HATA)</u> Basic Production Control -- Material Handling, Plant Layout, IE --	<u>Lecture (Mr. IZUHO)</u> Basic Production Control -- Inventory Management --		

## 2<sup>nd</sup> Week

	Morning (8:00 ~ 12:00)	Afternoon (13:30 ~ 17:30)	Nights (19:00 ~ 21:00)	Remark
2/16 MON	<u>Assembly plant tour</u> PT ASTRA HONDA MOTOR (SUNTER)	1. Field tour 2. Presentation and discussion on quality control 3. Presentation and discussion on purchase policy and related issues (by purchase manager) 4. Presentation and discussion on audit 5. Presentation and discussion on the guidance for suppliers	<u>Discussion and review</u> ● Questionnaire survey (including a coffee break)	Coffee break (15 minutes per every two hours)
2/17 TUE	<u>Assembly plant tour</u> PT National GOBEL (BOGOR)	Ditto ● Matsushita Gobel	<u>Discussion and review</u> ● Questionnaire survey	
2/18 WED	<u>Lecture (Mr. Hata)</u> Basic Production Control - Preventive Maintenance -	<u>Lecture (Mr.HATA)</u> Basic Production control -- KAIZEN --	<u>Case study "Keys to Our Success"</u> Mr.GUNAWAN ELISA (Managing Director: PT. GUNA SENAPUTRA) ● Questionnaire survey	
2/19 THU	<u>Lecture (Mr.HATA)</u> Basic Production Control --5S, Measures Against Muda, Muri, Mura ---	<u>Supplemental lecture for BPC</u> - (Mr.IZUHO and HATA) Including Q&A session	FREE	
2/20 FRI	"Day-to-day production control practice on the shop floor" Harmonics Techindo Agung	<u>Simulation training (Mrs. Hata and Izuho)</u>	Successful cases of Japanese SMEs (Mrs. Hata, Izuho and Takeuchi) ● Questionnaire survey	
2/21 SAT	<u>General guidance on Kaizen planning to be carried out in the 3rd week</u> Participants were divided into two groups and received guidance from Mr. Hata or Izuho, respectively, on key points. ● Questionnaire survey	FREE		

3<sup>rd</sup> Week

	Morning (8:00 ~ 12:00)	Afternoon (13:30 ~ 17:30)	Night (19:00 ~ 21:00)	Remark
2/23 MON	NATIONAL HOLIDAY			Coffee break (15 minutes per every two hours)  The Friday morning session started at 7:30 and ended at 11:30.
2/24 TUE	<u>Kaizen Planning Workshop (factory visit)</u>	A group (Mr.HATA) = PT. BANGUN SARANA ALLOY Bgroup(Mr.IZUHO)=GERITJI METAL JAYA	<u>Discussion</u> A Group: Mr.HATA B Group: Mr.IZUHO	
2/25 WED	<u>Kaizen Planning Workshop (discussion)</u>	A group: Led by Mr. Hata B group: Led by Mr. Izuho	Compilation of a report	
2/26 THU	<u>Kaizen Planning Workshop (proposal)</u> Preparation of a formal report on enterprises covered by each group  Rehearsal for presentation	<u>Presentation for managers of recipient enterprises</u>  ● Questionnaire Surveys of Participants and Managers of Client Enterprises	FREE	
2/27 FRI	<u>Lecture (Ms. WAHYU) - ENVIRONMENT</u>	<u>Special lecture “Keys to Success of SMEs in Indonesia”</u> Mr.Bambang / President of PT ASTRA NISSAN DIESEL		
	Examination	Examination		
2/28 SAT	● Questionnaire survey <u>Graduation ceremony</u> ● Speech Mr. Agus Mr.Moriguchi ● Speech: Representative of participants ● Presentation of certificates	FREE		



## 7. Organization and Objective of the Curriculum

### 7.1 Overall Objective

To teach, in the form of intensive training, theories and practical knowledge required to become trainers of production control techniques for SMEs.

### 7.2 Organization and Objective

(1) Field tour in 1st week (four factories)

CV. DUA SEKAWAN (manufacturer of automotive batteries that are primarily sold on the aftermarket; 57 employees; classified into Stage 2)

Note: See Chapter 6 for the definition of "Stage" and the method for classification of SMEs according to their "Stage."

CV. GALIH SEKAR SAKTI (manufacturer of injection molded plastics products that are supplied to assemblers (e.g., Honda and National Gobel) and sold on the aftermarket; 367 employees; classified into Stage 3)

PT. NANDYA KARYA PERKASA (metal press, and die/mold making; a successful case of ASTRA Group's venture fostering project; products supplied regularly to automotive (ASTRA Group) and electrical and electronics (National Gobel) appliances; 140 employees; classified into Stage 4)

PT. CHUHATSU INDONESIA (A Japan-Indonesia joint venture to manufacture springs; 430 employees; a model case for adaptation of Japanese management style to Indonesian culture and other local conditions)

#### Objectives

- 1) As most participants worked for MOIT or university/technical college (lecturers), the factory tour was designed to help them obtain a general idea of supporting industries in Indonesia. For this purpose, the factories to be visited ranged from Stage 2 to 4 or a joint venture in representative industries.
- 2) Participants were expected, prior to a lecture, to devise and propose a kaizen plan for the factories visited. Then, after receiving lectures, they proposed a new plan in the Planning Workshop that took place in the third week. By comparing the two plans, effectiveness of the program could be measured.

(2) Lecture on basic production control techniques

The lecture was carried out from Wednesday of 1st week through Thursday of 2nd week, namely Basic Production Control - and supplemental lectures. It was designed to teach basic knowledge on production control techniques.

Areas covered QC, Production control, Material handling/Plant Layout/IE,  
by Mr. Hata: Preventive Maintenance, KAIZEN, 5S/Countermeasures to Muda,  
Muri, Mura

Areas covered ISO9000, Cost Management, Inventory Control  
by Mr. Izuho:

(3) General management

In addition to production control techniques, the program covered other management techniques that were required for SMEs and their operation.

Mr. Ito (JICA expert, resident at MOIT) : Management strategy (SWOT analysis)  
Mr. Imo (Professor of the University of Indonesia) : Accounting, Financial management and  
general administration  
Ms. Wahyu (EPA) : Safety and environment

(4) Case study (talk by successful managers)

Managers of SMEs that made success in the supporting industry talked about their experience in order to help participants understand major issues relating to SME management and supporting industries, together with solutions. In addition, a special lecture was given by an executive of ASTRA Group, the largest automaker in Indonesia, under the theme of "Keys to Success of SMEs in Indonesia."

◇ Mr. Yoshio Sakai (Harmonics Technindo Agung, wire harness manufacturer):  
Advisor)

Management techniques (innovative efforts) to motivate workers and raise morale

◇ Mr. Gunawan Elisa (President of PT.GUNA SENAPUTRA SEJAHTERA;  
machining, metal press and plastics molding of shafts and similar parts)

He started up the business with 15 employees in 1996, survived through the 1998 crisis, and successfully developed it to a large enterprise having 400 employees. Based on experience, he talked about management philosophy and techniques that would be useful for SMEs to win contracts from Japanese assembly companies.

◇ Mr. Bambang Trisulo (President of ASTRA Nissan Diesel Indonesia; President of GAIKINDO)

Mr. Bambang talked about the keys to success of SMEs in Indonesia as the environment surrounding them is changing under the wave of globalization.

- (5) Factory tour to learn quality control/purchase policy of major assembly manufacturers, and the fostering of suppliers, and audit procedures.

The following two companies were visited on Monday and Tuesday of the second week.

ASTRA HONDA MOTOR	ASTRA Honda Motor: Approx.6,500 employees; daily production of 7,000 motorcycles, with market share of 55%; the second largest production capacity among Honda's overseas plants, next to India; purchase from around 120 first-tier suppliers.
NATIONAL GOBEL	National Gobel: 3,072 employees; manufacture of TVs, refrigerators, audio/visual equipment, and other electronics equipment; 268 first-tier and second-tier suppliers; annual sales of 24.6 billion yen in 2002.

- (6) Factory visit as part of the Kaizen Planning Workshop

Participants evaluated the factories and their operations by applying production control techniques learned during the first and second weeks, as practical training in the Kaizen Planning Workshop.

- 1) Factory visit as a preliminary step of the planning workshop (Friday, 2nd week)

At HARMONIC TECHNINDO AGUNG, participants learned actual quality control practice in each process and its key points. As the company was in the process of shifting to a cell production system, the field tour allowed participants to compare it with the current (process-oriented) system and identify advantages and disadvantages of the two systems.

- 2) Kaizen Planning Workshop (3rd week)

The 29 participants were divided into two groups, each of which conducted a factory diagnosis and then proposed a kaizen plan to promote a Stage 3 enterprise to a Stage 4 status. Participants were expected to demonstrate their knowledge learned during the two-week lecture.

Group A (14 participants; led by Mr. Hata)	PT. BANGUN SARANA ALLOY (a manufacturer of automotive aluminum wheels; supplying most of products to the aftermarket, with a small percentage going to assemblers; Stage 3; 258 employees)
Group B (15 participants; led by Mr. Izuho)	PT.GERITJI METAL JAYA (a second-tier supplier serving automotive and electrical/electronics assemblers, specialized in metal press, plastics)

molding, and die and mold making; 68 employees;  
State 3)

(7) Examination (Friday, 3rd week)

The examination covered the following six fields. For each field, nine multiple-choice questions and one essay question were asked, totaling 60 questions.

- 1) QC, QC Tools
- 2) Inventory Management
- 3) Cost Management
- 4) Material Handling/Plant Layout/IE
- 5) Preventive Maintenance
- 6) Process Control

The examination had the following two purposes:

1. To evaluate and measure the level of understanding upon completion of the three-week program.
2. To use the result as one of criteria to select trainers, among the participants, who will teach a seminar for manufacturing SMEs to be held jointly by IDKM, PUSDIKLAT-INDAG and JICA in June.

## **8. Questionnaire Surveys for Program Evaluation and Feedback to Program Improvement**

The following six questionnaire surveys were conducted (four surveys of participants and two of others).

### **8.1 Questionnaire survey on the factory tour in 1st week**

The survey was designed to collect opinions of participants as to how well they understood the difference in control level among SMEs in the support industries according to their “Stage,” and participants were asked to rate their level of understanding on a five-point scale.

### **8.2 Questionnaire survey on the lecture**

This survey was conducted at an end of each lecture session (Basic Production Control - , and 3 lectures on general management). Participants evaluated, on a five-point scale, each lecture on three key aspects (usefulness for instructor education, and the ease of understanding on the lecture and the textbook).

### **8.3 Questionnaire survey on the factory visit of assembly manufacturers**

Participants evaluated, on a five-point scale, the result of factory visit to ASTRA Honda Motor and National Gobel, as to whether it had fulfilled the objectives described in VII-2-(5).

### **8.4 Questionnaire surveys on the Kaizen Planning Workshop**

(1) The survey covering participants

Participants evaluated, on a five-point scale, the workshop by responding questions regarding its quality, e.g., adequacy of prior guidance by instructors, and usefulness and applicability of the kaizen plan proposed.

(2) The survey covering enterprises for which a kaizen plan was proposed

Enterprises that received the kaizen plan were asked to state their opinions on the quality of the proposal.

### **8.5 Questionnaire Survey on Overall Evaluation**

Participants were asked to evaluate the program as a whole, including the content and quality of the lecture, the quality of program management, effectiveness of the program. Furthermore, questions were asked to evaluate the level of motivation inspired by the program, e.g., whether they were confident in serving as an instructor in June; what subject or area of interest they would like to teach; and how they would like to maintain and improve their skills in future.

### **8.6 Questionnaire Survey of Participants by Instructors**

While the result of the examination is an important element of evaluating participants, the program intended to evaluate them in terms of aptitude for the instructor by asking the program instructors about their observation on participants during the program, including their attitude and activity during the lecture and the factory visit.

## **9. Evaluation of the TOT Program**

Based on the results of the questionnaire surveys, the program and its effectiveness were evaluated and drawbacks and other lessons learned were identified.

### 9.1 Summary of the Questionnaire Survey Results (Factory Visits in 1<sup>st</sup> week)

Questions	Average score (on a five-point scale)
(1) How do you think about the “explanation on key points” made by instructors prior to the factory visit? It was helpful and suited your purpose?	4.1
(2) How well the factory visits helped you to understand the current state and level of manufacturing SMEs in Indonesia?	3.7
(3) How well you understood differences in the levels of production control and technology among enterprises you visited?	3.7

- Questions (2) and (3) were given of relatively low scores, probably because, although the questionnaire survey was conducted after the visit to four factories, they stayed at each company for around two hours only.
- At the end of this survey, a question was asked as to whether each participant had made a similar visit to a manufacturing enterprise in the supporting industry. All the participants responded affirmatively, suggesting that this type of factory visit may be no longer necessary.
- Participants were asked to propose kaizen plans for the four enterprises, but only a few of them were analytical and specific, whereas most participants merely made critical observations based on their impression or comments in qualitative (general) terms.

### 9.2 Summary of the Questionnaire Survey Results (Lecture)

Questions	Average score (on a five-point scale)
(1) Was the lecture useful for you to serve as an instructor on the subject at a seminar intended for manufacturers?	4.65
(2) Was the lecture easy to understand?	4.08
(3) Was the textbook useful for you to understand the lecture?	4.12

- All the questions received fairly high scores, indicating that the lecture was rated highly in the three aspects (usefulness, ease of understanding, and content of the textbook).
- It should be noted, however, that several problems were pointed out by participants, including: the textbook sometimes lacked unification of technical terms; the language

(Indonesian) had still to be refined for the ease of understanding; and the interpreter was not fully familiar with the field of production control techniques.

- The detailed results of evaluation on the eleven lecture sessions (responded by 29 participants) are shown below. The overall average score is 4.28.

	Question -(1)	Question -(2)	Question -(3)	Average
Lecture -1	4.48	3.86	3.90	4.08
Lecture -2	4.28	3.45	3.86	3.86
Lecture -3	4.66	3.97	4.07	4.23
Lecture -4	4.45	3.93	3.86	4.08
Lecture -5	4.76	4.69	4.28	4.58
Lecture -6	4.76	4.03	3.90	4.23
Lecture -7	4.62	4.07	4.21	4.30
Lecture -8	4.69	3.97	4.21	4.29
Lecture -9	4.79	4.14	4.31	4.41
Lecture -10	4.83	4.10	4.21	4.38
Lecture -11	4.86	4.69	4.48	4.68
Average	4.65	4.08	4.12	4.28

### 9.3 Summary of the Questionnaire Survey Results (Visit to Assemblers)

Questions	Average score (Nabel)	Average score (Honda)
(1) How well did the company's explanation help you to understand business management and production control practices?	4.66	3.86
(2) Did you understand the company's procurement policy and procedure?	4.62	3.52
(3) How well did you understand procurement-related problems facing each company, and their solution?	4.24	3.62
(4) Did you understand how the company provided guidance for suppliers from the viewpoint of QCD?	4.52	3.97
(5) Did you understand the audit and its content?	3.90	3.76
Total average score	4.40	3.74

- The differences between the average scores for Honda and National Gobel are relatively large probably because the factory visit to the former was completed in the morning, while that to the latter was continued until four o'clock in the afternoon.
- Overall evaluation indicates that the factory visit has achieved its objective.

#### 9.4 Summary of the Questionnaire Survey Results (Kaizen Planning Workshop in 3rd Week)

##### (1) Survey covering participants

Questions	Average score for group A	Average score for group B
1) Was the instructor's guidance and advice useful and suited to your purpose?	4.77	4.40
2) Did the recipient company well cooperate?	4.62	4.87
3) Was the kaizen plan proposed useful for management?	4.69	4.60
4) Please cite three fields of knowledge and three skills, which are considered to be critical in proposing a kaizen plan for a company. Field of knowledge/experience: QC/QC tools, maintenance, inventory management, plant layout, and other operations/practices Skill: analysis, communication/presentation, leadership to motivate employees		

The fairly high scores indicate that participants, who were divided into two groups (A – Bangun Sarana Alloy; B – Geritji Metal Jaya), felt effectiveness of the planning workshop. The kaizen plans actually submitted to the companies are attached hereto. In summary, they have been substantially refined from those made in the first week, indicating that the two-week lecture and training produced good results.

##### (2) Survey covering enterprises for which a kaizen plan was proposed

Questions	Group	Score
Was the proposed kaizen plan useful for your future management?	Group A: BANGUN SARANA ALLOY	5
	Group B: GERITJI METAL JAYA	4

A prevailing impression among the client enterprises was: "The proposal is well based on detailed analysis, despite of a limited duration (one day) of observation."



## 9.5 Questionnaire Survey of Participants on Overall Evaluation

This survey consisted of the following two elements.

- Overall evaluation on the program (3 questions)
- Motivation for the seminar in June (4 questions)

The summary of the survey results is shown below for overall evaluation on the program, while those concerning the level of motivation are reviewed in the following section.

Questions	Average score
(1) Was the lecture useful and adequate in terms of knowledge level suitable for your needs?	4.46
(2) Was the program operated adequately?	4.36
(3) Were the factory visit and the Kaizen Planning Workshop suitable for the program objective?	4.86

- The overall evaluation represents fairly high levels of satisfaction regarding the content and quality of the lecture and program management.
- Participants feel that the factory visit and the Kaizen Planning Workshop were useful and effective. Without them, the TOT program would have been more or less the same as the training programs on production control conducted by Matsushita Gobel and ASTRA Group. The result indicates that MOIT's training programs in the future should incorporate the factory visit and the planning workshop.

## 9.6 Evaluation of Participants by Instructors

Participants were evaluated by instructors for the following four elements, the examination score (weight distribution - 40%), educational background, specialty and experience (20%), attitude and contribution during the program (20%), and motivation (20%).

### (1) Examination (weight – 0.4)

Type	<ul style="list-style-type: none"> <li>• Questions were asked for six fields.</li> <li>• 9 multiple-choice questions and 1 essay question, totaling 10 questions for each field and 60 questions in total</li> </ul>
Score assigned	One point per question, five points for the essay question, 14 points for each field, and 84 points in total
Overall score	When converted to 100 points, the average score of 28 examinees was 57.74, with the highest score of 70.24 (2 persons) and the lowest score of 45.24 (1 person)

(2) Educational background, specialty and experience (0.2)

Educational background: Diploma/degree and major

Specialty/work experience: As reported by the participant

This item is rated to see how they meet the criteria on a three-grade scale.

(3) Attitude and contribution during the program (0.2)

This is rated on a three-grade scale (excellent - 15 points; good – 10 points; poor – 5 points). Additional 4 points were allotted to a group leader of the Kaizen Planning Workshop and 2 points to a sub-leader.

(4) Motivation (0.2)

Based on Items 4 – 7 of the questionnaire survey of participants on overall evaluation.

Motivation

This was rated for three criteria (confidence in becoming an instructor; reason for confidence; and future training (self-development) plan); 15 points for a high level of fitting with the criteria, 10 points for a fair level of fitting, and 5 points for a poor level of fitting.

The overall evaluation results of (1) – (4) above are tabulated in “Evaluation Sheet” below.

JICA - IDKM- PUSDIKLAT (INDAG)  
TOT MODEL TRAINING - PRODUCTION CONTROL

**Evaluation Sheet**

JICA HRD Study Team

Name	Examination			Background Specialty Experience	Attitude Positiveness	Motivation	Total	Ranking	Desired Subjects to Teach					
	Out of 84	%	Out of 40						Out of 20	Out of 20	Out of 20	QC	IM	CM
	59	70.24	28.10	15	15	15	73.10	1		2		1		
	59	70.24	28.10	15	15	15	73.10	1	2			1		
	57	67.86	27.14	15	15	15	72.14	3		1				2
	50	59.52	23.81	15	17	15	70.81	4		1		2		
	54	64.29	25.71	15	15	15	70.71	5	1					2
	52	61.90	24.76	15	15	15	69.76	6	1					2
	53	63.10	25.24	10	19	15	69.24	7	2					1
	52	61.90	24.76	15	14	15	68.76	8	1	2				
	49	58.33	23.33	15	15	15	68.33	9	2	1				
	42	50.00	20.00	15	15	15	65.00	10	2					1
	51	60.71	24.29	10	15	15	64.29	11	2			1		
	56	66.67	26.67	10	10	15	61.67	12	2	1				
	53	63.10	25.24	15	10	10	60.24	13	1					2
	53	63.10	25.24	10	10	15	60.24	13	1					
	43	51.19	20.48	15	10	10	55.48	15	1					2
	42	50.00	20.00	10	10	15	55.00	16	1	2				2
	44	52.38	20.95	10	12	10	52.95	17	1	2				
	47	55.95	22.38	10	10	10	52.38	18					1	2
	45	53.57	21.43	10	10	10	51.43	19					1	2
	50	59.52	23.81	5	10	10	48.81	20	1	2				
	38	45.24	18.10	15	5	10	48.10	21	1				2	
	48	57.14	22.86	10	5	10	47.86	22		2	1			
	47	55.95	22.38	5	10	10	47.38	23	1		2			
	43	51.19	20.48	5	10	10	45.48	24	2	1				
	48	57.14	22.86	10	5	5	42.86	25						
	40	47.62	19.05	5	5	10	39.05	26				2	1	
	39	46.43	18.57	10	5	5	38.57	27		1	2			
	44	52.38	20.95	5	5	5	35.95	28				1	2	
	0	0.00	0.00	10	5	5	20.00	29						

## 10. Evaluation on the TOT Program and Participants by Instructors

### 10.1 Instructor A (JICA study team)

General findings and comments

#### Attitude during the lecture

1. Generally, it is pleased to see that many participants enthusiastically ask questions during the lecture because it reflects a high level of desire to understand the subject better. Unfortunately, however, some asked “obvious questions” that slow down the progress. Participants should learn what they can ask as a question in the class and should ask a question concerning personal interest after the lecture.
2. All participants worked intensively with small exercises (one problem on quality control and the other on process control) given during the lecture and submitted answers within a time limit set. I am glad to see their serious attitude.

#### Training for field guidance

3. When making a report to a client company, the use of specific data to substantiate an argument is very important. It is essential in persuading the client. Discussions in the report were largely of abstract and general. It was pointed out to participants during the preparatory discussion prior to a formal presentation.
4. A kaizen plan should contain a proposal that can be readily implemented. It should not necessarily “big” or “important.”
5. Division of responsibilities among the leader, the sub-leader, and members  
I am glad to see that the division of responsibilities has been decided through extensive discussion prior to the start of the workshop and has been complied with in the course of the workshop, thereby contributing greatly to a smooth implementation. The leader and the sub-leader should take credit for it as they have showed good leadership, while other members have also extended cooperation.

#### Examination

6. The examination results have generally reflected the attitude of each participant during the lecture; the more he pay attention to the instructor and take a note, the higher score he obtains.
7. Multiple-choice examination  
As questions were refined several times before the examination, there was not much problem relating to the understanding of questions themselves. However, many

participants were surprisingly bewildered by certain types of problems (e.g., to fill out a blank to complete a sentence).

8. Essay examination

Only 60% of participants wrote an appropriate answer that followed the intent of the question. Some answers totally missed the point. It was discouraging. Maybe, they were short of time.

**Overall evaluation**

9. Participants are expected to become not only an instructor for training programs intended for SMEs, but a technical advisor who can provide effective field guidance as well. In particular, a good advisor should have good communication skills to understand the client and its needs as well as planning skills to develop and propose a workable solution. He should not act one-sidedly but should be able to help the client to conceive and implement an effective solution through close communication.
10. Needless to say, it takes considerable time and effort to acquire such skills. The good advisor can only grow through practical experience and with modesty to learn from clients and shop floors. In conclusion, I am very happy to see that some participants have made a significant progress during the program and I believe that the TOT program has produced significant results.

## **10.2 Instructor B (JICA study team)**

1. Subject taught

I taught three courses of “basic production control techniques,” namely “Quality Management System ISO9000s,” “Cost Management” and “Inventory Management.” In addition, I gave a special lecture on “A General Outline of SME Promotion Policy in Japan and Case Study on Three SMEs in Japan, Which Effectively Use Human Resources” as a success story.

As for the three courses, each of which lasted four hours, I gave a lecture for the first two hours and then conducted a seminar for the remaining two hours, during which participants were divided into four teams and were engaged in case studies in the form of discussion and presentation. In addition, a case study on “Cost Management” was conducted as a supplemental session.

Furthermore, I provided guidance and advice prior to and during the factory visit (6 establishments) and the Kaizen Planning Workshop (1 establishment).

## 2. Lecture and Its Progress

I was able to spend less time on the lecture than expected, as I had to answer questions raised by participants, not to mention the time required for oral interpretation of my lecture. While I welcome that a lecture is conducted under two-way communication, it is regretful that I was only able to provide much less information on each subject than expected.

Nevertheless, I was impressed by a good attitude of participants, who listened to my lecture attentively and were eager to acquire new knowledge and ask a lot of questions.

Generally, participants did not have high levels of knowledge on the subject matters, except for those who served as ISO9001 instructors, and this is one of the reasons why they were eager to learn from all the courses.

## 3. Results: What Participants Have Learned

Most participants did not have an opportunity to learn production control techniques that were closely related to the shop floor, and their level of knowledge was fairly poor at the beginning of the program. Upon completion of the program, they seem to have absorbed a large amount of information and their level of interest in each field has significantly heightened.

Nevertheless, most of them still lack knowledge and experience required for instructors who can provide effective guidance and advice for SMEs. To meet the needs of manufacturing SMEs, participants should be given of an opportunity to learn modern production control techniques on a continuous basis and have rich field experience, thereby to become truly competitive instructors and advisors for SMEs.

## 4. Other

I looked around several large bookstores in the country and found few books on production control. Moreover, there is no place for corporate employees to learn production control techniques, except for private training programs conducted by several assemblers. As private consultants are still limited in their ability to provide adequate guidance in the field of SME production operation, SME managers expect government organizations to play the role and the training of qualified instructors/advisors is urgent and important.

### **10.3 Instructor C (JICA study team)**

As for knowledge, participants are expected to attain a sufficient level required for instructors, provided that further training is provided. While they have good fundamental knowledge and skills, they lack field experience. It is therefore important to make them

build up their experience by participating in consultation service for SMEs as often as possible

Annex-3 Report on the Model SME Training Program

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## **Annex-3 Report on the Model SME Training Program**

Intensive Training of Production Control Technologies for Productivity Improvement

### **Introduction**

Under the present study, a model training program for manufacturing SMEs was implemented as extension of the TOT program on production control technology. The program was conducted for three weeks from June 8 through 26, and 17 instructors trained through the TOT were organized into 6 groups (3 instructors in each group), each of which was responsible for one of the six programs offered.

Each program admitted an average of 24 persons, totaling 144 participants for the entire model training program. The six programs covered the following themes (fields): 1) production control; 2) quality control; 3) Kaizen; 4) inventory management; 5) cost management; and 6) preventive maintenance.

1) Process Control 2) Quality Control 3) KAIZEN 4) Inventory Management 5) Cost Management 6) Preventive Maintenance

This section outlines the model training program and identifies areas of improvements that are required for sustainable program implementation.

### **1. Objective of the Model Training Program**

In Indonesia, education and training on production control technology designed for manufacturing establishments has rarely been conducted by public training institutes, despite of strong demand. The model training program under the present study was implemented by the MOIT, with the study team's support, as a key attempt to initiate continuous public support in the highly demanded but unserved area, with a view to helping productivity improvement of small- and medium-sized supporting industries.

### **2. Curriculum for the Model Training Program**

Basically each of the six program that consisted the model training program was composed of two-day lecture sessions and one-day factory visit. The lectures were given by MOIT

instructors, together with special lectures by Japanese experts and guest speakers who represented various local companies.

## Curriculum for Training

### *The first week*

<b>Date</b>	<b>Subject</b>	<b>Instructor/factory name</b>	<b>Time</b>	<b>Curriculum</b>	<b>Reference</b>
6/8 Tue	Process Control	Hata Akira(JICA) Ni Nyoman Ambareny (MOIT)  K.S.Nurkamal(MIDC)	8:00-8:30 8.30-10.00 10.15-11.45 13.30-14.15 14.15-15.00 15.15-16.45	Introduction of the PC Introduction of the Concept Production Planning Production Planning Production Process Production Control	Suprevisor:Ms:Elget
6/9 Wed		Team Hata Akira(JICA) K.Yapri(Tjokro)	8.30-10.00 1015-11.45 13.30-15.00 15.15-16.45	Case Study Guideline for satisfactory delivery Process Control in my company(1) Process Control in my company(2)	
6/10 Thu	Factory Visit	P.T Tjokro Bersaudara Cikarangindo:Cikarang Factory	11.30- 13:00- selasa	Meeting place:Pusdiklat Meeting time:11.30	Contact:Mr.K.Yapri tel:021-893-4690
6/11 Fri	Quality Control	Izuho Yasuhiro(JICA) Basoeki(PPEI)  Susirawati Sukmaji(Pusdiklat) Mardjulis Maas(Pusdiklat)	7:30-8:00 8.00-9:45 10.00-11.30 13.30-15:00 15:15-16:45	Introduction of QC Introduction of the Concept Pareto & Scatter Diagram Cause -Effect Diagram(Histogram) Stratification	
6/12 Sat		Mardjulis Maas(Pusdiklat) Team Izuho Yasuhiro(JICA) Hadi Subroto(Nandya Karya)	8.30-10.00 1015-11.45 13.30-15.00 15.15-16.45	Control Chart Case Study Problem settlement using QC-7 tools QC in my company	

*The second week*

<b>Date</b>	<b>Subject</b>	<b>Instructor/Factory name</b>	<b>Time</b>	<b>Curriculum</b>	<b>Reference</b>
6/15 Tue	Kaizen	Hata Akira(JICA) Linda Teresia(ITI)	8:00-8:30 8.30-10.00 10.15-11.45	Introduction of the Kaizen IE & Motion Study Time Study & Ergonomics	
		Yenny Widianty(ITI) Soeprijono(BDI Surabaya)	13.30-15.00 15.15-16.45	Plant Layout & Material Handling Kaizen: Concept	
6/16 Wed		Soeprijono(BDI Surabaya) Yenny Widianty(ITI) Hata Akira(JICA) Alexandra Meity Djalín(Waja Kamaja)	8.30-10.00 10.15-11.45 13.30-15.00 15.15-16.45	Kaizen:Application Kaizen:Process & Techniques Key point in Kaizen process Kaizen in my company	
6/17 Thu	Factory Visit	P.T Meta Presindo Utama	8.30 - 9.30-selesai	Departure from PUSDIKLAT Factory visit	contact:Mr.Adhi Saptaputra tel:021-460-5501
6/18 Fri	Inventory Managemen	Izuho Yasuhiro(JICA) Agus Setiadi(Pusdiklat)	7:30-8:00 8.00-9.30 9.45-11.15	Introduction of IM Introduction & Concept Strategy of Inventory Decision	
		Hernadewita(STMI Jakarta)	13.30-15.00 15.15-16.45	Inventory Control Technique(1) Inventory Control Technique(2)	
6/19 Sat		Nimrod Yakub(Pusdiklat) Team Izuho Yasuhiro(JICA) Yong Ding(Indocipta Hasta Perkasa)	8.30-10.00 10.15-11.45 13.30-15.00 15.15-16.45	Inventory Decision Application of Inventory Model in Inventory reduction to achieve market competitiveness Inventory Management in my company	

**The third week**

<b>Date</b>	<b>Subject</b>	<b>Instrutor/Factory Name</b>	<b>Time</b>	<b>Curriculum/meeting place,time</b>	<b>Reference</b>
6/22 Tue	Cost Management	Izuho Yasuhiro(JICA)	8:00-8:30	Introduction of the CM	
		Mayu Swastha(MOIT)	8.30-10.00	Introduction,Production System,Production Cost Structure	
		Novri(APP Jakarta)	10.15-11.45	How to decide manufacturing cost	
		Mayu Swastha(MOIT)	13.30-15.00	Cost Management	
		Novri(APP Jakarta)	15.15-16.45	Actual Cost Analysis	
6/23 Wed		Adil Silalahi(MOIT)	8.30-10.00	Why production cost becomes high ?	
			10.15-11.45	The way of cost reduction	
		Izuho Yasuhiro(JICA)	13.30-15.00	Basic theory to apply cost management	
		Akira Hata	15.15-16.45	Case study of cost management	
6/24 Thu	Factory Visit	P.T Nandya Karya Perkasa	7.00 9.00-selesai	Departure from PUSDIKLAT Factory visit	contact:Mr.Hdi Subroto tel:021-867-7663
6/25 Fri	Preventive Maintenance	Hata Akira(JICA)	7:30-8:00	Introduction of the PM	
		Hafid(MIDC)	8.00-9.30	Introduction & Replacement analysis	
			9.45-11.15	Total productive maintenance	
		Ayi Yudia Bakti(MIDC)	13.30-15.00	Procedure & Process maintenance	
			15.15-16.45	Testify after repair	
6/26 Sat		Buchori Sumarna(MIDC)	8.30-10.00	Introduction & Type of machine tools	
			10.15-11.45	Inspection & Operation of machine tools	
		Hata Akira(JICA)	13.30-15.00	Facility and machine operation ratio and "Chokotei" in automatic line	
		Adhi Saptaputra(Meta Presindo Utama)	15.15-16.45	Preventive maintenance in my company	
	Closing Ceremony	Ditjen IDKM/JICA	17.00-selesai	Certificate delivery, Closing speeches	

### 3. Program Instructors

Instructors who conducted the actual training programs, their fields of specialty, and background are shown below.

#### 3.1 MOIT Instructors

Subject	Name	Sex	Age	Dept.	Academic background	Specialty
Process Control	A	F		IDKM	Bogor University of Agriculture MS of Industrial Engineering from Univ. of Indonesia	Food processing SMEs
	B	M	54	MIDC	B of Engineering	Metalworking
Quality Control	C	M	60	PPEI	BS in Chemistry from Gadj Mada University MA in Economics from IPWI	Industrial standards
	D	F		PUSDIKLAT	MS of STIE (Marketing) from Dept. of Agriculture, Gadjya Mada University	ISO chief examiner
	E	M	58	PUSDIKLAT	Univ. of Bogor Pertania	QC
KAIZEN	F	F		ITI	MS of ITB Engineering	HR/labor relations
	G	F		ITI	B of Engineering	Plant layout
	H	M	54	PUSDIKLAT		
Inventory Management	I	M	53	PUSDIKLAT	MS of STIE in Human Resources and Industrial Relations from Bogor University of Agriculture	Agriculture, food, HR/labor relations
	J	F		STMI	ME	
	K	M	52	PUSDIKLAT	MS of IPWI HRD	HR, labor relations, management
Cost Management	L	M	46	IDKM		
	M	M	51	APP	BE in Chemical Engineering MS in Economy from UNPAD	Textile, finance
	N	M	52	IDKM	ME from USU, and MS in Economics from IPWI	Production control
Preventive Maintenance	O	M	43	MIDC	MBA from ITB	QC
	P	M	46	MIDC	BE	Lathe, CAD
	Q	M	38	MIDC	BE	Welding

### 3.2 Japanese Instructors (Study Team Members)

#### **Mr. A.Hata**

Licensed Engineering Consultant

PL (products liability) Consultant

Licensed Management Relations Consultant

Part-time teacher at the Institute for Small Business Management and Technology

Part-time teacher at High Level Polytechnic Center

Member of Precision Engineering Society and Japan Mechanical Engineering Society

#### Specialty

##### Engineering field

- Developing and applying mechanical devices, production control, process control of mechanical machines
- Development of electric devices

##### Management field

- Development of new devices
- Preparation medium and long term development plan
- Nurturing successors

##### Others

- Human resource development at engineering field



#### **Mr. Y.Izuho**

Licensed Management Relations Consultant (since 1978)

Examiner of ISO9001

Japan Quality Award examiner

Executive Director at Food Safety supporting Organization (NPO)

Part-time teacher at the Institute for Small Business Management and Technology

Part-time teacher at Tokyo Institute Polytechnic University

#### Specialty

- Development of new synthetic fiber based products
- Technical development for a new synthetic fiber related products
- Business and Production Management consultation for supporting industries
- Sales and marketing consultation

### 3.3 Guest Speakers (\* denotes a company visited for field tour)

1) Process control I

Mr. K Yapri, General Manager of PT Tjokro Bersaudara\*, Cikarang

- PT Tjokro Bersaudara belongs to TJOKRO Group, operates repair shops for machine parts throughout the country, and manufacturers automotive parts.
- The company is known for its excellent quality control, one of highest level in the sector.

2) Quality Control

Mr. Hadi Subroto, General Manager of PT Nandya Karya Perkasa\*, Bogor

- The company has developed to an excellent supplier for ASTRA MITRA VENTURA under its foster program.
- Its key engineering technologies are machining and die and tool making

3) KAIZEN

Ms. Alexandra Meity Dhalin, General Manager of PT. Waja Kamajaya Sentosa, Cakung

- She obtained MBA in the U.S. and worked at a few companies including Motorola
- She is involved, among other things, in the improvement of business operations by applying knowledge and techniques learned at the MBA program.

4) Inventory Management

Ms. Yong Ding: Vice president of PT. Indocipta Hasta Perkasa, Bekasi

- The company makes parts for motorcycles.
- Its key engineering technologies are press work, machining, die and tool making, heat treatment, and plating.
- While maintaining flexible production to make a variety of products, it practices cost control by product type and inventory control compatible to the Honda bar code system.

5) Preventive Maintenance

Mr. Adhi Saptaputra: Director of PT Meta Presindo Utama \*, Pulogadung

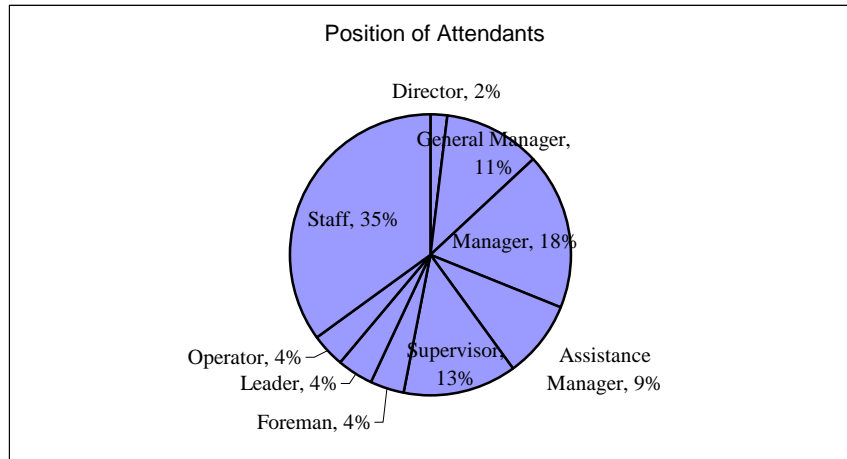
- The company operates a press shop, a die/mold shop, and a plastics molding shop.
- It makes automotive parts and is recognized as an excellent supplier within the sector.
- By emphasizing preventive maintenance, the company successfully maintains high levels of quality and productivity by using a number of second-hand machinery.



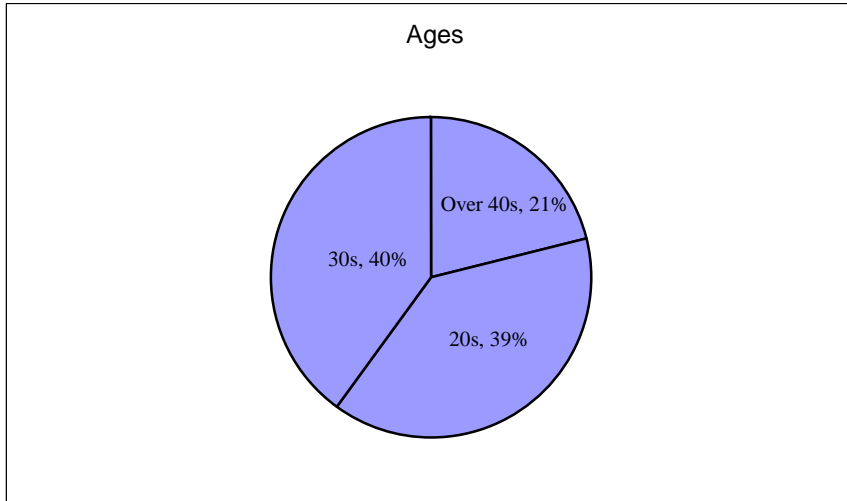
#### 4. General Profiles of Attendants

- Number of attendants: 144
- Male/female composition: 133 and 11, respectively

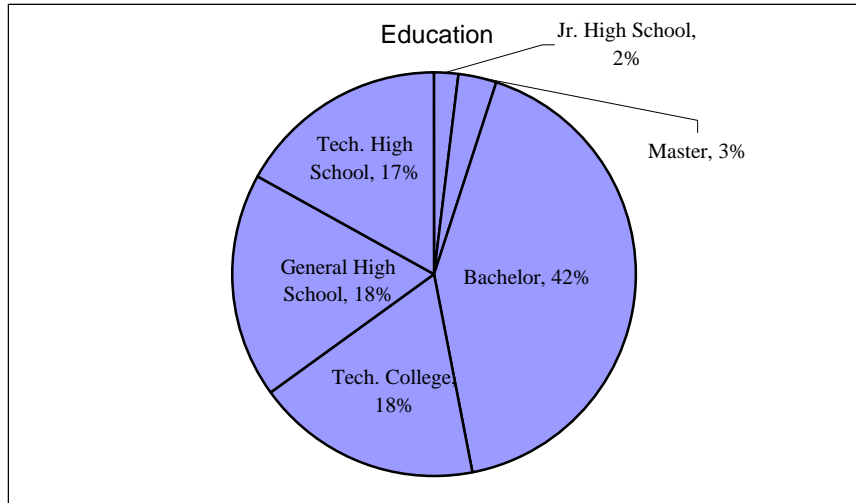
##### 1) Position



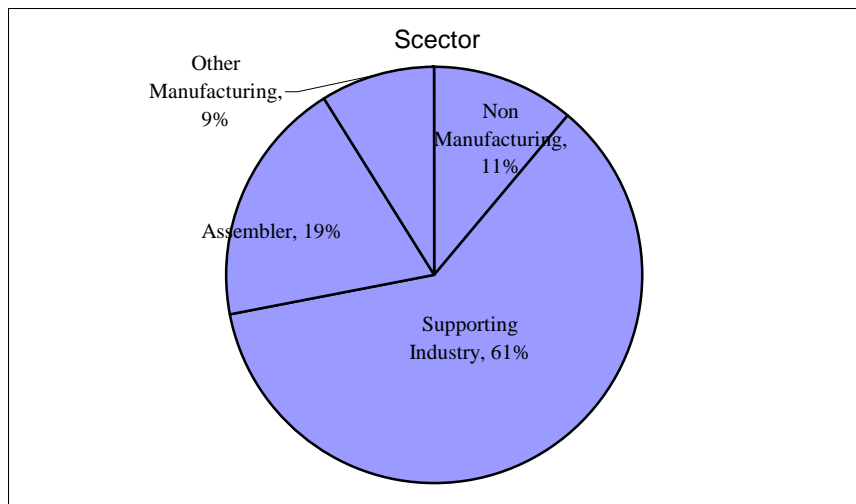
##### 2) Age (average age: 33 years old)



3) Educational background



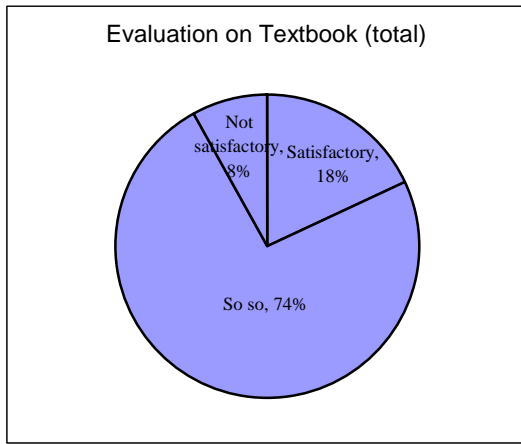
4) Industrial sector



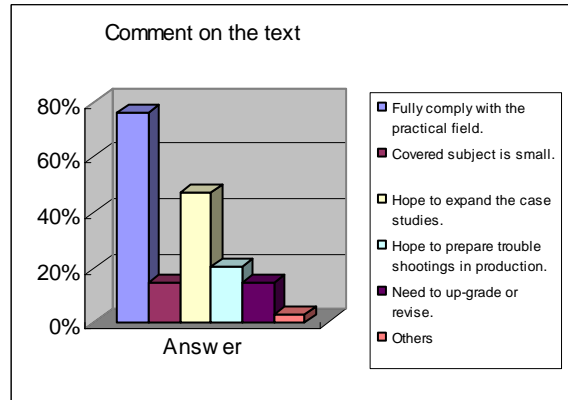
**5. Evaluation by Attendants (Questionnaire Survey)**

During the model training program, a questionnaire survey was conducted for attendants to collect opinions and suggests useful for future program design and implementation. Questions mainly concerned about: 1) textbooks; 2) program evaluation; 3) intent to participate in a future program; 4) impression on instructors; 5) impression on factory visit; 6) impression on guest speakers; and 7) requests and expectations for the program.

1) Textbook

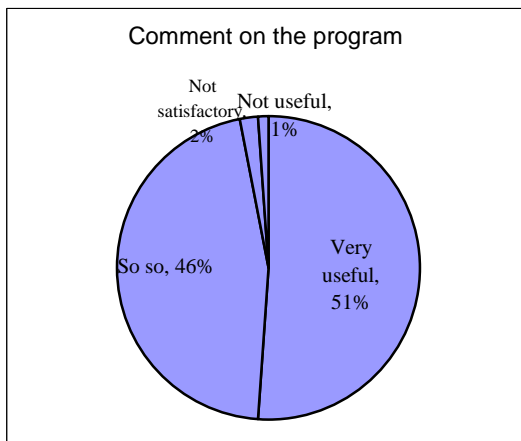


A dominant share of responses are neither satisfied nor dissatisfied, strongly suggesting the need for continuous upgrading.

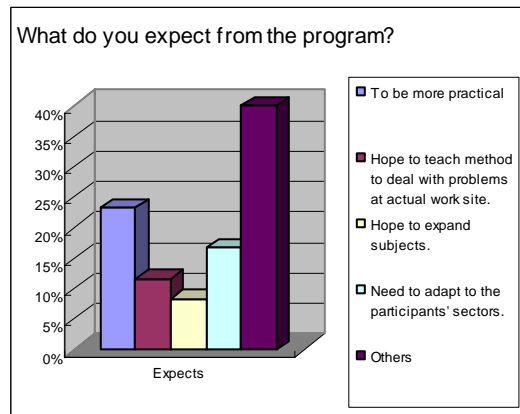


While most attendants consider the textbook to reflect field conditions to some degree, many expect more case studies.

2) Program evaluation

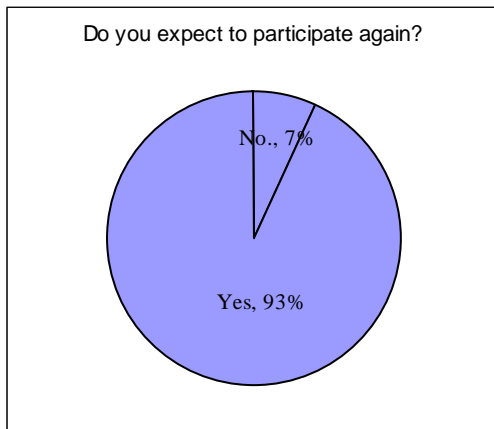


Majority of responses think that programs they have attended appear are very useful. To gain a higher percentage of the favorable response, however, the upgrading of the curriculum as well as the development of a new curriculum is essential.

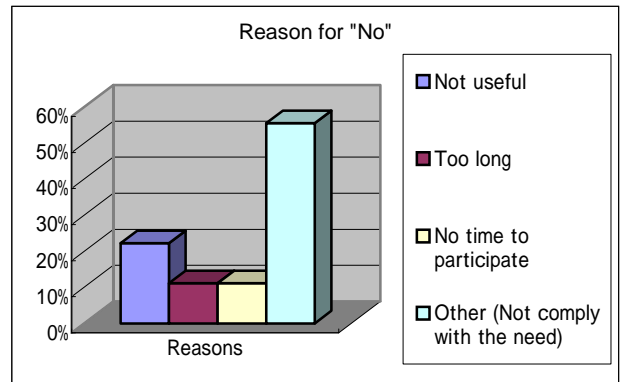


While "Others" accounts for the highest percentage, many responses demand longer training hours and a more detailed lecture and instruction.

3) Intent to participate in the future program

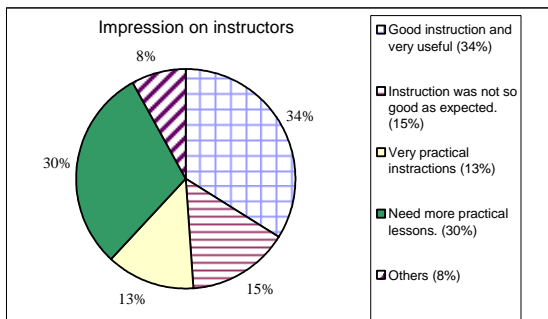


Most participants expressed the willingness to attend at a future program under the same or similar theme. Reasons for negative responses are summarized on the right.



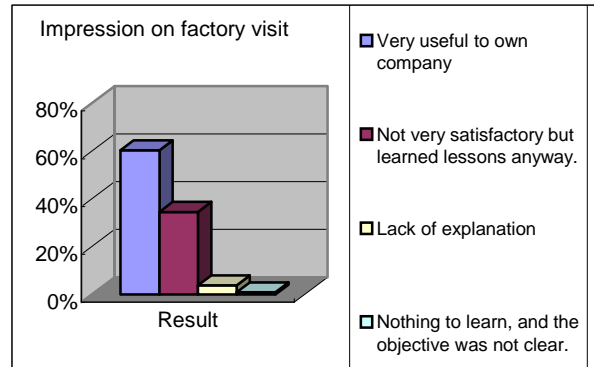
While “Others” accounts for the highest percentage, it mainly consists of reasons associated with “the program fails to meet the needs.” This stems from the fact that the program admitted participants from non-manufacturing sectors, for whom the program content was very different from their own business environment.

4) Impression on instructors



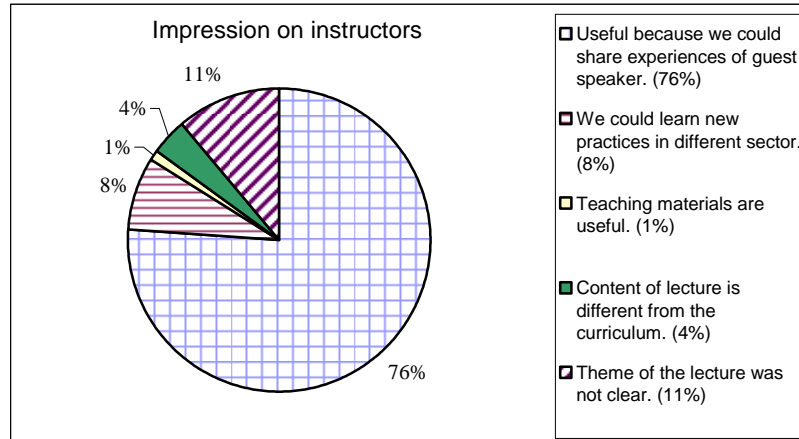
Approximately one half of respondents gave favorable evaluation, including good instruction and useful, and practical instructions. On the other hand, 30% were not satisfied as they felt more practical lessons would be needed, suggesting the need for continuous upgrading.

5) Impression on factory visit



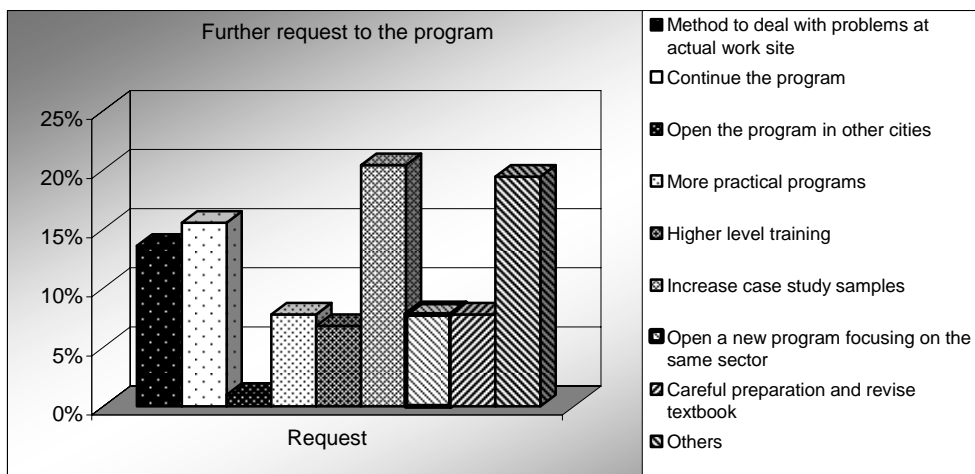
Most responses were positive and favorable. Nevertheless, some respondents felt that they were not able to learn factory’s quality control activities operation due to the lack explanation, which should be carefully analyzed for further improvement.

6) Impression on guest speakers



Special lectures by guest speakers were highly appreciated by many respondents on account of practical content and usefulness. It is therefore recommended to include special lectures in each program on a continuous basis.

7) Request and expectation for the future program



The highest percentage of responses want “more case study samples,” followed “continuation of the program” and “method to deal with actual problems.”

**6. Opinions and Recommendations by MOIT Instructors**

For most MOIT instructors, teaching production control technology for manufacturers was the first experience. To hear their impressions and opinions on the program as well as

recommendations for future program improvement, a questionnaire survey was conducted. Excerpts are shown below, according to category.

1) Lecture and field guidance

- Special lectures by guest speakers and factor visit have made program content more practical and field-oriented than expected.
- Actual teaching has made me realize that I need more teaching experience. I would like to learn more in the TOT program, if any.
- I have to improve presentation skills.
- I am glad to have participated in the program as instructor and I want to continue to serve this way.
- I was pleased to hear a lot of questions from participants, concerning actual problems in the production process, which also made me realize that I would have to work harder to improve instructor's skills.
- I want to conduct a training program for participants who work for a same manufacturing subsector.
- The program will become more effective by incorporating more practical elements into the curriculum, such as case studies, problem solving techniques, and factory visit.
- Textbooks and course materials should continuously be updated and upgraded to make the content that is applicable to the actual production process.
- I expect a further enhancement of the TOT program, including the extension of the program period.

2) Program implementation and curriculum development

- Prior to the start of the program, related parties should establish and maintain effective communication concerning the teaching method and organization.
- Discussion should be made to develop a curriculum that effectively addresses the needs of participants as well as course materials that are not overly theory-oriented.
- In addition to instructors, experts of the MOIT and the JICA and other stakeholders should be mobilized for the exchange of opinions and ideas.
- The program schedule should include more time for communication between instructors and participants, which would allow instructors to recognize what should be done to improve the teaching method.
- Preparation of case studies requires guidance and advice of an expert with rich field experience.

- The program can be provided more efficiently by focusing on participants in a similar industry.

3) Proposals for program upgrading and enhancement

- To promote further improvement of instructors' skills, sending them to overseas training that provides an advanced level of TOT should be considered.
- The TOT program should continuously be provided in the future to ensure stable supply of instructors in terms of both quality and quantity.
- Overseas study to compare various training programs should help instructors to gain experience.
- Local efforts may be limited and foreign assistance is needed to improve quality of the overall program.

**7. Evaluation on the model training program by Japanese advisors and recommendations for improvement**

Two study team members, who served as instructors for the TOT program, acted as advisors for the model training program by participating in all the lectures and providing support for MOIT instructors. Their evaluation on each of the six programs and recommendations for improvement are summarized below.

(1) Process Control

[Quality of lecture and instructors]

The lecture was centered on the basic concept of production planning, various theories, and detailed planning of production processes. One instructor appeared not to digest theories very well. Another instructor had abundant field experience and was not able to show it in his lecture effectively. He should have confidence in himself.

[Guest speaker]

The guest speaker presented examples of QC, PC and Kaizen activities, which were carried out at his company. The lecture was very specific and well received by participants. Hopefully, he will be able to provide continuous support for the program.

[Recommendation for improvement]

Efforts should be made to relate the instructor's experience to his lecture effectively to improve understanding. At the same time, the lecture should be well rehearsed to develop enough confidence before actual presentation.

(2) Quality control

[Quality of lecture and instructors]

After the discussion on "Introduction & Concept," three instructors discussed, in turns, "7 QC tools" including an outline, a preparation method, and applications. In fact, some instructors of other teams, specialized in QC, questioned effectiveness of the lecture on "7 QC tools" because most participants knew about the tools. In reality, however, the QC tools are not widely used on the shop floor, and the lecture has been effective in making many participants realize their usefulness and actual use.

[Guest speaker]

The special lecture focused on defects and the process of their occurrence. Discussion was rather general and it would have been more useful for participants if the company's QC system and successful cases had been presented.

[Recommendations for improvement]

The following themes should be included in the program in the future:

- 1) The method for developing an internal quality control system;
- 2) The methods for product inspection and data utilization; and
- 3) The methods for control chart preparation and utilization.

(3) KAIZEN

[Quality of lecture and instructors]

The lecture mainly dealt with ergonomics, while touching upon IE and work study. Discussions on material handling, importance of Kaizen, and ergonomics were well organized and presented. As for comparison of Kaizen concept, however, discussion was limited to the introduction of reference materials.

[Guest speaker]

The speaker introduced an example of quality improvement for products shaped by a 500-ton press at her company, which attracted attention of participants. According to the



speaker's presentation, field production control is led by the president, suggesting the need for training a new leader.

[Recommendation for improvement]

The lecture should emphasize more on practical examples and their application.

(4) Inventory management

[Quality of lecture and instructors]

During the discussion on "Introduction & Concept," the lecture on importance of inventory management by relating it to the degree of customer satisfaction was very persuasive and effective.

Then, the inventory management method was discussed by focusing on the just-in-time/kanban system, EQO (economic order quantity), and MRP (material requirement planning). Generally, the lecture seemed to be rather difficult for participants who came from SMEs that mainly machined parts. However, the second half gave a detailed discussion on EQO and MRP by showing various examples, successfully encouraging the understanding by participants who showed strong interest.

[Guest speaker]

The special lecture, although rather general, dealt with the company's procurement, contract administration, and delivery control practices in relation to inventory management, which seemingly provided useful information for participants.

[Recommendation for improvement]

A Japanese instructor introduced the reduction of work-in-process inventory – a critical cost reduction factor for the Indonesian manufacturing sector. In the future, it is recommended for the MOIT instructors to focus on basic knowledge, including the method for materials procurement using the constant/periodic order system, and the method for reduction of work-in-process inventory.

On the second day, a game to compete on assembly of blocks was held. Although participants showed enthusiasm, it was not exactly related to inventory management. It can be modified to include elements of procurement and work-in-process inventory management.

(5) Cost management

[Quality of lecture and instructors]

The textbook is excellent as it describes cost management systematically and consistently from cost accounting to cost control based on standard cost.

On the other hand, the lecture was not appropriate in that major portions of time were spent on the method for valuation of balances in the materials receipt and requisition table, direct cost and break-even point calculations, the method for overhead cost allocation, and use of control charts, as well as exercises using data.

[Guest speaker]

Unfortunately, the special lecture was not held as the guest speaker cancelled the appointment without prior notice.

[Recommendation for improvement]

At present, most SMEs in Indonesia have still to practice true cost management. For instance, among the manufacturers that sent their employees to the program, only two (Japanese) have adopted the standard cost accounting system, which is a basic element of modern cost management. Under these circumstances, an emphasis should be placed on the teaching of the cost management system that should be adopted by SMEs and the method to introduce the system.

(6) Preventive Maintenance

[Quality of lecture and instructors]

The lecture covered general principles of preventive maintenance, the concept of equipment upgrading, general description on machine tools and maintenance, welding operations and related examples. It was based on field experience and was well organized and interesting, except for some subjects that were not fully covered due to time constraint.

[Guest speaker]

The special lecture was very comprehensive as the speaker explained the company's PM activities by showing actual charts and records. Methods presented seem to be applicable to other companies. Clearly, it was very useful for participants. In addition, support staff that came from the speaker's company was highly competent and contributed greatly to the excellent presentation.

[Recommendation for improvement]

The lecture was generally good and well organized. In the future, it can be further improved by expanding the coverage of PM fields and rehearsing the lecture in advance.